THE MAGAZINE OF THE INSTITUTE OF ENERGY

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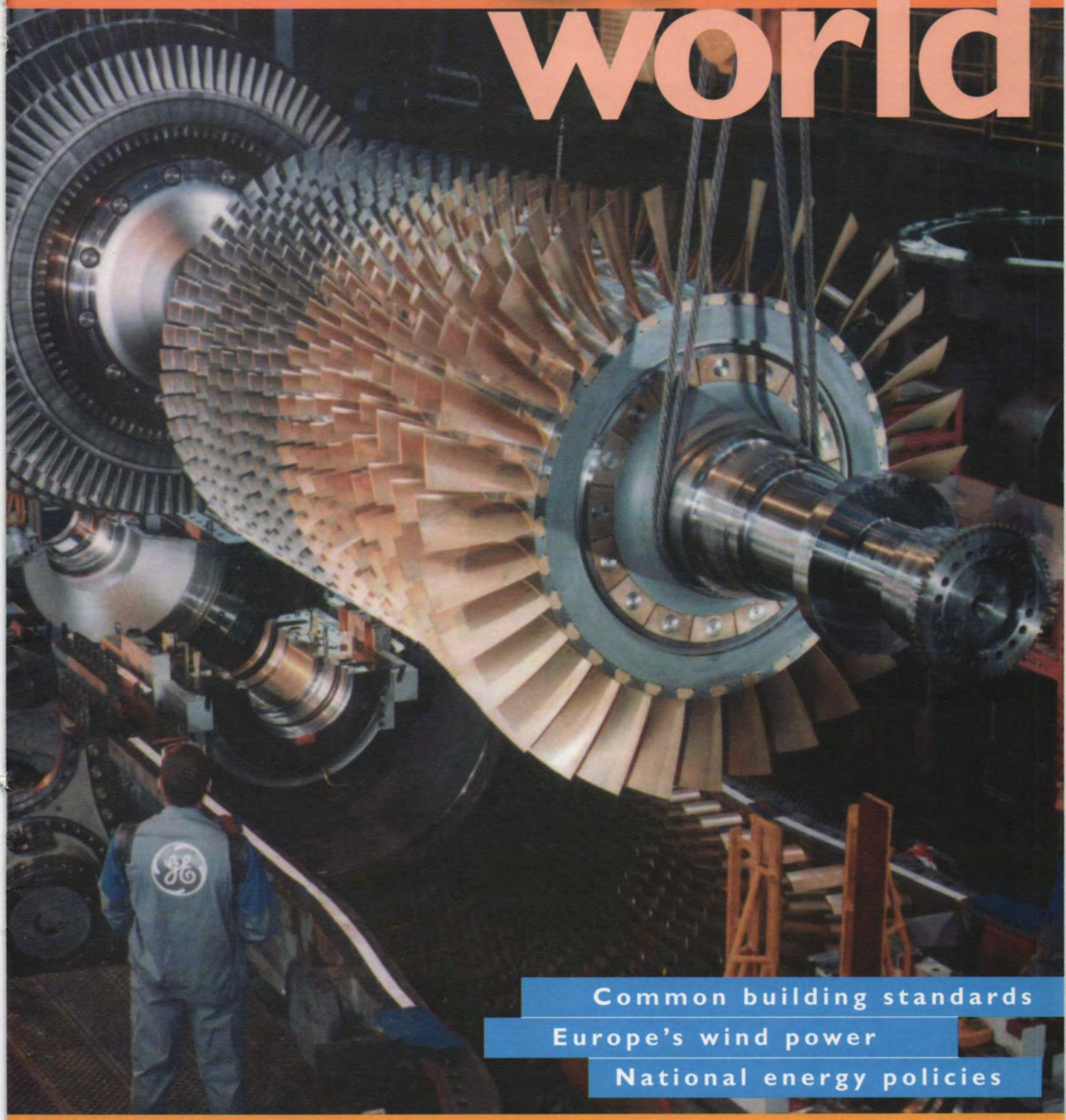

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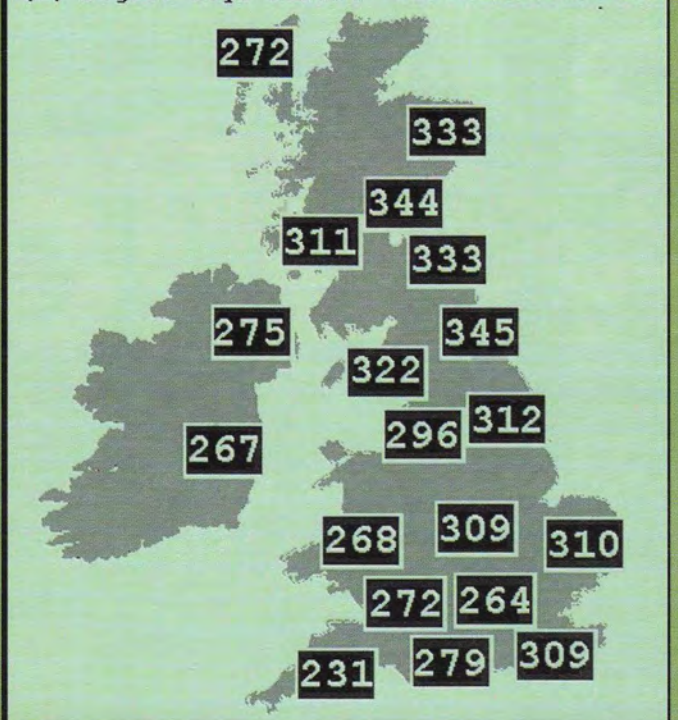

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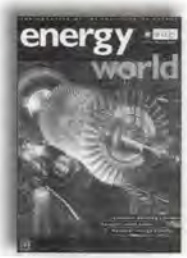

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COVER

Belfort, France - GE Power Systems is uprating one of its gas turbine models to offer increased output. Together with renewable energy generation projects, gas turbines form the heart of many of the 'distributed generation' schemes which have begun to shift national electricity systems from relying on a few large, centralised generating plants, to at least partial reliance on many more, small disbursed schemes. This issue of Energy World examines shifting energy policies and practices across Europe - from the growth of wind power to modernising district heating in ex Soviet bloc countries.

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Overcoming barriers to cutting carbon

Tom Delay, chief executive, The Carbon Trust

In recent years the debate over climate change has shifted decisively. No longer do serious people ask the question *whether* something is wrong. There is a broad consensus that climate change, triggered by the greenhouse gas build-up, poses a wide-scale environmental threat, with serious consequences for industry and economic performance. The emphasis now is on what to do. The search is on for mechanisms and technologies that will make a difference and avert the threatened disasters.

The Kyoto summit in Japan in 1997 was a turning point. For the first time, the international community - 180 signatories including the United States - accepted that climate change could not be tackled without legally binding commitments to cut greenhouse gases.

Looking further down the road, the Royal Commission on Environmental Pollution has set a target of cutting greenhouse gas emissions by 60% by 2050, as the UK's contribution to tackling the global problem of climate change.

Can that target be met? The good news is; yes, it can be. A study commissioned by The Carbon Trust and carried out by the Imperial College Centre for Energy Policy and Technology last year, concluded that the 60% target is technically feasible without harming prosperity.

No problem then. We can all stop worrying. Unfortunately not. The study also concluded it will require a sustained programme of innovation and the introduction of new low carbon technologies to meet the target. It also found that a whole range of barriers had to be overcome if what is possible technically becomes reality.

It is the role of The Carbon Trust to ensure that these barriers are overcome. The Carbon Trust is a unique model of partnership. It is a not-for-profit company, Government-backed but business-led. Its creation reflects consensus between Government and business about the practical support required to deliver the UK's Climate Change Programme while truly helping businesses.

That is because the partnership approach of The Carbon Trust has business needs at its heart, whilst involving expertise from other sectors. The Carbon Trust board, chaired by Ian McAllister, Chairman and Managing Director of Ford UK, is made up of high-level representatives from business, the research world, trades unions, NGOs and government – all determined to ensure that business gets a competitive advantage whilst delivering real success in tackling climate change.

Our remit came directly from the Prime Minister and is to "take the lead on low-carbon technology and innovation in this country and put Britain in the lead internationally."

I don't underestimate the problems. Climate change is a very difficult concept to sell. You're looking at something 50 years in the future, knowing that if you do a fantastic job and everything goes right, the result is that nothing happens - we stabilise the climate. That's not a good marketing proposition. Except that the alternative view is Armageddon.

We have to jump a great number of hurdles from conflicting government policies and gaps in funding to public attitudes. We have to overcome market failures and barriers. For instance, small businesses often cannot raise seed capital. Larger businesses might have invested in research and development but cannot fund a demonstration scheme. Businesses small and large face informational and behavioural constraints that make many so-called 'cost effective' initiatives non-viable.

The Carbon Trust will be investing for the short, medium and longer-term and it will be investing for a carbon return, not just a purely financial return. I'm encouraged by the fact that there is a growing awareness in business that cutting greenhouse gas emissions – once thought to be economically costly and a threat to business, is in reality, a huge business opportunity.

Businesses face the choice between being leaders or laggards. And the laggards face pressure from a number of directions; from Government, reflecting the concerns of voters, directly from consumers through 'green purchasing', and indirectly through shareholder democracy, concerned about the long-term value of their investments. The opportunities for business are two fold. Firstly, they can make themselves more competitive by cutting their energy costs, thus safeguarding profits and employment. Secondly, they can achieve growth by adopting new low carbon technologies. Don't forget that 80 countries have signed up to the Kyoto protocol. They form a huge potential market for products based on low carbon technology.

I believe the UK's Emissions Trading Scheme, the first of its kind in the world, will have a significant impact on business attitudes. It is due to come into effect in April and puts a monetary value on carbon emissions. Those businesses that can better their emissions reduction targets can trade the extra emissions credits with other companies thus making a real financial return from reducing their impact on the atmosphere.

This will mean that carbon emissions become the concern of the managing director rather than just the energy manager. Success and failure in this area becomes very transparent because it will be reported on the company balance sheet.

So, although we have taken on a big job, I am optimistic. To achieve our aims we need concerted action and support from the Government through smart regulation and incentives from business through the development and deployment of technology, and ultimately acceptance from the public. Success will lie in getting a broad range of stakeholders to pull together.

the institute of energy

ENERGY MANAGEMENT ONE DAY COURSE

Do you need guidance on energy management? Would you like to meet your energy efficiency targets more effectively? Do you need support to reach environment targets?

The Institute of Energy, the professional body for the energy sector, is a leading provider of energy management training and has developed a comprehensive one day course, covering all aspects of energy management to assist you in meeting your energy costs effectively.

The Energy Management course will enable energy professionals and newcomers to the industry to keep up to date with recent developments in energy management and participate in valuable discussion on topical issues.

This course includes information on the National Standards for Managing Energy, the national benchmark for the energy management profession.

" I was fairly new to Energy Management and I found the course extremely useful and informative. The presentation and course material were both comprehensive and broke down into easy to understand sections. The course provided useful toolkits for preparing energy audits in both my own building and customers sites. I would recommend this course to anyone new to Energy Management or needing an update in the current market."

Claire Manning, Account Manager, GM Associates

The course covers all aspects of energy management including:

- Energy policy;
- Energy management structure and accountability;
- Investments for energy efficiency;
- The National Standards for Managing Energy;
- The principles of monitoring and targeting;
- Staff awareness and motivation programme;
- Introduction to site services; and
- Additional topics according to participants interest.

PLUS you will receive follow-up support from your facilitator to assist and advise you in applying these principles to your current role.

Courses are being held in London and Sheffield and cost £125 for InstE Members and £175 for Non-Members. Please see reverse for dates, locations and registration.

www.instenergy.org.uk

Programme

09.30	**Registration & Coffee**
10.00	**Introductory Session**: What do we want from today? What is energy? Climate Change? Fossil, Nuclear and Renewable Energy? Energy Efficiency? Energy Management? Energy Technology?
10.45	**Important Technologies**: Lighting; Heating & Air Conditioning; Combined Heat & Power; Renewables.
11.30	**Coffee**
11.45	**How do we begin?** Policy and the three year plan; The actions and their presentation; Will the Board support it? Monitoring & targeting; Staff involvement.
12.30	**Discussion**
13.00	**Lunch**
13.30	**The Standards for Managing Energy**: To help you define your job better; As a route to a qualification.
14.00	**What does the future bring?** Climate Change Levy; Emissions Targets; Am I doing my bit? Energy Efficiency Accreditation.
14.45	**Workshop**
16.15	**Close**

Registration form

Please complete one registration form per delegate. This form may be photocopied if necessary.

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☐ 28 February (London) ☐ 17 April (Sheffield) ☐ 6 June (London)

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Terms and conditions: Cancellations received in writing up to 10 working days prior to the date of the course will be subject to a 25% administration charge of the total remittance. No refunds will be made for cancellations received after this time or for non-attendance. However, we are happy to make substitutions at any time before the event. We are not able to confirm any bookings until after payment is received. The Institute of Energy reserves the right to alter the programme without prior notice.

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Conoco, Lattice to build major new CHP plants

Bucking the recent trend for a severe slow-down of CHP activity in the UK, two major new CHP plants were announced in January, including one of Europe's largest.

Conoco Global Power (UK) has given the go-ahead for a 730 MWe plant, one of the largest in Europe, to be built alongside its Humber refinery at South Killingholme, North Lincolnshire. The South Humber bank is one of the very few areas in the UK capable of sustaining a CHP plant of this size.

Construction will begin immediately on the plant, on land owned by Conoco, with completion expected in early 2004.

The facility will supply steam and electricity to the refinery, steam to a neighbouring refinery and electricity to the national grid. It also will have the capacity to provide an alternative, highly efficient and competitive source of power and heat to other companies on the South Humber Bank.

The plant will substantially reduce atmospheric emissions of carbon dioxide, sulphur oxides and nitrogen oxides compared with power generation by conventional means. The plant will also make better use of certain by-products of the refining processes; reduce surplus gas flaring; and conserve water resources by using existing waste water for cooling, rather than fresh water, says Conoco.

Meanwhile, Lattice Energy Services is to build what it calls the 'largest multi-engine CHP plant in the UK' at Cleveland Potash Limited (CPL), located at Boulby Mine in Cleveland. The company, which produces potash used for fertilisers and road salt, currently uses medium fuel oil to fire its massive rotary kiln dryers.

CPL has signed an £11 million, nine-year contract with Lattice for the design, construction, operation and financing of a 16 MWe plant which will not only fuel the production process but will also generate enough electricity to substantially reduce the company's demands on the national grid.

An 8 km connection pipeline is being laid from Brotton to the mine at Boulby which will feed a new energy centre housing five 3.2 MWe generators. Annual gas consumption to CPL will be around 20 million therms, representing one of the largest new gas loads on the Transco system in 2001/2. The new pipeline will be owned by ES Pipelines Limited, who are actively seeking to connect additional loads to it.

The CHP plant should deliver a reduction in carbon dioxide emissions of 20,000 tonnes per annum, equivalent to the carbon dioxide emitted by 60,000 cars, says Lattice.

New lease of life for historic Argyll field

Two companies new to operations on the UK Continental Shelf, Tuscan and Acorn, have been awarded licences to restart production from the UK's oldest offshore oilfield - Argyll. The field was famously opened by then Energy Minister, Tony Benn, in 1975, but was abandoned ten years ago when it became uneconomic to recover the remaining oil. Less than 40% of the oil had been retrieved.

Announcing the awards, Energy Minister, Brian Wilson said: "Tuscan and Acorn will use the latest technology to reopen Argyll and extract more of the remaining oil. Subsequently they should be able to reopen the old Duncan and Innes fields too, both of which were abandoned at the same time as Argyll. It's good to see two small new British companies, taking a fresh and imaginative look at the opportunities in the North Sea, and introducing productive new alliances with the supply chain."

In a second out-of-round, award Wilson gave a boost to the DTI's 'fallow field' campaign by authorising ATP and CalEnergy to start work on the 43/21a gas discovery, which has been lying fallow for the past ten years. Wilson said: "ATP is one of the new entrants that DTI has been working hard to attract to the UK to bring work to our Fallow Discoveries.

Britain's sixth largest array of photovoltaic panels has been incorporated in the latest business units to be completed at the Welsh Development Agency's Dyfi Eco Parc, Powys in mid Wales. They will help tenants become self-sufficient in their consumption of electricity.

The two 300 m² units are the latest additions to the Eco Parc; the three existing 'environmentally friendly' units provides employment for 65 people. The new units incorporate passive solar heating, natural ventilation, exceptionally low embodied energy, recycled newspaper/cellulose insulation within timber walls, and a methane gas heating system. Built with locally-sourced materials where possible, the units have been awarded the highest possible grading by the BRE's Environmental Assessment Method (BREEAM).

Young Woman Engineer of the Year

Design engineer with Yorkshire Electricity Clare Roberts has won the 'Young Woman Engineer of the Year 2001' award sponsored by the Institution of Incorporated Engineers in London. With the title comes the responsibility of raising the awareness of engineering as a career opportunity for women, a challenge that she is keen to face.

Clare developed an interest in engineering relatively late in her career, and it was her rapid progression from a clerical role to a full design engineer that impressed the judges. At the age of 24, working as a clerical assistant within a team of engineers, Clare found herself becoming frustrated when attempting to understand the technical jargon used by her colleagues. With no formal technical training behind her, Clare successfully persuaded her CEO to support her re-entry into education. Her ambition and sheer determination soon ensured that Clare became the first non-graduate ever to complete the Yorkshire Electricity graduate scheme.

Now, having completed an ONC and HNC in Electrical and Electronic Engineering, Clare has firmly established herself within Yorkshire Electricity, proving, as she said, "that engineering is no longer a man's world".

Clare's current role focuses on the design of minimum cost electrical schemes at the customer's request for high and low voltage connections. She is a customer-focused engineer with a can-do attitude and innovative approach to the development of engineering solutions.

Clare Roberts, clerical assistant turned design engineer

Waste treatment plant to include steam turbine

A new, £7 million waste-to-energy plant being built at Crymlyn Burrows near Neath in South Wales will include a 4.5 MW steam turbine built by Peter Brotherhood Ltd. The turbine will produce electricity to power local council buildings and street lights using fuel derived from domestic and commercial refuse.

The new 4.5 MW steam turbine

The waste-fuelled power station is part of a £32 million integrated waste treatment plant, which will also include recycling and composting, that is being developed by HLC (Neath Port Talbot) Ltd. Mixed municipal wastes from local homes and business will enter the treatment plant and be separated into various streams for recycling, composting or processing into fuel.

The refuse-derived fuel will comprise mostly low-grade paper, wood and plastics - about 30% by weight of the mixed waste stream that enters the plant.

Almost half of the 4.5 MW of electricity generated will be used to power the facility itself and the balance will be used by Neath Port Talbot County Borough Council in council buildings, street lighting, etc.

The contract with Peter Brotherhood has been placed by Nifes Energy, one of a number of specialist equipment suppliers and contractors involved in building the plant. The turbine will be commissioned early this year and the plant is expected to be operational by the summer.

Operator of the Cottam Power Station in Retford, Nottinghamshire, the London Power Company, has renewed its contract with waste management company the OSS Group for the supply of more than 60,000 tonnes of recycled fuel oil (RFO) per annum.

This five year contract represents the largest recycled fuel oil contract in the UK energy sector. Used at Cottam as a replacement for heavy fuel oil (HFO), RFO provides significant cost savings and has other benefits compared to HFO, such as a lower sulphur content and better viscosity, removing the need for pre/trace heating, says OSS.

2002 the 'year of renewables' - particularly in Scotland

The Government's Renewables Obligation, which comes into effect on April 1st, will transform the market for alternative generation technologies, according to Energy Minister, Brian Wilson. The Minister has also said that 2002 will be "the year of renewables" in which the potential contribution of power generated from clean sources will finally be recognised in the UK.

The Obligation will require the electricity companies to purchase a proportion of power from renewable sources at a premium price. At present, less than 3% of electricity in the UK comes from renewables. The Government, which is committed to a 10% target by 2010, has said that regional targets are to be established throughout the country to help ensure that reasonable expectations are set and monitored.

The Government, said Wilson, is investing £260 million in the development of renewable technologies over the next three years. In addition, the Renewables Obligation will guarantee at least a £750 million market for electricity generated from renewable sources by 2010.

Meanwhile, the Minister has also announced plans for a cluster of wave power stations in the Western Isles, and new funding for tidal energy research in Scotland.

Scottish and Southern plc are working with Wavegen to develop a proposal for a cluster of offshore based wave power stations in the Western Isles. These are intended to be technically innovative and to act both as demonstration plants and as commercial generators to supply Scottish and Southern.

"It is their hope and intention that a key feature of these plans will be the use of the former Arnish fabrication yard for manufacturing" added Wilson: "The use of Arnish for this purpose is entirely compatible with the intention of Amec and British Energy to use the yard for manufacturing purposes related to their proposed windfarm on Lewis."

On the related, tidal energy front, the DTI is to provide £1.1 million of renewables technology funding to support the development of a full size 'Stingray' device prototype, which generates electricity from the oscillatory movement of hydroplanes driven by flowing tidal current. A farm of such devices would convert tidal movement into electricity on a commercial scale.

Technological development and manufacture of the device by Business Engineering Ltd will take place in Wallsend, Tyneside, while the proposed location for its operation is Shetland. The machine will be located on the seabed reducing the need to protect it from stormy weather.

These announcements come on top of the release of plans to build what would be Europe's largest - 600 MW - wind farm on the isle of Lewis (see *Energy World* February 2002) and of a study into the feasibility of building an offshore electricity transmission grid off the west coast of Scotland and England in order to deliver the power generated to consumers (see *Energy World* January 2002).

A tracking solar water system from Magpie Technologies has won the local authorities category of the Eurosolar 2001 award for Halton Borough Council, Widnes near Liverpool.

The 'Solar Tracker' was bought by the Council a year ago to power a new hot water system for an eight storey building. It has generated 30,000 kWh of energy and saved the Council some £1500 in its first year. The judges praised the project for its "readily quantifiable results with clear environmental benefits which can be seen on the balance sheet". Several other councils are now said to be looking to follow Halton's lead.

Towards a new PV production plant

UK solar technology leader the Intersolar Group has been awarded a DTI grant to begin work on plans for a 10 MW 'thin film' solar cell production plant for the UK. If it goes ahead, this would be the largest thin film plant in Europe.

The initial research, costing a total of £1.2 million, will take around two years and will incorporate the development of new thin film processes for high volume production. The current high cost of solar is largely due to low production levels at relatively high fixed costs, says Intersolar. The company believes that a 10 MW plant would be able to reduce the cost of solar cells to $1 (£0.70) per watt. The DTI is funding 35% of the project costs.

Intersolar Group is the country's only producer of the latest generation thin film solar cells. The company has pioneered an innovative high rate deposition process at its integrated production plant in Bridgend, South Wales.

New power plants from Siemens for Portugal, Italy and Israel

New gas-fired power plants in Portugal, Italy and Israel will be built by Siemens Power Generation (PG) under contracts worth a total of euros 600 million.

Near Lisbon in Portugal, a consortium lead by Siemens is building a 780 MW turnkey combined cycle power plant comprising two units, with an option for a further 390 MW plant to be built at the same site. Negotiations on a long-term service contract for this power plant are now in progress. Siemens will supply two gas turbines, two steam turbines, the associated generators as well as electrical and I&C systems.

Together with Fiat Engineering, PG is also constructing a 380 MW combined cycle power plant in Montcalieri near Turin, to supply the city of Turin with electricity and district heating. When used exclusively for power generation, this plant will be capable of providing 380 MW into the grid or, by reducing electric output, supplying up to 260 MW to the district heating system.

The state-owned power provider Israel Electric Corp (IEC) has selected PG to supply equipment for three combined-cycle power plants - each rated at over 370 MW. Siemens PG will supply one gas turbine, one steam turbine, the associated generator, the boiler as well as auxiliary systems for each of the three IEC plants, which are to be built near the cities of Lod and Haifa. The plants will initially be run on diesel fuel, later on natural gas.

New coking facility for Germany

Power and automation technology group ABB has won a $32 million contract from ThyssenKrupp Steel AG to act as general electrical contractor for a new coking facility at a plant at Duisburg Schwelgern in Germany's Ruhr area. The new plant, with the largest coke oven in the world and an annual production of 2.5 million tonnes, will produce coke for ThyssenKrupp's steel manufacturing.

ABB will supply the plant with the equipment for electrical power and industry automation. This includes medium and low voltage substations, transformers, process automation, measurement and control technology, as well as analysis technology.

ABB says its industrial information technology will measure and control manufacturing, safety and environmental processes at the plant, which will provide coke for blast furnaces. The plant, scheduled for completion in 2003, is among the largest ABB Industrial IT projects to date.

BP, Chevron Texaco turn to wind

BP and ChevronTexaco are to join the wind power age by building and operating a 22 MW wind farm at their jointly-owned Nerefco oil refinery near Rotterdam in the Netherlands. The project is subject to planning and other consents.

The $23 million scheme is due to begin operations in the second half of this year and will be the first substantial use of wind turbine technology for both oil companies. It will generate electricity equivalent to the consumption of 20,000 households, displacing 20,000 tonnes of carbon dioxide a year, says BP. The electricity will be sold locally and support the Dutch national target for renewable energy generation.

2001 'second warmest year on record'

The year 2001 was the second warmest globally since record keeping began in 1880, according to the US National Oceanic and Atmospheric Administration (NOAA). Only 1998 ranked higher, and temperatures that year were boosted by strong El Nino conditions. In contrast, 2001 began with weak La Nina conditions, which tend to depress global average temperatures. Temperatures in the United States were also above average; the year ranked as the sixth warmest since record keeping began in 1895, adds NOAA.

Separately, cotton yields are predicted to increase in the southeastern US if carbon dioxide levels continue to rise and farmers are able to adapt their practices to the resulting climate change, according to a new study by the US National Center for Atmospheric Research (NCAR).

It is thought that increased atmospheric carbon dioxide will enhance plant growth by stimulating photosynthesis. Increased cotton yields up to 36% are projected where farmers adapt to a longer growing season.

Three 5 MWe generator sets are to be supplied to and commissioned at a major food manufacturing company in Taiwan by UK genset packager Centrax Gas Turbines. The order was placed by Rolls-Royce Australia. The 60 Hz, 11.4 kV units will provide up to 15 MW of electricity and 35 MW of waste heat for the site. In order to meet local earthquake requirements the units will have to achieve a specific seismic specification of 0.3 g (approximately 6.5 on the Richter scale).

Government says yes to new nuclear plant in Finland

The Government has made a favourable 'decision-in-principle' on plans to build a fifth nuclear power plant unit in order to meet projected rising electricity demand in Finland. The majority decision-in-principle is subject to ratification by Parliament. In addition, the Government made a separate decision-in-principle, also subject to ratification by Parliament, on the final disposal of spent nuclear fuel accrued from the operation of the new nuclear power plant.

Finland's energy industries and major users have been lobbying for permission to build a new plant at one of the two existing nuclear sites for some time - see *Energy World* June 2001. The two parties - linked by partial ownership of the major nuclear operator by its industrial customers - say there is very little scope for increasing its power imports from neighbouring countries and that Finland already makes extensive use of renewables (particularly hydro) and biomass-fuelled CHP.

Ms Sinikka Mönkäre, Finnish Minister of Trade and Industry added that the country has, due to international emissions reduction commitments, to find means to replace coal in electricity production. The Government will also support the development of new renewable generating capacity and further energy efficiency measures, but the go ahead is based on the view that the nuclear power alternative is most cost-effective both in terms of the central government finances and the national economy, says the MTI. The project should also lead to a more stable electricity price in Finland.

If ratified, the decision-in-principle remains in force for five years, during which time the company has to submit an application for a construction licence in accordance with the Nuclear Energy Act.

See page 19 for further coverage.

Gearbox technology usually seen in wind turbines is being used in a major new hydro-electric project designed to provide power to Kasendorft, a small city near Karlsbach, in Germany. A two-stage gearbox from Brevini UK's standard range is providing efficiencies approaching 96% on the largest hydraulic wheel for generating electrical power ever built, says the company.

Boga-Wasserkraftanlagen GmbH of Bochum has supplied the Turas hydraulic wheel (or turbine). The patented, high-efficiency turbine has a diameter of 4 m and an absorption capacity of 300 l/s. Manufactured from aluminium alloy, to be resistant to sea water, it is the largest ever built with its own integrated transmission system. The planetary gearbox minimises power losses between the main output of the wheel and the electric generator which interfaces to the Brevini gearbox by a highly efficient belt drive system.

New York leads charge for fuel cells

Leading US-based PEM (proton exchange membrane) fuel cell manufacturer Plug Power Inc says it delivered over 130 new 5 kW gas-fired systems during 2001, together with one 50 kW prototype system that operates on hydrogen. Included in the 5 kW systems were two CHP systems that provide supplemental heat as electricity is produced, and four CHP subsystems that were delivered to Vaillant GmbH in Germany, one of Plug Power's European partners, to be integrated into fuel cell heating appliances.

During the fourth quarter of 2001, a total of 81 fuel cell systems were delivered, including:

- 50 systems to the Long Island Power Authority (LIPA), installed at a substation in West Babylon, New York,
- 21 systems to the New York State Energy Research and Development Authority installed at various sites around New York State,
- two 5 kW CHP systems to Kubota Corporation in Japan, installed at Kubota's facilities in Amagasaki City,
- two systems to DTE Energy Technologies, scheduled to be installed at the Hancock Substation, one of Detroit Edison's largest substations. The fuel cells will support the DC battery systems that provide backup power to the control circuits for the station's five turbines,
- one 50 kW hydrogen-fuelled system to Air Products and Chemicals, Inc for installation in a hydrogen vehicle refuelling station in Nevada.

Meanwhile, the New York Power Authority has purchased eight 200 kW fuel cells from UTC Fuel Cells, to be used at four wastewater treatment facilities in New York City. NYPA will use waste gas (primarily methane) from the water treatment process to power the fuel cells.

- Governor Gray Davis has praised Californians for achieving a cut in total electricity use in 2001 (adjusted for economic growth and differences in weather) of 7% compared to 2000. The peak electricity demand was also down, by 9%, or nearly 3,800 MW. Unadjusted data shows a 4% fall in electricity use.

Towards common energy stand

by Andrew Warren, Director, UK Association for the Conservation of Energy (ACE)

The world of the speculative builder of commercial premises - offices, shops, hotels, or hospitals - is about to change dramatically. Before planning permission is granted anywhere in Europe for any building larger than 1000 m², the builder will be required to investigate installing an energy supply system based on renewable energy.

This is one of the key requirements included in a new draft directive, called 'Energy Performance of Buildings', due for approval by all the European institutions by June this year. As the European Commission only published the original details last May, there is no question that this is one energy initiative which has definitely been fast-tracked. Perhaps this is because the proposed directive is their first initiative in a long while which directly addresses the single biggest sector of energy usage: buildings. Running 160 million of these causes over 40% of Europe's energy consumption.

And it won't be just a case of a perfunctory token investigation, before returning to business as usual. The onus will be very much on the builder to demonstrate why he or she isn't taking up the renewable option. Because before they try to head off down any conventional fuel route, they will have to place on the public record their entire technical, environmental and economic feasibility study. It will then be up to any stakeholder to challenge receipt of planning permission which is insufficiently environmentally friendly - reports Andrew Warren.

There are lots of opportunities to switch the electricity supply system into a new building, so that it is based on more decentralised energy, often incorporating cogeneration, district heating or heat pumps, all replacing conventional fossil fuel generated electricity.

Changes are also promised in the directive to improve Europe's existing buildings. If you are moving into a different building, whether for work or to live in, you will now automatically receive information on how energy efficient it is - and guidance on how that can be improved. Implementing this will require a considerable expansion in the number of trained energy assessors. This prospect has so alarmed some European governments that they are arguing to defer implementation of this part of the directive until 2008, to allow sufficient training time.

Fortunately, that should not be a problem for the UK. Brian Scanlon of the relevant trade association FAERO, the Federation of Authorised Energy Ratings Organisations, says: "We are absolutely confident that our members will be in a position to meet this welcome extra demand for their services in a thoroughly competent and efficient way." All they ask is agreement within the next twelve months as to the exact criteria to be employed for measuring business buildings' energy performance. There are no such problems for the residential sector, where the Standard Assessment Procedure (SAP) has long been common currency.

Both the European Parliament and the Commission are very alarmed at the prospect of such delays, and this is likely to be a much-contested point in the detailed negotiations, which the Spanish presidency will oversee over the next few months. After all, as Alejo Vidal-Quadras MEP, the Spanish rapporteur, points out: "This directive is supposed to deliver 45 million tonnes of carbon dioxide savings, during the first Kyoto Treaty time period. That starts concluding from 2008. If large parts of the directive don't begin operating until then, it greatly reduces its usefulness for the European Climate Change programme."

But there are other parts of the directive which will have to be part of all national laws within two years. For instance, if as an occupant you are substantially upgrading a commercial building bigger than 1000 m², you will need to ensure you are following contemporary energy saving criteria. Regular inspections will be required to check efficiency of boilers or air-conditioning units. Public buildings will display prominently, details of relative energy performance.

Buildings are expanding

And buildings are expanding in size. Between 1985 and 1997, the average size of a European home increased from 83 to 87 m². Whilst the residential sector is responsible for two-thirds of energy consumption in buildings, the commercial sector is expanding even more rapidly, as service industries grow in importance across Europe. In Britain, energy demand in this sector is leaping by 3.7% each year – proportionately much faster than the growth of energy consumption in transport. There is a net increase in the building stock of 1.5% every year.

How is all this fuel used? In both sectors, heating fuel is the most important end usage - 57% in homes, 52% in commercial buildings. Water heating is next most important - 25% in homes, just 9% in commerce. Appliances are responsible for 16% of commercial energy usage, 11% of domestic – but upgrading of energy standards for such appliances are deliberately not addressed in this directive.

How much of this fuel can be saved? According to Energy Commissioner Loyola de Palacio - herself also a Spaniard - "a savings potential of around 22% of present consumption can be realised by 2010." Savings potential is defined in terms of investments in energy efficient technologies which offer a payback period of eight years or less, thus "allowing a high rate of return compared to alternative investments, including in energy production." Given that the lifetime of a building can be a century or more, such 'payback' criteria can even be argued to be rather conservative.

Bearing in mind this substantial potential to save energy in existing buildings, how far does the new directive go in ensuring it is realised? Some would argue the directive is

ards for buildings across Europe

overly modest. Nowhere is there any requirement that the recommendations from the energy survey – the certification, in Eurospeak – be implemented.

But then nor was there in the UK Government's similar scheme, which tells English and Welsh housebuyers about the energy characteristics of their new home. This had been one of the key features within the 'sellers' pack' concept, which was a key feature of the Government's Homes Bill. The Bill itself was a casualty of the election. Although it had passed through all its House of Commons stages well before polling day, it got seriously bogged down in the House of Lords, and was one of several Bills which the Government business managers eventually abandoned.

It has not yet been resurrected in the new Parliament. But now there may be no need for it to take up parliamentary time: Current official thinking is that the directive can become law automatically under the terms of the European Communities Act of 1972, abetted by a few judicious statutory instruments.

Will anyone act?

So, the energy saving advice is given. But will anyone act upon it? Getting advice implemented tends to work best when it has a grant scheme attached. Most homes in Britain now have some insulation in the loft (although few have more than one-quarter of the recommended thickness installed). In most cases, this insulation was paid for via a grant meeting 67% of the total cost. Since the general grant was abandoned in 1987, the number of people paying to install loft insulation has dropped away.

Small grants have more recently been on offer for brief periods from the Energy Saving Trust, to assist with items like high efficiency gas boilers or cavity wall insulation. Whenever the grants have been around, installation levels have increased dramatically, only to decline when the grant scheme is terminated.

Certainly there are strong hints in the directive about the need for judicious tax incentives or grant schemes to encourage improvements. But no more than that. Perhaps the new Energy Efficiency Commitment, which comes into effect in the UK next month, can step into the breach. Under it, all gas and electricity companies will have to deliver agreed levels of kWh savings, at least in the residential sector. Past experience suggests that 'cashback' equivalents will be among the more effective carrots they can offer.

Nor will every country have to carry out the certification in an identical way. Several have existing measurement schemes – the Standard Assessment Procedure (SAP) scheme marking between 1 and 100, familiar to all new homebuyers in the UK, is not unique, but nor is it identical to schemes operating on the Continent. The requirement is only that certain key characteristics are included in the measurement procedure. In the short term, that is sensible, although inevitably pressure will build for a common measuring scheme across Europe.

Only the most perverse Europhobe could portray this initiative as being the slightest bit 'dirigiste' (if only!). Commissioner de Palacio has had to tread a very delicate line regarding subsidiarity. On the face of it, as by definition buildings do not cross national frontiers, what precise energy standards they meet are nothing to do with Brussels. On the other hand, buildings are the biggest users of energy bar none - 40% of Europe's carbon dioxide emissions come from buildings, just 31% from transport. And the EU most certainly does have responsibilities to reduce greenhouse gases to meet international commitments. All of which makes the directive a priority, whilst at the same time restricting the amount of detailed change it can mandate.

Last December, the Council of Ministers from the 15 member States, and this February the European Parliament, endorsed what is essentially an 'enabling' directive. Despite some initial knee-jerk rumblings concerning 'whether buildings cross frontiers', in the end both institutions are responding positively. After all, even if buildings themselves don't cross national frontiers, the emissions caused by the fuel burnt in them most certainly do.

Both Parliament and Council have repeatedly urged the European Commission to initiate something positive to cut energy usage in buildings, as well as switching out of fossil fuel electricity into renewables. At meetings for Member State

Common energy standards - the directive in summary

The draft directive has four main components.

- There will be a common basis for minimum energy performance standards. This will integrate energy aspects of building design, construction and services; allow designers to meet energy reduction standards in a flexible and cost-effective way; and incorporate simple energy indicators.
- The standards will apply to all new residential and tertiary (roughly the commercial and public) sector buildings and to major refurbishments of existing buildings larger than 1000 m^2.
- An energy performance certificate, renewable every five years, will be required whenever a building (new or existing) is constructed, sold or rented out. The certificate should include advice on improving energy performance and should be on display in buildings.
- Boilers with an output of more than 10 kW will be inspected regularly (every two years for boilers of more than 100 kW). Where the boiler is more than 15 years old, inspection should extend to heating systems. Similar measures are needed for cooling systems, particularly in larger buildings.

officials called to consider options to consider both climate change and energy security options, there has been universal backing for the need for an initiative of precisely this type.

The proposal put before us should be welcomed wholeheartedly, even whilst recognising its limitations. If all a national government does is implement its' proposals on a minimalist basis, nothing like the identified savings potential will be achieved. But if it becomes a catalyst to stimulate other incentive measures designed to suit local conditions and mores, then this could just be the start of something very big.

Politics, as RA Butler called his autobiography, is the 'art of the possible'. This well-crafted directive should prove to be very good politics.

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UK buildings 'fail on energy saving'

Two new reports: *Building in Ignorance* and *Flying Blind?* published by the Oxford Energy Advice Centre and the Association for the Conservation of Energy have poured scorn on the UK's paucity of energy efficient buildings, both domestic and commercial.

The reports make constructive suggestions for future policy and approved guidance, in keeping with the Government's legally binding Kyoto commitment on carbon dioxide emissions and its environmental duty of care to establish best practice in the construction industry, the property industry, and in the management of commercial buildings.

Building in Ignorance by David Olivier looks at the residential sector. It highlights the weakness of Part L of the Building Regulations and suggests that even the undemanding building standards presently insisted upon, do not necessarily deliver the performance they promise. Extensive analysis of UK and other national standards show that, not only is the UK system delivering a poor deal for consumers, but it is also damaging the environment.

The longevity of the housing stock, particularly in Britain, means that today's building standards affect the country's carbon emissions for well over 100 years. Therefore, the continuing low standard of new British homes is jeopardising our ability to reach climate change targets in 2010 and beyond.

According to the report:

- The Building Regulations should promote higher standards for energy conservation and should force the elimination of poor building practice. The new revision of the Approved Document Part L [2001] represents a missed opportunity to improve the quality of new housing in England and Wales.
- Previous Part L revisions in 1982, 1990, 1995 – cumulatively were supposed to reduce energy consumption for space heating by 60%. No evidence exists to show that these benefits were achieved in practice and the net effect may have been only a third of this target. The present aim of a further reduction of 23% may well be barely 10% in practice.
- Experience of energy conserving projects has existed in the UK since 1980 showing that good building standards can at least halve energy consumption. Yet the new Part L still allows for standards in one part of the building fabric to be 'traded off' against standards in other areas, resulting in worse energy performance - for instance, less insulation when the windows are small – resulting in higher heating and lighting bills, and the encouragement of speed-driven building practices at the expense of energy saving, for example, the use of plasterboard instead of wet plaster, which is more airtight.

Meanwhile, *Flying Blind?* by Bill Bordass looks at the commercial sector and the inexorable rise in energy use. For example, it describes the way that energy demands in offices are tailored to expectations rather than realities, and that excessive fuel consumption and associated costs both financial and environmental are widely ignored. Its recommendations would enable property users to change the habits and practices which currently prevail.

Commercial buildings account for about one-sixth of the UK's carbon emissions and the proportion has been growing. If emissions from the commercial sector are not to prejudice the UK meeting its Kyoto target, massive changes are required in the way that buildings are commissioned, designed, built and operated, says the report.

In spite of the stark global issues and the need for urgent action, the market's response has been at best sluggish and often downright contradictory, says Bordass. This report exposes "a just-in-time commercial world with increasingly short time horizons responding only to the perverse and contradictory incentives which currently operate."

The main lesson is said to be the existence of a huge potential for demand reduction. However:

- the knowledge and skills to build low energy commercial buildings in this country have existed for at least fifteen years but the lessons are ignored;
- the supply side of the building industry does not routinely go back into the buildings it creates to obtain feedback on achieved performance, including energy performance;
- it is not uncommon for actual energy use - particularly of more highly-serviced buildings - to be twice the design estimates (at least for some end uses); there is no direct feedback from experience of actual buildings into building regulations on energy performance.

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Europe's energy management market to grow

There's a great deal of optimism around the prospects for growth for energy management, and particularly contract energy management, activity in Europe. Two separate market-watchers, Datamonitor and Frost & Sullivan, have both issued up-beat predictions of growth recently.

Datamonitor is predicting that Europe's energy management market will grow by some 12% per year, or up to 80% within five years, offering a substantial profit-generating potential to the region's utilities. Indeed, with intensifying competition in industrial and commercial supply, energy management offerings will become increasingly crucial to utilities' customer acquisition and retention strategies, adds the company.

Datamonitor bases its conclusions on the results of a survey of 1,200 major energy users, in nine European countries (Germany, Italy, Spain, the UK, Norway, Sweden, Austria, Denmark and the Netherlands).

The survey suggests that between 5% and 35% of respondents who do not currently use outsourced energy management services, plan to do so in the next five years. This will lead to a dramatic increase in the penetration rates for all categories of products, with the average growth in the use of software and hardware solutions slightly higher than in the use of services.

As a result, the value of energy management products in the nine countries is projected to reach £5.5 billion. Particularly high growth is expected in Italy, Germany and the UK, says Datamonitor.

In the majority of countries, energy suppliers will emerge as the main beneficiaries to this upturn in business. In Germany, Austria, Italy, Spain, Norway and the UK suppliers will have a significantly increased role in providing energy management services to their customers. By contrast, in Sweden, Denmark and the Netherlands, the greatest relative growth is expected in the specialist provider sector.

Moreover, with intensifying competition in Europe's industrial and commercial markets, prices are set to converge even further, meaning that added-value services such as energy management will assume still greater significance as a customer acquisition and retention tool.

Boost for CEM

Frost & Sullivan has come to similar conclusions. In its separate survey, the company predicts that major core end-users such as the automotive, pharmaceuticals and chemicals sectors are expected to drive the European contract energy management (CEM) market over the next few years.

According to Frost & Sullivan, the total CEM market will grow rapidly from around £1.5 billion in 2000 to nearly £4 billion in 2007. Several companies are likely to outsource energy management services as they concentrate on their core competencies, resulting in strong growth for the CEM market over the forecast period.

Frost & Sullivan Industry Analyst Björn Larsen says: "The CEM markets in Europe are in different phases of development. The more mature markets include France, Scandinavia and the UK, while the other markets are less developed. The latter are expected to grow quickly because there is a large potential for these services, especially in Germany and the Benelux."

"The largest potential is displayed by the German market, with an estimated market potential of almost £12 billion. The largest potential end-user segments are basic metal industries and pulp and paper, all of which have a combined estimated market potential in the region of £10 billion," observes Mr Larsen. "Recent market liberalisation is expected to act as a catalyst as utilities push CEM contracts to counteract price competition."

Energy purchasing

Meanwhile, energy purchasing is also due for a shake-up, according to Datamonitor. With energy supply in the industrial and commercial sectors expected to be largely open to competition across much of Europe by the end of 2003, the region's major energy users will increasingly demand single contracts which cover all of their western European sites.

Datamonitor warns that while utilities remain wary of consolidated pan-European contracts, they will soon have no option but to either offer them or face losing their clients to those competitors who do.

More than half of western Europe's major energy users would like to have all their sites in the region supplied under a single contract, says Datamonitor. Major users believe that by pooling the energy requirements of all their sites, they should be able to secure bulk-purchase discounts from their supplier. Customers are also attracted by a simplified tendering and negotiating process, as well as simplified account administration due to having to deal with fewer utilities at any point in time. Ease of strategic planning is also an important consideration, says Datamonitor.

Somewhat lower levels of interest in pan-European arrangements seen in Spain, Italy and the UK can be explained by the geographic positioning of these countries, with limited physical interconnections with the rest of Europe.

However, despite demand from consumers for pan-European contracts the same survey suggests that few of the leading European utilities are prepared enough to tap into the growing customer demand for consolidated contracts. Suppliers say that the efficiency savings available from supplying a customer on a pan-European level are limited and customers overestimate the price reductions available to them.

Also, energy procurement procedures in many large consumers remain largely decentralised, and many important markets remain dominated by large incumbent suppliers - making it difficult for foreign utilities to muscle in.

Nevertheless, a combination of pan-European energy supply contracts - coupled with add-on energy management services - seems to be the way forward for European energy suppliers, if the market-watchers' surveys of major energy consumers are to be believed.

Growth of wind power to

by Christian Kjaer, Policy officer, European Wind Energy Association

While the recent growth of wind power in the UK has been patchy, the pan-European picture is much more up-beat, particularly in Germany, Spain and Denmark. And, with the prospect of major, accelerated growth offshore, wind energy really is an energy technology going places - argues Christian Kjaer of the European Wind Energy Association.

Wind power is the fastest growing energy technology in the world today. Over the past six years, the industry has experienced an average annual growth of some 30%. 20 years ago the typical wind turbine had a generating capacity of 22 kW and a rotor diameter of 11 m. The largest wind turbines today have generating capacities of 2,500 kW and rotor diameters of 80 m, or 25% more than the wing span of a Boeing 747 Jumbo Jet.

Size is not the only thing that has changed. Modern turbines are more efficient and more importantly, the cost of producing a kilowatt hour of electricity has been reduced dramatically. The production cost of one kWh of wind power is one fifth of the cost 20 years ago. Over the past five years alone, costs have been reduced by some 20% and the development seems set to continue for a foreseeable future. Today, wind power can fully compete on cost with new coal fired power plants.

Unfortunately, reality today is that it does not make sense to discuss competitiveness between the various electricity generating technologies in the European electricity markets. It only makes sense to discuss technologies that can or cannot compete under the current market distorting conditions, created by decades of state subsidies to national monopolies in the energy industry. Wind power cannot compete under those conditions - yet.

Level playing field

In a yet unpublished report from the European Parliament, direct and indirect subsidies to the European oil, gas and solid fuel industries in the form of tax relief and money transfers total euros 22 billion. Renewable energy receives euros 2.4 billion per year.

The existence of environmentally damaging support schemes to mature industries such as coal, oil, gas, and nuclear will inevitably lead to higher environmental policy costs. One of many steps to influence the internal supply of electricity should be to remove state aid to fossil fuels, nuclear and other mature and environmentally damaging industries. This would contribute towards a more level playing field in the electricity markets, create less biased market conditions, save large amounts of money currently spent on unproductive state aid schemes, and finally make it considerably cheaper to develop an indigenous European energy base on renewable technologies. And renewable energy sources are the only choice for Europe to create an indigenous energy resource.

A recent EU Commission study, the ExternE project, suggests that if external environmental and health costs of electricity generation were taken into account the cost of generating electricity from coal and oil would double, and the cost of gas generation would increase by 30%. In fact the external costs are estimated to be 1-2 % of EU Gross Domestic Product, not including the cost of global warming.

If those costs were included in the generation costs of fossil fuels, wind power and biomass could easily compete with gas and would be considerably cheaper than coal generated electricity. Just because environmental costs do not appear on the electricity bills that are sent out to European electricity consumers, it does not mean that they disappear. They just end up on people's tax bills instead. We need a level playing field. Otherwise the allocation of resources in the energy sector will continue to be inefficient.

Abundant wind resources

The European Commission is currently debating how to solve Europe's rapidly increasing dependence on energy imports. The European Union imports 50% of its energy, mostly from Russia and the Middle East. If no action is taken this figure will increase to 70% over the next 20 to 30 years, claims the European Commission.

With a Europe facing challenges ranging from reconciling security of energy supply, climate change, sustainable development, economic growth, and employment objectives, wind power is good news for the energy industry. Renewable energy technologies are the only energy supply option to have a positive effect in all these policy areas.

Apart from the vast wind power potential on land, European seas present a huge resource for indigenous, emissions-free electricity generation. According to studies, the offshore wind energy potential alone, could be as large as 3,000 TWh of electricity per year, or 150% of current EU electricity consumption (see also table).

Especially in the North Sea, there is an enormous untapped energy resource and the technology is available and continuously developing. What the industry needs is permissions to install the turbines and the infrastructure to transport that energy to where the consumers are, recognising, of course, that this must be done in a sensitive and sustainable manner.

The oil and gas industries formerly existed where offshore wind finds itself now. There is lots of energy out there above the sea and it needs to be brought ashore to the centres of population. The initial costs of building such a European super grid for offshore wind may seem high. Estimates suggest that an offshore grid with a total length of 11,000 km would require investments totalling some euros 10 billion. That is no more than the value one years' direct and indirect subsidies, in the form of money transfers and tax relief, to the European oil and gas industries.

accelerate - offshore

More action needed

Policies are slowly being implemented to in part correct failures in electricity markets, allowing wind power to compete in markets that should eventually better reflect the environmental costs of competing energy supply options.

A secure supply of energy is vital for economic development. But energy investments are made for the long term; the choice of energy source, and of power generation technology for a new plant, determine impacts on climate and local environmental quality and risks for decades to come.

More action is needed. The EU needs a long-term vision for a sustainable energy future. A sustainable energy future requires investment now to allow the potential offered by wind power and other renewables to become reality.

The cost of renewables may seem high in a narrow electricity market context, but in a wider socio-economic context there is little doubt that greater use of renewable energy would be both an environmental and economic benefit to the European Union, and would unquestionably contribute to a larger indigenous primary energy base, create employment, develop technology and increase exports.

Wind power is proof that there are no technological, economic, or resource limits constraining the European Community from enjoying the dual benefits of high levels of energy services, a clean environment and security of energy supply.

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Ireland plans 'world's largest' offshore wind farm

"The development of major offshore wind energy parks will be the biggest energy revolution since the internal combustion engine" according to Eddie O'Connor, EWEA Vice President and CEO of Irish renewable energy company eirtricity, speaking at a conference on offshore wind energy held in Brussels. Dr O'Connor went on to say "the resource is there, the technology is proven, the costs continue to drop - all that is needed is the political will to see it happen."

Since the conference, plans to build the world's largest - so far - offshore wind farm on a sandbank 7 km off the coast at Arklow, County Wicklow, Ireland have advanced with the signing of a 'foreshore lease' for the developer, eirtricity. The company plans eventually to build a 520 MW scheme in several stages.

So far some 86 MW of offshore wind capacity is installed in the seas of Northern Europe - see Table. But we are on the brink of a rapid expansion in offshore wind power generation, says the EWEA, at the beginning of a move from small offshore projects to so-called utility-sized projects. Projects at various stages in the pipeline amount to more than 5000 MW, starting with 160 MW Horns Rev, off the coast of Denmark, due to come on line in 2002.

One message from the conference was clear; policy makers can make all the difference. "The industry is ready to take the plunge", said Filip Martens of C-Power, the Belgian consortium planning a 100 MW wind farm off the coast of Belgium. "The policy framework will determine the temperature of the water. The technology is ready, investors are testing the water. What we need now is a clear legal framework."

The granting of a foreshore lease for eirtricity's planned farm off the coast of Ireland is, effectively, planning permission to build the largest offshore wind park in the world, says eirtricity. The granting lease represents the culmination of over two years work by the company, during which time a full environmental impact statement has been prepared and extensive consultation held with local and national interests. The project has received huge local support in the Arklow area, evidenced by the number of letters of support lodged during the statutory consultation period during the summer of 2001 and the fact not a single objection was lodged with the Irish Government.

The table shows offshore wind farms currently in operation across Europe.

Country	Site	Number of turbines	Individual turbine capacity	Total capacity MW	Year on-line
Sweden	Norgersund	1	220 kW	0.22	1990
Denmark	Vindeby	11	450 kW	4.95	1991
Denmark	Tunø Knob	10	500 kW	5.00	1995
Denmark	Middelgrunden, Copenhagen	20	2 MW	40.00	2001
The Netherlands	Lely (Ijsselmeer)	4	500 kW	2.00	1994
The Netherlands	Dronten (Ijsselmeer)	28	600 kW	16.80	1996
Sweden	Gotland (Bockstigen)	5	550 kW	2.75	1997
Sweden	Uttgrunden, Kalmar Sound	7	1.5 MW	10.50	2000
UK	Blyth Offshore	2	2 MW	3.80	2000
Total		**88**		**86.02**	

Gas deregulation and the

by Colette Lewiner and Philippe Coquet, Cap Gemini Ernst & Young, Paris

Gas markets in the countries of Europe are all moving, albeit from different start points and at different paces, towards deregulation. The UK and the Netherlands lead the way, while France and Belgium are towards the rear. Here, Cap Gemini Ernst & Young's Colette Lewiner and Philippe Coquet explain how, 18 months on from its August 2000 market opening, the gas market has evolved and to what extent deregulation is a reality.

Energy and utilities markets are deregulating all over the globe. In Europe, the electricity market is leading the way, but the gas market is following suit.

A number of challenges for the gas industry could slow the deregulation process. In marked contrast with the electricity industry, there is currently an uneven balance of gas sources in and around Europe, with more than 60% of gas consumption crossing geographic borders on its way to its final destination. Whilst the electricity market has largely been a competitive one in European countries such as in Scandinavia and the UK, the national gas markets in continental Europe have been mostly dominated by individual gas companies and subject to little, if any, competition (except in the UK). However, unlike electricity, gas is a commodity that can be stored and this allows greater flexibility in its distribution.

Complexity

August 2000 saw the official opening of the gas market in continental Europe with the aim of ensuring over the coming years that all consumers have a real choice of suppliers. This change also allowed non-discriminatory access to the pan European gas supply chain, as well as optimising the contribution of gas to the overall EC market.

Introducing a new business model, through the unbundling of the gas market, allows a new set of players to enter the market. Italy is a case in point, with the incumbent gas transmission company undergoing significant restructuring.

Furthermore, the result of greater competition and market convergence will be the increasing capital links between European energy players.

Added to this will be the development of communication networks, storage facilities and trading hubs. Bacton, Huberator, Winksele, Zelzate, Baumgarten being some of those places where 'over the counter' trading is already occurring.

Cap Gemini Ernst & Young's view is that the gas market will change irrevocably as a result of the impact of deregulation. Upstream production has already been widely swallowed up by larger integrated oil corporations, and whilst gas supply is increasingly being bundled with all manner of other services, oil corporations are also moving into the gas supply business (Exxon Mobil, Shell and BP, to mention but a few). The incumbent suppliers will also undergo substantial change with an unbundling of the supply and distribution, and possible restructuring.

Theory versus practice

The theory of deregulation may not entirely match the practice of it. Not least, this is because grid access remains a key barrier for new entrants trying to break into the European gas market.

For example, the denial of network access to third parties in Germany, allegedly on congestion grounds, gave rise to many complaints from prospective new entrants.

...there lies the prospect of a truly open pan-European gas market.

In contrast, the Netherlands was the first continental country to publish its tariffs and in 2000 it boasted significantly higher levels of gas being carried by third parties. Unsurprisingly, operators reported that they were largely successful in gaining access to the Dutch grid.

Additional challenges for new market players have been a lack of available capacity at entry points and on the network, combined with the high transport costs for delivery of supplies from their point of origination to the customer. Furthermore, harmonised and stable tariffs for access to the networks and ancillary services are a prerequisite if a functioning, competitive gas market in Europe is to be achieved.

Each existing player or new entrant must acknowledge that deregulation requires a 'customer-centric' organisation. The UK-based Centrica, a leading supplier of energy and other services for the home, is a case in point. Following the 1986 privatisation of British Gas, Centrica de-merged from its parent company. It then became the first European 'multi-energy' company with 14.5 million gas customers and 2.6 million electricity customers. Today, Centrica is a multi-utility with a large and varied customer base. Its customers buy services from insurance to telecoms, in addition to energy.

Many utilities have found the transition from public sector to private sector an uphill struggle. A particular challenge has been the need to control costs in a competitive market where competition and shareholder value are key priorities. Examples of companies that have been tackling this challenge recently include Gas Natural, which has launched a 15% operating cost reduction initiative in an attempt to boost its net profit by 10 % per annum for the next five years. Similarly, Transco after eight years of cost reduction is still expected to cut its operating expenditure by 3.5% per year.

To reap the benefits of increased and diverse trading opportunities, companies must be efficient and ensure a balance between supply and demand as well as managing risk. With the opening of the gas market, suppliers and producers have to manage increased risks both on prices and volumes. Appropriate risk management and accurate demand forecasting are thus becoming key to success.

impact of change

The investment required for transmission is also substantial and the perception of the industry is that the risk is escalated by the introduction of third-party access and short term supply contracts. As a result, the business risk of bringing new sources of natural gas to market has considerably increased.

Impact of new technologies

It is expected that energy trading will be increasingly facilitated by the internet. By 2004, it is projected that approximately 25% of natural gas sold in the US will be over the internet (about 11% of total electricity). Trends in Europe confirm a move in the same direction. Web-enabled technologies are a key enabler of customer relationship management. This is illustrated by the use of business to business portals by several large gas companies, enabling them to enhance their relationships with larger, industrial customers through the provision of value-added services. Information technologies also play a key role in billing. The replacement of a legacy system with a new 'customer-centric' billing system has become a prerequisite for gas companies that need to manage multiple products and services.

The final technological barrier to market deregulation involves ensuring that effective communication and connectivity exist between suppliers, their partners and their customers. The streamlining of communication and data exchange processes between market participants is key to this process, particularly if organisations are to remain competitive.

In the Canadian province of Ontario, Cap Gemini Ernst & Young has developed a communications platform for all of the province's major energy players. The central hub allows each of the 270 delivery companies and 100 suppliers to make a single connection to the hub. The results are a reduction in market costs as efficiency increases with more sophisticated offerings being delivered to customers. The province of Ontario expects to save millions of dollars by moving to this central hub.

Organisational change

Deregulation has been a key driver of important changes in the energy value chain. A good example is British Gas, which has been through two de-mergers from which three independent organisations now operate in different parts of the value chain.

Centrica, focussing on the retail customer; Lattice, focussing on UK gas transmission and distribution for gas shippers; and BG plc which, over its international operations, more resembles the original British Gas activity profile, from E&P to gas supply. Interestingly, while BG plc appears to see a niche for its operations against the general trend for more specialisation in the value chain, Centrica and Lattice have both diversified into energy and other customer-orientated services.

The process of deregulation and liberalisation induces a tremendous cultural change in the incumbents and across the whole gas industry. The culture of these organisations is required to move from 'old utility', characterised by an engineering oriented, long-term planning mind set and a lack of focus on the consumer, to one that focuses on performance, competitive service, and value provided to the customer. Furthermore, the regulator should no longer be seen as a hindrance but as an important stakeholder.

Conclusion

Deregulation has created a series of strategic challenges. To be successful, organisations must develop a consistent portfolio of assets that will enable them to:

- exploit geographic and business synergies,
- improve client retention,
- extend their client reach, and
- reduce procurement and delivery risks.

In addition to this, quick delivery of post-merger-acquisition synergies through restructuring, cost reduction and revenue and margin growth must be achieved to ensure that gas companies in this fast moving and ever-changing market remain competitive. Furthermore, a strong management team is required that can handle different cultures, regulatory models and labour laws.

If all these barriers and issues are overcome, then there lies the prospect of a truly open pan-European gas market. However, to date, the transformation of the UK gas market is the only example of such progress and the rest of Europe has much catching up to do.

Contact Philippe Coquet at philippe.cocquet@cgey.com

Market affected by the Enron effect

Enron's recent demise has had significant effects wherever energy is traded - including European gas markets. The company was a major trader in Europe and its disappearance has temporarily, at least, reduced market liquidity and forced other players to look harder at their risk management strategies, says Cap Gemini.

However, these effects are expected to be short-lived, and other players are taking over where Enron used to be, including the purchase of Enron Direct in the UK - and its 160,000 customer accounts - by British Gas Trading.

Further acquisition and merger activity continues across the continent, with several suppliers seeking to establish a base in the Spanish gas market.

Meanwhile, the number of consumers eligible to choose their gas supplier continues to rise. Even in France, one major industrial gas consumer which burns some 15% of the total eligible market has gone over to a Belgian supplier in recent weeks.

Comparing national energy policies -

The Paris-based International Energy Agency regularly publishes critical reviews of the energy policies of its member countries, most recently passing judgement on three very different European (if Turkey counts) countries. The IEA looks for sound policies and progress on energy security, market liberalisation and environmental issues. Here, we summarise the IEA's views on Spain, the Czech Republic and Turkey.

Czech Republic - positive market reforms but energy intensity still too high

The Czech Republic is to be commended for improving oil and gas security of supply and reducing air pollution. However, an effective regulatory framework is needed to open its electricity and gas markets

The Czech Republic has greatly diversified its oil and gas supplies and routes. Commissioned in 1996, the oil pipeline from Ingolstadt (Germany) to Litvínov provides Czech refineries with an alternative to Russian supplies. Norway now supplies 15% of the country's natural gas. Strategic oil stocks and emergency preparedness meet with IEA standards.

The Czech Republic plays an important role in the transit of natural gas to Western Europe. The review notes that the reliability of, and fair access to, transit facilities is likely to continue after the privatisation of Transgas.

Coal still dominates the Czech fuel mix and generates 70% of total electricity. The commissioning of a second nuclear power plant in Temelín next year will increase the share of nuclear in total power generation to 40%. As a result, the use of brown coal is expected to be cut by 25% and several power plants are likely to be closed.

The Republic's two nuclear power plants are to be privatised. The review stresses that nuclear safety should remain a high priority and that there must be adequate and guaranteed funds for future waste management and decommissioning of nuclear plants and uranium mines.

While remarkable progress in energy market reform was made during the last decade, the momentum must be maintained to achieve real competition. From 2002, Czech consumers will be given the right to choose their electricity suppliers. Full liberalisation of the market is scheduled for 2006. The introduction of competition in the natural gas market will start in 2005.

The Government plans to sell electricity, natural gas and oil state-owned companies as single packages, so that they will remain large and sufficiently influential to compete in the European market, and to offer the companies for sale at high prices.

The Czech oil market is competitive. However, the strength of major oil companies, which already hold substantial market share, may restrain competition. This should be monitored by the Office for the Protection of Economic Competition.

The Government has made substantial progress in restructuring and privatising the coal sector, although it has announced that the planned lifting of restrictions on coal imports from 2002 will be postponed.

Energy intensity in the Czech Republic fell dramatically during the last decade but is still 1.6 times the average of IEA Europe and 25% higher than Hungary. Further efficiency improvement and, consequently, reducing carbon dioxide emissions is possible, says the review. The Czech Republic will have no major difficulties in meeting its Kyoto target but emissions per unit of GDP are still higher than the average for IEA Europe.

The review recommends that energy efficiency improvement should be given a high priority in the country's energy policy. The Czech Energy Agency is responsible for implementing energy efficiency policy, but needs adequate resources to be effective.

The IEA commends the Czech Republic for having dramatically reduced its emissions of pollutants, thanks to an effective mix of policy measures and investments. These efforts should continue, notably in transport, a major emitter.

Turkey - moving towards liberalisation but projected fossil fuel growth unsustainable

Turkey has taken steps towards energy liberalisation in the last two years and the notion of privatisation has been introduced into the Turkish constitution. New legislation to introduce competition into the electricity and gas markets will reduce the dominant position of the state-owned energy companies BOTAS and TEAS. These laws will help the country cover its rapidly growing energy demand and address its chronic reliability problems in electricity supply. But Turkey's rapid growth in energy demand growth could imperil the environment. The IEA recommends that all energy subsidies be eliminated and that competition be introduced without delay. Turkey should also adopt measures to limit greenhouse gas emissions.

Turkey has made repeated efforts to increase foreign investment in its power industry. Turkey's energy demand is growing at 8% a year, one of the highest rates in the world. But investment has lagged far behind what is required to ensure reliable supply. Investors have not been given sufficient control over their investment. Until 1999, privatisation was prohibited under the constitution.

The Electricity Market Law adopted in February 2001 calls for opening of the

power industry to competition in early 2003 for customers consuming 9 GWh or more per year. A regulator for the electricity and gas industry is to be established. It will be charged with determining the pace of further market opening, enforcing open access, and regulating prices for grid services.

The Natural Gas Market Law of May 2001 will open the gas market to competition by 2003. Turkey's natural gas company BOTAS is to be split in two by 2009, with one company responsible for trading, the other for transmission.

At the time of drafting of the review, Turkey had not signed the UN Framework Convention on Climate Change (UNFCCC). As an OECD country it would have been included among Annex I and II countries. But with its much lower GDP and carbon dioxide emissions per capita, the Turkish Government believed the country had neither the technical or the financial capability to commit itself to the required emissions reductions. This situation has now changed. The Conference of Parties to the Climate Convention in Marrakech (COP 7) removed Turkey from Annex II. Turkey has now become a Party to Annex I of the Convention, with the obligation to implement policies and measures for emissions reductions, but without an emissions target. Ratification is pending.

Despite this change of status, the main conclusions of the report remain valid. Turkey's energy use causes serious air pollution problems. Furthermore, the Government forecasts strong growth in fossil fuel use, including a four-fold increase in coal use by 2020 that would cause large greenhouse-gas emissions. While the forecasts may overestimate fossil fuel demand growth, the Government must address the environmental issues rapidly. Specifically, Turkey needs a strategy that allows it to assume a concrete greenhouse gas emissions target no later than the second commitment period of the Kyoto Protocol.

The IEA believes that there is potential for greater energy efficiency and greater use of renewable energy sources. Turkey's industrial energy consumption could be reduced by 24% and energy demand for residential space heating by over 40%, at little or no extra cost. Electricity grid losses are very high and could be halved. The IEA recommends that all remaining energy subsidies, direct and indirect, be eliminated, and that price-setting and regulation be made more transparent.

Spain - good progress on liberalisation but carbon emissions rising

While Spain is one of the most advanced countries in energy-market liberalisation, a number of challenges face the country in the coming decade.

Spain has limited energy resources, amounting to only 25% of total primary energy supply. Energy demand has grown at more than 3% annually over the past five years, so Spain needs to keep the issue of energy security under constant review.

Natural gas has increased its share in Spanish total primary energy supply from 5.5% in 1990 to 11.2% in 1999, thereby diversifying overall energy supplies. The Government has decided that no more than 60% of gas imports should come from a single country. The IEA approves this emphasis on energy security, but Spain needs to seek to pursue this objective without adversely affecting competition. The review stresses the need to build new liquefied natural gas terminals and gas network links with neighbouring countries, and to increase the capacity of existing links and terminals.

Spain's electricity consumption has been growing about 6% per year. To ensure supply security, it is essential to invest in domestic power generation capacity and infrastructure, and build new links with neighbouring countries.

Though some important details are yet to be defined, Spain has gone well beyond the minimum requirements of the European Union in opening up its gas and electricity sectors and plans to liberalise these markets fully by 2003. Powerful companies now dominate the energy markets, and it is essential to further elaborate the ground rules in order to achieve effective competition.

Spain's National Energy Commission, an independent advisory body, deals with some regulatory issues in the electricity, gas and oil sectors, but the Ministry of Economy retains primary responsibility for regulatory matters. The IEA recommends that the Government support the Commission and help it collect all necessary information. It encourages the Ministry to follow the advice given by the Commission, as when it set such stiff conditions for the proposed Endesa-Iberdrola merger that the deal had to be abandoned.

Spain's efforts to curb the growth of greenhouse gas (GHG) emissions have focused on the replacement of coal and oil by natural gas, and the promotion of renewable energy sources, cogeneration, and energy-saving measures. The rate of emission growth has reduced slightly, but Spain's GHG emissions have nevertheless grown with its economy, with the major increase in emissions coming from the transport, residential and commercial sectors.

Under the EU burden-sharing agreement, Spain's GHG emission target is set at 15% above 1990. In fact Spain's GHG emissions in 1998 were already 21% higher than in 1990.

Spain needs to speed up the development of its climate change mitigation plan, which should include clear targets and a set of measures chosen for their cost-effectiveness. A follow-up to the *Energy Saving and Efficiency Plan for 1991-2000* would help greatly in the more vigorous promotion of energy efficiency. Spain has ambitious plans to increase the share of renewables in its primary energy supply to 12% by 2010. Rather than subsidising the producers of renewables, Spain could consider developing a nation-wide green certificate system.

For copies of these and other country reviews, contact IEA Books, fax: +33 1 40 57 65 59, e-mail: books@iea.org, or visit the website at: www.iea.org/books

Making eastern Europe more energy efficient

Supported by investment from the EBRD, the Paris-based energy services company Dalkia is expanding its energy efficiency work in several eastern European countries.

The European Bank for Reconstruction and Development is to invest euros 100 million to raise energy efficiency in central and eastern Europe through an investment with Dalkia International, the energy services arm of Vivendi Environment and Electricite de France that has built a business of energy services and especially efficiency and energy saving solutions.

With the EBRD investment, Dalkia will intensify its existing work in east European and Baltic Countries (see box).

Dalkia is already perhaps the leading energy services provider in Europe, specialising in district heating and cooling systems, industrial services and facilities management. In the east European countries, Dalkia has developed energy service companies (ESCOs) that operate district heating networks for municipalities and reduce energy consumption in various public or private buildings or facilities. Under long-term contracts, the ESCO introduces efficiency measures - typically by replacing coal-fired boilers with modern light-oil or natural-gas fired boilers - to reduce energy costs. The savings are shared between the ESCO and the client.

EBRD President Jean Lemierre, who signed the agreement with Dalkia, said "the investment reflects the EBRD's strong commitment to reversing the legacy of energy waste in the planned economies of the Soviet era. The kind of efficiencies that Dalkia introduces are good for consumers, good for the environment and - as Dalkia has proven over and over again - good for business," he said.

"There is a real potential for energy efficiency in these countries," said Jean-Pierre Denis, President of Dalkia. "The liberalization of energy markets and the development of privatizations increases the opportunities. That is why the partnership with the EBRD will boost our activity in the region."

The EBRD investment is in the form of a multi-project facility that can be used to channel loans, equity or bank guarantees to small and medium-sized companies. The EBRD can provide financing under standardised terms and conditions to 'fast-track' approval of projects based on the sponsors' own due diligence and expertise.

Meanwhile, Dalkia International has also purchased majority stakes in two cogeneration plants, TUL and PPC, in the Czech Republic. With a total heating capacity of 594 MW, the plants supply the district heating system of Usti Nad Labem, a city with a population of 100,000 located north of Prague.

In conjunction with this move, Dalkia International has signed two electricity supply contracts with SCE, the local power utility in Usti Nad Labem. The contracts will generate revenue of at least euros 300 million during their seven-year validity period.

The plants also provide a total electricity generating capacity of 158 MW. When combined with Dalkia's holdings in MST and TEK in Moravia, this makes the Group the second-largest independent power producer in the country. The deal also strengthens Dalkia's position as the foremost heat producer in the Czech Republic.

Dalkia in central and eastern Europe

Central Europe is an important market for heating networks, and Dalkia's expertise in this area has won it several major competitive bids. Backed by the European Bank for Reconstruction and Development (EBRD), Dalkia is promoting the concept of energy-services companies in the region, along with innovative solutions for financial engineering.

Hungary

In Budapest, Dalkia is in charge of modernising and managing the energy systems of Hungary's largest train station, whose generating plant also supplies power to a hospital. Subsidiary Prometheus is also responsible for the Donbovar and Dorog district heating systems.

Poland

Dalkia Termika, a Dalkia subsidiary created in Poland in 1997, has expanded its heating systems management business through guaranteed-result contracts to supply services for heating networks, hospitals and housing project managers. In January 2000, Dalkia Termika signed its first contract with an industrial client to manage process heat. Dalkia is also developing its facilities management business in Poland with contracts covering a total area of more than 100,000 m^2.

Czech Republic

In the Czech Republic, Dalkia has acquired Moravian Energy, one of Central Europe's largest heat production and distribution utilities. The company manages six very large systems with a total heating capacity of 3,070 MW and a power generating capacity of 360 MW. These systems serve more than one million residents.

Romania

Dalkia is involved in managing district heating systems in Romania and handles heating and hot water distribution in the cities of Albaiulia, Boldesti, Cluj Napoca, Plojesti, Sinaia and Tulcea.

Slovak Republic

Dalkia a.s. has been active in the Slovak Republic since 1993. It is now the country's leading private heating systems management contractor. Dalkia currently manages district heating systems in the capital, Bratislava, and in the cities of Poprad, Senec, Kralovski Chlmec and Cadca. The systems serve approximately 200,000 people in nearly 80,000 homes.

Energy in Finland - a 2001 snapshot

Continuing Energy World's coverage of the Finnish energy scene, the Finnish Energy Industries Federation, Finergy, has released data on the country's energy scene for 2001. It shows growing electricity consumption, but a more complicated supply picture. The country is now looking to build a new nuclear power plant to meet rising demand.

Electricity consumption in Finland grew by 3% in 2001, up from the just under 2% recorded in 2000. The accelerated growth was due to sectors other than industry, indeed, electricity consumption by industries and construction decreased by around 1% as a result of a minor downswing in the economy towards the end of the year. Electricity consumption by households and agriculture grew by 9%; most of this was caused by cold weather.

The Nordic hydro-electric situation was not as good as in the previous year, that is, lower rainfall meant less power generated and less available for export. Prices in the electricity exchange rose considerably, and consumer prices of electricity also went up. More than half of the retailers raised their list prices of electricity; these went up by almost 11%. Electricity transmission charges also rose by more than 1%. The total price of electricity including tax went up by some 6%.

The change in the Nordic hydro-electric situation meant that electricity imports into Finland from the west decreased to a half of their previous value. This was compensated for by the increase of almost 70% in electricity imports from Russia and by the increase of 57% in domestic condensing power, that is, conventional coal-fired plant.

Rising consumption

In 2001, Finland used a total of 81.6 billion kWh of electricity, an increase of 3.1% on the year previous. The temperature and calendar adjusted growth rate was 1.4%. This year, the consumption of electricity is expected to grow by approximately a further 2%.

The new power peak value, 13,310 MW, was achieved at the end of the long cold period last winter on 5 February 2001. Corresponding power figures were reached at the beginning of 2002, even though some industries still had their Christmas shutdowns. Cold weather was also a common phenomenon in the other Nordic countries, and power production within the entire region was hard pressed. Rationing was not necessary, but there were wishes that customers would use electricity sparingly in Sweden, for instance. The price of electricity on the exchange was also very high.

In 2001, Finland used a total of 81.6 billion kWh of electricity, an increase of 3.1% on the year 2000

More than 32% of the total electricity used in Finland was generated by CHP production, almost 27% by nuclear power, more than 16% by hydropower and almost 13% by coal and other conventional condensing power. Net imports of electricity decreased from 15% in 2000 to 12%. Wind power accounted for 0.1% of the total national use.

Finland's net imports of electricity in 2001 totalled 10 billion kWh. Imports from Sweden and Norway dropped to approximately half, to 4.1 billion kWh. Most of the reduced imports from the west were compensated by the record high imports of 7.7 billion kWh from Russia; these imports increased by 70%. Exports of electricity to the west increased five-fold. The Elspot exchange price of electricity in the Nordic Nord Pool rose by more than 80%, and Finland's area price rose by more than 50%.

Generation moves

Due to cold weather, CHP production reached a record level of almost 26 billion kWh, up by 6% on 2000. The main fuels in CHP production are natural gas, coal and domestic biomass. Finland is the leading country globally in the use of CHP; two new CHP power plants were completed by the end of 2001, in Pietarsaari and Kokkola. Nuclear power production rose by approximately 1% to 21.9 billion kWh. The availability of Finnish nuclear power plants is among the highest in the world. In January, the Government accepted the preliminary application for the building of a new nuclear power unit, submitted by Teollisuuden Voima Oy in November 2000. Parliament will start handling the matter in the spring.

The hydropower situation in Finland was poorer than in the year 2000 but still better than average. Hydropower produced 13.3 billion kWh of electricity, 8.2% less than the year before. Since the early 1980s, the biggest hydropower production volume has been 15.0 (1992) and the smallest 10.1 billion kWh (1980). The average annual production volume is 12.7 billion kWh. Due to reduced net imports and hydropower, coal and other condensing power grew by 57%.

The year 2001 was less windy than 2000. Despite a slight increase in wind power capacity, wind power production decreased by 8%. Wind power accounted for less than 0.1% of total electricity use.

Two exceptionally severe storms in November caused major forest damage and more serious power distribution problems than any other storm in decades. Hundreds of thousands of Finns faced power failures during the storms, and some of the failures were very long. Both the Ministry of Trade and Industry, and the electricity industry, are now examining the reliability of the electricity distribution system during exceptional natural conditions.

Events

March

InstE Branch Event
Optimisation of aluminium melting processes
Seminar, 4 March
West Midlands
Contact: Midlands Branch - Vian Davys
Tel: 01332 666296
Email: vian.davys@eme.co.uk

Environmental strategy
Conference, 4-7 March, London
Tel: 020 7291 1030
Email: info@gbnuk.com

Euroheat & Power annual conference
Conference, 5 March, Belgium
Tel: 32 2 7402 110
Email: info@euroheat.org

Fuelling the future: energy storage
Seminar, 5 March, London
Contact: Institute of Energy
Tel: 020 7580 0008
Email: events@instenergy.org.uk

InstE Branch Event
Annual dinner
Dinner, 6 March,
Culloden Hotel
Contact: Northern Ireland Branch - David McIlveen-Wright
Tel: 028 7032 4477
Email: dr.mcilveen-wright@ulst.ac.uk

InstE Branch Event
Developing the low carbon economy
Seminar, 6 March, Newcastle
Contact: North East Branch - Andrew Cox
Tel/Fax: 0191 261 5274
Email: awcox@eimr.demon.co.uk

World sustainable energy day
Conference & Gala, 6-8 March
Austria
Fax: +43 732 7720 14383
Email: office@esv.or.at

InstE Branch Event
Anything to declare?
Seminar, 12 March, Yorkshire
Contact: Yorkshire Branch - Andrew Mallalieu
Tel: 0113 276 8888
Email: info@facultatieve-technologies.co.uk

Energy policy review
Lecture, 12 March, London
Contact: Institute of Energy
Tel: 020 7580 0008
Email: events@instenergy.org.uk

Sustainable transport
Workshop, 12 March, Cardiff
Contact: Glasgows
Tel: 01772 767781
www.transportaction.org.uk

Central and eastern Europe power industry forum
Conference, 12-14 March
Poland
Contact: PennWell Publishing
Tel: 01992 656600
Email: ceepif@pennwell.com

Emerging opportunities for the oil and gas industry
Conference, 13-14 March
London
Email: penny@gbnuk.com
www.gbnuk.com

InstE Branch Event
Young persons' short paper evening
Meeting, 14 March, venue TBC
Contact: South Wales & West of England Branch - Prof. Syred
Tel: 01222 874318

The future of utilities
Conference, 14-15 March
London
Contact: Lee Gisbourne
Tel: 020 7608 3491
www.marketforce-communications.co.uk
Co-sponsored by the Institute of Energy

National science week
Special Event, 8-17 March
Contact: Lisa Jones
Tel: 020 7973 3500
Email: lisa.jones@the-ba.net

Energy: new era, new governance
Conference, 18-19 March
London
Contact: Philippa Challen
Tel: 020 7957 5700
www.riia.org

Profiting from opportunities presented by the Kyoto mechanisms
Conference, 18-19 March
London
Contact: Marcus Evans Conferences
Tel: 020 7436 5735
Fax: 020 7436 5741

UK energy policy
Seminar, 19 March, venue TBC
Contact: Chris Maude
Tel: 01622 858762

InstE Branch Event
Annual general meeting
AGM, 19 March, London
Talk from Gordon MacKerron of the PIU team follows the AGM.
Contact: London and Home Counties Branch - Joanne Wade
Tel: 020 7359 8000
Email: joanne@ukace.org

Cogeneration in the new energy market
Conference, 19-21 March
Brussels
Contact: COGEN Europe
Tel: +32 2 772 8290
Email: info@cogen.org

UK electricity markets overview
Workshop, 19-21 March
Brighton
Contact: Power Ink
Tel: 01273 202920
Email: margaret@power-ink.com

Power plant operations maintenance & management
Conference, 20-21 March
Berlin
Contact: Laura Beachus
Tel: 01932 893851
Email: cust.serv@informa.com

Environmental challenges
Seminar, 20 March, London
Contact: Andrea Whitehead
Tel: 01926 462908
Email: events@sbgi.org.uk
Co-sponsored by the Institute of Energy

InstE Branch Event
Annual general meeting
20 March, Warrington
Contact: North West Branch - Brian Doran
Tel: 0161 817 4036
Email: brian.doran@burohappold.com

Sustainable transport
Workshop, 22 March, Glasgow
Contact: Glasgows
Tel: 01772 767781
www.transportaction.org.uk

Events

World nuclear association symposium
Call for papers, 31 March
Email: propasis@wna-symposium.org

April

Global windpower
Conference & exhibition
2-5 April, France
Contact: European Wind Energy Association
Tel: 32 2 546 1940
Email: info@ewea.org

Hydrogen investment forum
Conference, 3-4 April
Washington DC
Contact: Intertech Conferences
Tel: 1 207 781 9800
Email: info@intertechusa.com

Enterprise-wide risk management
Conference, 4-5 April, London
Contact: Energyforum.net
Tel: 46 8 459 9620
E-mail: info@energyforum.net
Co-sponsored by the Institute of Energy

Sustainable development research
Conference, 8-9 April
Manchester
Contact: ERP Environment
Tel: 01274 530408
Email: elaine@erpenv.demon.co.uk

CHP in industry and commerce
Course, 9-10 April, Leeds
Contact: Alison Whiteley
Tel: 0113 233 2494
Email: cpd.speme@leeds.ac.uk

InstE Branch Event
Ellis memorial lecture
Lecture, 10 April, Birmingham
Contact: Midlands Branch - Vian Davys
Tel: 01332 666296
Email: vian.davys@eme.co.uk

Coal UK 2002 - life after the reviews
Conference, 10 April
London
Contact: the McCloskey Group
Tel: 01730 265095
Email: amber.bates@mccloskeycoal.com

Energy policy review - the outcome?
Workshop, 11 April, venue TBC
Contact: Di Hammet
Tel/Fax: 020 8767 9744
Email: BEAwec@aol.com

Diesel particulates and NOx emissions
Course, 15-19 April, Leeds
Contact: Alison Whiteley
Tel: 0113 233 2494
Email: cpd.speme@leeds.ac.uk

InstE Branch Event
Greenhouse gas mitigation technology
Seminar 16 April Loughborough
Contact: Midlands Branch - Vian Davys
Tel: 01332 666296
Email: vian.davys@eme.co.uk

The new European gas business: can it meet the security challenge?
Seminar, 16 April, London
Email: alison@igem,org.uk

Beyond petroleum
Seminar, 16 April, venue TBC
Contact: Chris Maude
Tel: 01622 858762

Energy management
Short course, 17 April, Sheffield
Contact: Institute of Energy
Tel: 020 7580 0008
Email: events@instenergy.org.uk

InstE Branch Event
Climate change levy
Discussion, 18 April, Epsom
Contact: London and Home Counties Branch - Joanne Wade
tel: 020 7359 8000
Email: joanne@ukace.org

InstE Branch Event
Visit to Magna
Visit, 20 April
Contact: Yorkshire Branch - Andrew Mallalieu
Tel: 0113 276 8888
Email: info@facultatieve-technologies.co.uk

IEMA annual conference
Conference, 24-25 April
Doncaster
Contact: IEMA
Tel: 01522 540 069
Email: a.underwood@iema.net

Carbon capture, storage and sequestration
Conference, 29 April - 2 May
Contact: IBC Conferences
Tel: 0207 017 4052
www.ibcenergy.com

InstE Events Programme

If you are aware of colleagues or other interested parties who would benefit from receiving regular information regarding InstE events, please send their name, address and e-mail address to events@instenergy.org.uk, and we will be happy to add them to our mailing list. Alternatively, if you are the organiser of an event and would like to see your event listed within Energy World, please send the name of the event, date and location, with your contact details for consideration to events@instenergy.org.uk

Registering on an event seen here?
If you are registering on an event which you have seen listed here, please don't forget to mention to the organisers that you saw it listed in the *Energy World* Events Diary.
For further information about events, and to view the Institute of Energy's events calender please click on to our website at: www.instenergy.org.uk/community
InstE Branch events are open to everyone regardless of the branch they are organised by.

Institute of Energy one-day courses

The Institute of Energy, the professional body for the energy sector, is a leading provider of energy management training and has developed two short courses entitled Energy Management, and Professional Practice for Sustainable Development.

Energy Management: This course will enable energy professionals and newcomers to the industry to keep up to date with recent developments in energy management and participate in valuable discussion on topical issues. The course is based on the National Standards for Managing Energy, the national benchmark for the energy management profession. All aspects of energy management is covered including: energy policy; investments for energy efficiency; the principles of monitoring and targeting; staff awareness and motivation programme; energy management structure and accountability; and introduction to site services. Courses are being held in London and Sheffield and cost £125 for InstE Members and £175 for Non-Members.

Professional Practice for Sustainable Development: There is an increasing need for employers to deliver sustainable development solutions that are technically, socially, economically and environmentally acceptable. Professional Practice for Sustainable Development provides a means for doing just this. This one-day course is designed to enhance participants' understanding of sustainable development and helps put learning into practice with the use of case studies from business and industry to illustrate how sustainable development principles are currently being applied. This course will be held in London in April (date tbc) and costs £100 for InstE Members and £150 for Non-Members.

The key to these courses is their flexible nature. When registering, delegates are encouraged to highlight their concerns and issues, and where possible these will also be discussed. PLUS delegates will receive follow-up support from the facilitator to assist and advise in applying these principles to business roles.

To register for either of these courses, please contact Katie Moore on 020 7580 0008 or e-mail events@instenergy.org.uk

www.

A big thank you to everyone who took time to fill in the questionnaire on our website. Your feedback and ideas were all very constructive, and are being used to develop the site over the coming months.

The winner of the bottle of champagne was Tim Taylor from Aircogen.

www.instenergy.org.uk

Obituary Victor H Miller MInstE

Victor Miller, died on 1st February 2002 after a long fight against cancer. He was born in 1925 and educated at Rotherham Grammer school, before becoming an apprentice fitter, later a 'school apprentice' at United Steels Company. He joined their fuel department, leaving to join Shell Mex and BP. Then followed a period as Technician Manager Power - Process at Wallsend Engineering company. He followed this with a time at Hamworth Engineering company where he was Chief Industrial Engineer until his retirement in 1988.

He gave numerous papers to various bodies, alone or in co-operation with fellow engineers, and gave an annual lecture to students at Salford University. He wrote sections of a number of books including the 'Burn Design for HTFS DR32 Industrial Flames' in 1980.

During his retirement back in Yorkshire he kept in touch with his numerous friends and colleagues giving his advice willingly and often. But his real interest in retirement was photography, showing the same precision and enthusiasm he used at work and winning many local awards.

New staff

The new year welcomes two new faces to the Institute of Energy staff team. Sarah Beacock joined us as Membership & Education Manager. From 1985-89 Sarah was Scheme Manager for RSA Exams Board, now OCR - the Awarding body for our VQ awards. From '89-98 Sarah managed various education functions and worked with membership colleagues within the Chartered Insurance Institute. Vicky Radcliff also joined us as Education Services Administrator. Her previous position was as Projects Officer, with the Clapham and Stockwell Town Centre Management Team, London Borough of Lambeth.

INSTITUTE OF ENERGY LECTURES

the institute of energy

The Institute of Energy is proud to announce its first speaker of the 2002 Evening lecture series.

Nick Hartley, from the PIU Review team, will be speaking on 12 March at the Institute of Energy at 5.30pm.

Tickets cost £30 for members and £35 for non-members, and include refreshments.

For further information regarding our programme of lectures, please telephone Katie Moore on 020 7580 0008 or e-mail events@instenergy.org.uk

Technical visit to Guangzhou pumped storage power station

Weekend Technical Visit to Guangzhou Pumped Storage Power Station in Chonghua, Mainland China
by Albert Tang, CEng MInstE Hong Kong Branch

On the weekend of 8-9th December 2001, the Hong Kong Branch organised jointly with the Nuclear Division of the Hong Kong Institution of Engineers, a technical visit to the Guangzhou Pumped Storage Power Station (GPSPS) in Chonghua, Mainland China.

With a total investment of 6 billon Yuan (0.5 billon pound sterling), the construction work of GPSPS started in May 1989 and the plant was commissioned in September 1994 for Phase I, and March 2000 for Phase II. Inside the GPSPS complex, there is an upper reservoir with an area of 5 km^2, and a lower reservoir with an area of 13 km^2. The reservoirs have an elevation difference of 500 m and an approximately equal water storage capacity of 24,000 km^3. There are two 9 m diameter 3,800 m long underground inclined tunnels linking the two reservoirs with the underground power houses located in between. Inside the power houses are 4 French 300 MW-capacity reversible pump turbines and another 4 equal capacity German made units.

The total installed capacity of 2400 MW makes GPSPS the largest pumped storage power station in the world. To cope with the rapid development in the region and in the adjoining provinces, a new pumped storage power station of similar capacity is being planned in another site within Guangdong Province.

The computerised supervisory and control system deployed in GPSPS enables unmanned plant operation. There are only 140 staff resident on site. The operation of the plants can be controlled either locally or remotely in Guangzhou or in Hong Kong, which are at some 80 km and 200 km away respectively.

By generating and pumping, GPSPS provides load-leveling services for its connected power systems. It has been playing an important role in enhancing the safe and stable operations of the Dyna Bay Nuclear Power Plant. It is a critical factor in enhancing the reliability of the power systems in Guangdong and Hong Kong.

The complex of GPSPS is a scenic spot away from the noisy city, surrounded by green mountains with clear waters, mattress-like lawn, and amiable climate. During these two days, our members apart from having an insight to the operation of this modern pumped storage power station, had an opportunity to refresh themselves in this wonderland, to taste the fresh air, and to immerse in this beautiful and peaceful environment.

The Environmentalist

The Institute of Energy has arranged for its members to subscribe to The Environmentalist magazine at the preferential rate of £25.

The Environmentalist is the Institute of Environmental Management and Assessment's (IEMA) current affairs magazine.

Please contact Amy Underwood at the IEMA quoting 'Institute of Energy Offer' by telephone on 01522 540069 or by e-mail: a.underwood@iema.net

Standard bearers for energy management

The Institute of Energy is glad to report that another three candidates have successfully completed the NVQ level 4 in Managing Energy - the only nationally recognised benchmark for individual performance in energy management. Thomas Donkor of Stratford Energy Action Centre, Ron Hill of North Lanarkshire Council and Keith Mayes of BASF Plc all gained their awards at the recent external verifier's visit. Congratulations to all three of them.

Gaining the NVQ means that these candidates have proven that they consistently work to the National Standards for Managing Energy, which cover such aspects of energy management as: monitoring and evaluating energy efficiency; providing advice on the development and implementation of energy policies; promoting energy efficiency; and developing systems to measure energy usage. With support from the InstE's team of assessors, each of them assembled a portfolio of evidence to show how their work meets the standards. Their awards demonstrate that they are fully competent in all aspects of energy management - something that employers and clients alike can be reassured by.

If you would like more information about the NVQ level 4 in Managing Energy, please contact Vicky Ratcliffe in the Education Department on 020 7580 7124 or at education@instenergy.org.uk You can also find details on the the web site www.instenergy.org.uk/training

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Mr George H Astin MInstE

The Institute of Energy's CD Rom Interactive Planner

The next incarnation of the Institute of Energy's CD Rom Interactive Planner is currently being compiled by Digby House Business Guides. If you have got any constructive ideas to make it even more useful we'd like to know.
Also, if you want to advertise to the entire InstE membership and beyond, you'll need to get in touch with the publishers straight away as spaces are limited.

Please contact Ashley Rigden at Digby House Business Guides on 01206 574674.

Institute of Energy Book Sale

Fire and Explosion Hazards - Energy Utilisation
Published by the Institute of Energy.
Was £10.00 now only £5.00
(plus P&P £1.35 within the UK*)

Measurement of Solids in Flue Gases
Authors: P.G.W Hawksley, S. Badzioch, J.H. Blackett
In conjunction with the Institute of Energy, second edition, 1997. (3rd imprint)
Was £29.00 now only £18.00 (plus P&P of 90p within the UK*)

Small Scale CHP
Authors: L.L. Gill and A.J.P. Ward
Was £49.00, now only £29.00
(plus P&P of £6.00 within the UK*)

Combustion & Emissions Control III
Editor: The Institute of Energy.
Was £10.00 now only £5.00
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Applied Energy Research
Published by Institute of Energy and Adam Hilger, Bristol and New York.
Was £10.00 now only £5.00
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