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Some of the speakers at the Institute of Energy's conference: Energy - Solving the policy jigsaw, held at the CBI in London in March. Clockwise from top left: David Varney, chief executive of BG plc; SPRU's Professor John Chesshire; Energy Minister John Battle; Energy Regulator Callum McCarthy; with Anna Walker from the DTI (centre). See page 14 for a full report.

Viewpoint

Playing an active role for your Institute

Although my name and picture will be familiar to the members I have worked with during the past six years at the Institute, many more of you may be wondering who I am, where I have come from, and how I intend to work with members to take the Institute forward.

I first came to the Institute in 1993 to work in the Events Department. Within a year I transferred to start up a new arm of the Institute's work - Special Projects and I also began to strengthen relations with the Branch network. Within three years the Institute's project office was thriving, supported by two further full time staff. The Institute's image was renewed and we were delivering training and awareness projects for clients including Government, industry sponsors and the European Commission. This work continues to succeed in making a contribution to raising the profile of the profession and energy as a subject of importance.

In 1996 I became Deputy to the then Secretary, Jim Leach and gradually involved myself in all aspects of the Institute's activities, providing support to others as necessary and working with members to develop and implement the policies of Council. Since this time I have been in post as Acting Secretary twice for extensive periods and in February Council unanimously agreed to appoint me Secretary & Chief Executive.

I have worked with members to reposition the Institute, and together we have achieved success in raising its profile. We have stabilised membership - and therefore the finances of the organisation, introduced new project work and created firm foundations to increase our standing, influence and contribution to the energy profession.

INSTITUTE EVOLVES WITH INDUSTRY

During the six years I have seen great change within the energy sector, and I have little doubt that there is more to come as energy climbs the political, social and economic agendas of many parties, both within the UK and globally. Changes that have taken place within the Institute have largely reflected the evolution of the energy sector and ensure that your professional body has a modern outlook. However, the Institute could not make this change without the active involvement of members, from students to presidents, taking an active interest in its affairs.

Among all the organisations within the energy sector The Institute of Energy is unique. It is the only truly impartial forum for the exchange of views and advancement and dissemination of knowledge. It is the only dedicated energy body bound by a Royal Charter and Bye-Laws and nominated by the Engineering Council to support professional engineers to gain recognition. In addition, the Institute is also the only dedicated energy body to give recognition to energy professionals from all walks of life, complementing the engineering constituent.

I believe this is a powerful demonstration of how a professional



body and learned society should function in a modern world - bringing all professionals together to Louise Evans - new Secretary & Chief Executive, The Institute of Energy.

advance the profession as whole, to the benefit of wider society. Again, a simple reflection of how society itself functions.

TIME TO ACT

Now, with the foundations in place, it is now time to talk a little less and to do a little more. The Institute overflows with innovative ideas on all the things we could be doing, but we must focus on our priorities and ensure that the members and the profession witness progress.

Communication is key - regularly I meet members who are unaware of some of the work of their Institute. I urge you to take an active interest in the Institute's activities - to join other active members, even if your time is limited. Modern communications provide more flexible ways of working and keeping in touch. The Institute's small size allows you to communicate with any one of us at the Secretariat. If you are unsure who to talk to, then look up the *Institute News* pages in this issue for an introduction to the rest of the staff team.

We are currently working towards a number of immediate priorities. First, we are reviewing the value of membership with the objective of increasing the benefits and services that companies and individual members receive. We will be polling members shortly for your views on the new services you would like to see developed.

We are shortly due to receive an auditing panel from the Engineering Council to review our nominated status as a result of our application to become a licensed and certificated body. We will also be assessing the viability of applying to award Engineering Technician registration in addition to the two grades of Engineering registration we currently support.

Membership recruitment is a further priority. It seems reasonable to suppose that we all know at least one individual or organisation who could be in membership, and we must offer value for money and the correct mix of services to encourage these potential members to join the Institute. This again provides an opportunity for you to play an active role.

Finally, I am working with my colleagues to re-organise administration to ensure that our income is expended on direct charitable activities, ie the activities of the learned society and professional body, wherever possible. Our internal systems are being redesigned to reflect this, with the introduction of a new IT system. I look forward to working with you all and I hope that you will accept my invitation to play an active part in forging our future. Louise Evans can be contacted at the Institute on tel: 0171 580 7124, fax: 0171 580 4420 or email levans@ioe.org.uk



NASA to save millions through energy-saving

The US Department of Energy has awarded \$1.5 billion in contracts to nine companies for energy saving improvements to US federal facilities. The contracts apply to the Mid-Atlantic and Northeast regions of the country and include a range of technologies, from efficient lighting to renewable energy. These socalled Super Energy Saving Performance Contracts (Super ESPCs) cost the government little or nothing up front; instead, the contractors are paid a percentage of the energy savings.

The National Aeronautic and Space Administration's (NASA) facilities in Houston is to benefit from the largest project yet under a Super ESPC. Honeywell will make an initial investment of about \$20 million to install energy efficient lighting and compressed air systems, reduce water consumption, and improve air conditioning controls at the Houston facilities. NASA will save about \$2 million in energy costs each year.

 The City Council of Santa Monica, California, has voted unanimously to purchase all of the city's municipal power needs from renewable sources for the next year. The five-megawatt power purchase will make Santa Monica the first US municipality to purchase all its power needs from renewable sources. The City will pay a five-percent premium - roughly \$140,000 annually - for its green power.

Armenia rebuilds networks

Japan's Overseas Economic Co-operation fund (OECF) has provided the Republic of Armenia with a loan amounting to Yen 5,399 million (US\$ 44 million) for the Electricity Transmission and Distribution Project.

Co-financed by the World Bank, the project will build a power transmission and distribution network across Armenia, as well as install consumption meters. The OECF loan will finance civil works, procurement of required electricity transmission equipment and consulting services.

The project will improve the reliability of the power supply by upgrading the substations and load-dispatching offices, improving the communication equipment, and rehabilitating the network. Also, through a more effective charge collection system, the work will strengthen the network management and improve the country's balance of international payments.

Armenia has a relatively large electric power generation capacity due to power plant construction during the Soviet regime. However, following years of insufficient maintenance, overuse of equipment and damage caused by earthquakes, the power supply has become unstable. In addition, nuclear power plants are still being used despite severe safety concerns. The Armenian government has therefore prioritised the construction of new power plants, the rehabilitation of existing plants and the improvement of the power network.

Australian power prices fall

Power prices in Australia are tumbling, following deregulation of the electricity industry, according to a new report from Datamonitor: Australian power: sales and marketing strategies in the contestable market. The report reveals that:

- 44% of all sites in contestable markets in Queensland, Victoria and New South Wales have already switched electricity supplier, and
- electricity prices in the contestable market are set to fall by as much as 40% for certain users by 2010.

Unlike in the UK, electricity reform and privatisation in Australia have occurred at both state and national levels, meaning that each state has pursued different reforms along different timetables.

To date, all customers with electricity demand in excess of 160 MWh per year are

contestable in New South Wales, Victoria and the ACT. In Queensland, all site using in excess of 4 GWh are contestable. In total. 26.000 customers were contestable across Australia in December 1998, and by December 2001. the electricity markets in these states will be fully deregulated. In contrast, Western Australia and South Australia have yet to determine the dates for total retail competition and no dates have been set for any degree of deregulation in the Northern Territories.

On average, the price of electricity in Australia was around 2.4% lower in 1997/98 than in 1996/97. However, business customers in Victoria and New South Wales saved 10% and 7% respectively on their annual electricity charges in the financial year ending June 1998, due to the introduction of retail competition.

US aims for a million domestic fuel cells

More than a million of the 70 million homes in the US connected to natural gas pipelines will also get their electricity from the same gas in less than a decade - if fuel cell developer Plug Power accomplishes its mission.

Plug Power has recently demonstrated a 4 kW, natural gas powered fuel cell system which it hopes to get to the marketplace by 2001. The proton exchange membrane (PEM) power plant included a fuel cell stack, power conditioner and a Johnson Matthey 'Hot Spot' fuel processor.

According to Plug Power, consumers could save 20% on their electric bills by operating a residential fuel cell powered by natural gas. The clean and efficient power plant would produce less pollution and greenhouse gases than power bought from the grid.



Mandela backs solar power for the people

President Nelson Mandela

has launched the first Powerhouse system in the world's largest commercial solar rural electrification project, in South Africa's Eastern Cape region. The project means that 50,000 homes will have access to electricity for light, television and radio - playing an important role in the pledge given by the South African Government to provide electricity to communities throughout the country.

Seen as a blueprint for introducing electricity in other rural areas in South Africa and other countries, the project is a joint venture between Eskom and Shell Renewables. Installation of the Powerhouse systems began recently in the Bipa area of the Eastern Cape. Of approximately 8.6 million homes in South Africa, only 2.75 million (32%) had access to electricity in 1990. Today a massive electrification programme has more than doubled the number, bringing electricity to 67% by the end of 1998. Despite this huge effort, it is unlikely that the grid will ever be extended to supply power to the smallest isolated rural communities.

The Powerhouse system and support infrastructure offers a viable solution in these locations. The 'fee-for-service' concept is that customers pay Rand 150 (\$30) to have the system installed and Rand 47 (\$8) every month for 30 days' power. In return they receive a utility type service, including replacement of batteries and full maintenance.



The end of Brent Spar - Shell's 14,000 tonne former oil loading and storage buoy is being cut into slices to form the base of a new quay at Mekjarvik, near Stavangaer in Norway. Spar's topsides were first to go - the picture shows the 1600 tonne topsides module being lowered into the dismantling yard last November prior to scrapping. The new quay is expected to be complete by the end of the year.

ABB and **ALSTOM** merge power businesses

ABB and ALSTOM have announced the merger of their power generation businesses in a 50-50 joint company, to be called ABB ALSTOM POWER. The new company will employ some 54,000 people in more than 100 countries.

The new company says that it can better respond to changes and opportunities created by privatisation and deregulation, thanks to the complementary product ranges, geographic scope and R&D capabilities of its parent companies. In 1998,ABB ALSTOM POWER invested about 630 million euros in total R&D, equivalent to 6-7% of revenues. The merger is subject to the customary approvals.

The new company will comprise all of ALSTOM's Energy Sector activities, including industrial gas turbines but excluding the General Electric-based heavy duty gas turbine business (above 20 megawatts), which it is divesting to GE.ABB ALSTOM POWER will also comprise all of ABB's Power Generation Segment, excluding its nuclear activities - today mainly fuel processing and service - and its serviceand financing-based distribution power business.

ABB ALSTOM POWER will be registered in the Netherlands, with its head office located, initially, in Brussels. Observers say that the merger was partly driven by the companies losing US power plant orders to US and German competitors in recent years.

Days before the merger announcement, ALSOM received an order worth 18 million euros from Ghana for a simple cycle power plant at Takoradi on the gold Coast. The plant, which is based on one 123 MW Frame 9E gas turbine, will be owned by the Takoradi International Company, a joint venture between CMS Energy and Volta River Authority (VRA). Electrical output will be sole to VRA under a long term agreement, providing electricity to the local network. Fitted with a water injection system for reduced emissions, the gas turbine will run on crude oil with light distillate for backup, but will eventually be converted to natural gas.



Energy tax will raise £1.75 billion from 2001

Environmental and energy efficiency organisations have given a broad, but cautious, welcome to Gordon Brown's budget announcement that a new'climate change levy' will be introduced from April 2001. The levy - in effect a tax on the use of energy by non-domestic users - is part of the Government's strategy to fight climate change.

But there has also been criticism that the levy will apply to power generated by CHP and renewables-fuelled power plants as well as more conventional fossil-fuelled power stations. Meanwhile large energy users have called the levy unfair, suggesting the arrangements to recycle the revenue collected back to business will penalise intensive users.

The new levy, which follows some of the recommendations made in Lord Marshall's report on the role of economic instruments to cut carbon emissions, will apply to gas, coal and electricity used by business, agriculture and the public sector. But the levy is not primarily designed to raise revenues - these will be recycled in full by a cut in the rate of employer national insurance contributions of 0.5%. A further £50 million per year has been earmarked for investment in energy efficiency measures.

The Government expects the levy to raise around ± 1.75 billion in its first full year and save around 1.5 million tonnes of carbon a year by 2010.

The rate at which it will be charged will be set next year, but'illustrative rates' published by HM Customs and Excise suggest figures of 0.21 pence/kWh for coal, the same for gas and 0.60 pence/kWh for electricity - regardless of how it is generated.

And, while the historic principle of taxing energy use has been established, discussion has now moved on to protecting large users. Ministers are reported to have offered energyintensive industries a 50% rebate in exchange for entering into'negotiated agreements' to cut their carbon emissions. Meanwhile environment groups continue to press for total exemptions for renewables plants.

The budget also included a series of measures designed to influence transport energy use: a continuing, above-inflation rise in the duty on road fuels; reform of company car taxation to reflect carbon emissions; and a reduced rate of vehicle excise duty on cars up to 1100 cc engine capacity.

Other environmental measures include an immediate increase in the landfill tax from $\pounds 7$ to $\pounds 10$ per tonne, with further rises to follow; but expected new taxes on quarrying and the use of pesticides failed to materialise.

See page 8 for a fuller discussion of the climate change levy

Separating and compacting nuclear waste

British Nuclear Fuels Ltd has signed a five-year agreement to give it access to AEA Technologyis specialist facilities for handling radioactive material, in a deal initially worth £6 million but with a potential of £20 million, depending on the volume of material processed.

The AEA Technology handling facilities at Windscale, Cumbria, are used to separate nuclear material into high, intermediate and low level radioactive waste. AEA will compact the separated waste to reduce its volume. As the cost of disposal depends on the level of radioactivity, minimising the volume of waste classified at each level will offer BNFL significant savings in waste disposal costs.

Under the agreement, AEA and BNFL will work together to reduce the overall cost of decommissioning buildings that were used in the early days of the British nuclear weapons and nuclear power programmes. A number of different BNFL wastes destined for the facilities will now be treated as one large project, thereby sharing costs and optimising throughput.

The facilities, known as cells, are large highly specialised sealed rooms within which AEA Technology staff can handle highly radioactive material using robotic arms whilst remaining outside of and shielded from the radioactivity.



More electric Citroen Berlingo vans - after last month's report of B9 Energy's no-emissions electric van (charged either from B9's own wind generator or the green electricity they buy from Northern Ireland Electricity) - Scottish Hydro-Electric has now acquired a couple. In collaboration with Lex Vehicle Leasing, Hydro-Electric will use one of the vans to buzz around its Perth HQ, while Lex will use the other around its Manchester office. Like B9, Hydro-Electric's vans were part funded under the Energy Saving Trust's Powershift Programme (see last month for details).



Slough Estates expands its power station

Steam turbines and gas compressor supplier Peter Brotherhood has won a £2.5 million contract to supply Slough Trading Estate's power station with a new 8.1 MW turbine alternator to replace a 40 year old 6 MW extraction condensing set.

Founded in 1920 as the UK's first business park and covering 200 hectares, the Slough Trading Estate is the



A Peter Brotherhood steam turbine during assembly

largest business park in Europe owned by a single company. It accommodates industrial, warehousing, office and retail premises and directly employs 25,000 people. In 1925, the trading company was authorised to distribute and sell electricity, steam and water generated by the original 1 MW coal-fired power station. By the late 1990s, the power station had a power of 90 MW.

Peter Brotherhood was chosen to supply the turbo-alternator set partly because it can engineer a machine which will fit into the space left by the old 6 MW extraction unit. The company will also be modifying the existing foundations and pipework and installing new cooling water pumps.

City 'should take on emissions trading'

A new market in greenhouse gas emissions permits could create new trading opportunities for the City, says a report published by the Corporation of London.

The idea of trading 'permits to pollute' was first considered a serious way of reducing global warming at the Kyoto summit in 1997, when it was written into international treaty. Emissions permits would be allocated to companies and, if they exceeded their pollution reduction targets, they would be allowed to trade the rest of their right to pollute to those struggling to reach their targets.

While the report suggests the number of jobs initially created by emissions trading would be small - maybe a few dozen jobs in London the growing enthusiasm for this market and the intended tightening of pollution targets could see the market increase to \$150 billion by 2050.

Author of the report, David Lascelles, said: 'London is exceptionally well equipped to run this market: it has the expertise and the infrastructure. But there are competitors, and it should aim to be among the first to start trading because there will not be much room for latecomers.'

The Corporation of London is now pressing the Government for an early start to the UK emissions trading scheme.

On-the-day gas trading on the way

Ofgas has published proposals for reform of gas trading arrangements, including a new on-the-day trading regime for buying and selling wholesale gas to be run by an independent market operator and open to Transco, the gas pipeline operator, gas shippers and suppliers.

The proposed screen-based system would replace the existing flexibility mechanism of the Network Code, where only Transco buys and sells gas as necessary to balance the pipeline system and passes charges on to all shippers. Under proposed arrangements, a new on-the-day commodity market (OCM) will be open to all network code signatories on 1 October 1999.

Already Transco has issued an invitation to tender to potential market operators. A panel evaluating responses to the tender is expected to make its recommendation of a preferred vendor by mid-May.

Callum McCarthy, Director General of Gas Supply, said: 'The network code has been successful in its primary objective of delivering competition to customers on time - including 20 million domestic customers - but it has not been without its problems. Today's proposals aim to introduce clearer pricing mechanisms into gas wholesale trading to make the market more efficient and deliver the full benefits of competition to customers. They match work going on within OFFER to reform wholesale electricity trading arrangements, to achieve a liquid and efficient market for energy.'

Cutting North Sea drilling costs

Aberdeen-based CMPT is

looking for industry partners to develop a new technology -DIODe - of dramatically reducing deep water drilling costs in the North Sea. The current low oil price is leading to a slowdown and, in some extreme cases, the abandonment of exploration plans and a cut in drilling costs is seen as one way of securing future activity.

The DIODe concept is a mobile drilling unit capable of being easily moved from one seabed location to another with minimal surface facilities. It will be capable of drilling both vertical and deviated (angled) exploration wells, supported only by a relatively simple surface support vessel at substantially less cost than a drillship or semisubmersible drilling unit.

Using remote control technology that is already well understood by the manufacturers of remotely operated vehicles, the system will be controlled via an umbilical to a surface support vessel. The same umbilical will be used to supply DIODe with power, drilling fluids and other consumables. It may utilise closed loop drilling fluid systems developed for underbalanced drilling.

Phase I of the project will involve a feasibility analysis followed by a preliminary design study to define the objectives in more detail, identify the technology gaps and set out the plans to fill them.



Renewables review examines new support method

The long-awaited results of the Government's review of the future for renewable energy is yet another consultation paper. Published immediately before Easter, New & renewable energy - prospects for the 21st century presents options for supporting renewables to follow the last Government's Non Fossil Fuel Obligation.

The document suggests that, while renewables are on target to meet 5% of UK electricity needs by 2003, the target of 10% by 2010 is looking increasingly unlikely. But the Government is careful to reaffirm its commitment to the development to renewables as part of its strategy to tackle climate change, to 10% of total electricity and well beyond.

The bulk of the report is a discussion of the post-NFFO - and post-liberalisation - options for continuing to support renewables. Completion of the liberalisation of the electricity industry, the entry of new suppliers who have no obligation under NFFO, current moves to reform the electricity Pool, difficulties with planning approvals for new schemes, and the convergence of some renewables prices with conventional generation have made an extension of NFFO in its current form impossible. The Government is therefore seeking comments on a new mechanism to deliver itimely investment in new renewable electricity generating capacity at minimum cost to the electricity consumer'.

Energy Minister John Battle also announced a restart of Government efforts to support the development of wave power, with a programme to monitor projects contracted under the Scottish Renewables Order and a call for proposals for more RD&D into the technology.

 Meanwhile, Sussex University's Science and Technology Policy Research Unit (SPRU) has published a report which proposes a support mechanism for a new generation of 'clean coal' power stations in the UK. The report says that collecting a levy from consumer bills is the best way of supporting clean coal technologies. The annual costs of a 15-year 'clean coal levy' could be £100 million per year for every 1000MW of capacity, equivalent to approximately 1% of final electricity bills.

Free copies of New & renewable energy - prospects for the 21st century (URN 99/744) are available from the DTI Publications Orderline, tel: 0870 1502 500, e-mail: dtipubs@echristian.co.uk Comments are required by 28 May.

Green power at non-premium prices

Energy Minister John Battle has welcomed the launch of a new green electricity tariff, which will soon offer consumers green electricity at market prices.

Ecotricity - a joint venture between the Renewable Energy Company and Thames Water - is a green tariff using electricity generated principally by renewable energy power stations previously supported under the first two rounds of the Government's Non-Fossil Fuel Obligation (NFFO) scheme. Former NFFO-1 and NFFO-2 schemes are now successfully competing in the open market, after their NFFO contracts expired at the end of 1998.

Mr Battle said: 'The launch of Ecotricity - the first scheme to offer green electricity at nonpremium prices - demonstrates the success of the NFFO scheme in taking renewables from the drawing board to the heart of the open electricity market the Government has created.'

The Renewable Energy Company now has the output from around 60 MW of renewables generating capacity - mainly sewage sludge and solid waste projects - to sell to users, on top of green power bought in from elsewhere.



ec@tricity

John Battle watches Thames' Gordon Maxwell (left) and the Renewable Energy Company's Dale Vince sign the deal

Electricity and gas 'on-course for Y2K'

Independent assessments show that the electricity and gas industries are on course to beat the millennium bug, according to information released by OFFER and Ofgas. The assessments, carried out in January and February, show that both sectors are making good progress towards full compliance.

In electricity, the assessment included companies in all parts of the electricity supply process - generation, transmission and distribution. PB Merz & McLellan found that preparations in the electricity industry as a whole are 71% complete. Work is underway in all the remaining areas critical to keeping the lights on.

Most millennium compliance activities are

expected to be completed by the end of June, says OFFER. The assessors found that the few systems programmed for completion by September 1999 had adequate resources allocated to meet these deadlines and will not pose a risk to electricity supplies at the millennium.

For the gas industry, BG Transco and Siemens Metering Services are the two companies critical in ensuring the continued supply of gas to customers. The independent assessors reported that Transco's preparations are 95% complete, with work on the remaining 5% already under way. Siemens' preparations are 80% complete with work under way on the remaining 20%.

Reforming taxes - the climate change levy

What are we to make of the new climate change levy announced in Gordon Brown's budget speech in March (and described on page 5)? On one hand it is a historic step towards ecological tax reform - switching the tax burden from 'goods' (employment included) to 'bads' - such as landfilling and profligate energy use. But the new levy has also been criticised, by the renewables industry and major energy users alike, for different reasons.

Our Government's target is to reduce greenhouse emissions by 12.5% by 2010. And today I will announce a programme of measures that will cut carbon pollution by three million tonnes.

My first proposal alone will reduce carbon pollution by 1.5 million tonnes. We will now implement Lord Marshall's recommendations and introduce a levy on business use of energy from April 2001. And it will be brought in, after further consultation with industry, on a revenue neutral basis, with no overall increase in the burden of taxation on business. Because we intend at the same time to cut the main rate of employers' national insurance contributions from 12.2 to 11.7%.

We also intend to set significantly lower rates of tax for energy intensive sectors that improve their energy efficiency. Today we are inviting them to submit their proposals. In pursuit of our policies for sustainable development we will also allocate an extra £50 million to encourage business to invest in the new environmental technologies and in renewable fuels. Extract from Gordon Brown's budget speech of 9th March 1999.

The use of 'ecological' taxes to persuade people and businesses to green their behaviour has long been advocated by the green movement. Last year-s report from Friends of the Earth and Forum for the Future (see Energy World April 1998) argued that the use of environmental taxes is essential in a market-based economy, as positive change is unlikely to come about through voluntary action. Ecological taxes work, explained FoE/FFF, through their incorporation into the price of products, which sends appropriate signals to consumers.

The FoE/FFF report listed two potential taxes as likely to have a significant impact on carbon dioxide emissions: continued escalation of road fuel duties, and an energy tax. Putting the former - and several related transport/energy/pollution issues aside for the moment, a substantial new energy tax or levy ought to have been greeted with enthusiasm by environmentalists.

Indeed, a week after the budget speech, Friends of the Earth pointed to its historic nature: 'This budget put the environment at the heart of economic policy-making... this is a vital change in direction of Britain's economic policy, perhaps the most important since the Second World War ... yet it has not been properly appreciated by the economics profession or economics commentators in the media'. Earlier, immediately after the speech, the CHP Association welcomed the new climate change levy, calling it a 'positive breakthrough' but warned that more of the revenues collected should be recycled to boost investment in energy efficiency. The Energy Saving Trust took a similar view, welcoming the levy but expressing anxiety that: 'revenue raised from this tax should be used directly to help the environment'.

Yet an Observer article a few days later was headed: 'Energy tax hurts greens'. The objection here was that the tax will hit users of electricity regardless of how it is generated. So electricity from renewable sources will be taxed every bit as much as power from fossil fuels. The Renewable Energy Company's Dale Vince called the levy: 'perverse and counterproductive, a major step backwards'.

Meanwhile, the Energy Intensive Users' Group has called for protection for major users from the levy, saying that EIUG members were ready to give commitments to Government to reduce greenhouse gas emissions. The Government has already moved to turn this readiness into action. It is offering substantially reduced levy rates (around 50%) to industries which sign-up to 'negotiated agreements' on improving energy efficiency.

So is the new levy a major step on the road to sustainability, or a body blow for British industry (or both)? Undoubtedly, there are problems with the levy, among them:

- The method of recycling the revenue will effectively take money from large energy users which employ few people (eg the chemicals industry) and give it back to modest energy users which employ many people.
- The £50 million earmarked for boosting investment is simply inadequate to cause any significant effect - many argue that much more of the £1750 million should be used in this way.
- The treatment of electricity generated from renewables (and, to a lesser extent, CHP) in the same way as conventional fossil-fuelled generation prevents 'green power' from having a built-in price advantage. Exemptions here would surely help to reduce carbon emissions.

On the other hand, the levy should affect the behaviour of large energy users, whether imposed in full or reduced in favour of binding agreements on improving energy efficiency. The uncomfortable truth is that currently low energy prices have effectively taken energy efficiency off the agenda for many companies and only legislation or higher prices will put it back. Indeed the levy could be seen as a way of clawing-back some of the very substantial energy price reductions enjoyed by users in the last decade.

However, while major users may alter their behaviour, it is less clear how smaller energy users, and those where energy represents just a few percent of total spending, will see an incentive to change.

The devil, as always, is in the detail and it unclear at present how much of that detail is negotiable. Might exemptions for green generators be available, will more of the proceeds be allocated for investment support, and will industry find an acceptable compromise on rebates?

Only with the answers to these questions can the new climate change levy be fully judged.

Supplying the sub-100 kW market

Eastern Electricity has won a contract to supply catalogue store chain Argos Distributors Ltd with electricity until 2001. The deal involves over 400 sites in the sub-100 kW market and is worth more than $\pounds 2$ million. Eastern was able to offer a number of value-added services, including single billing of all sites to a central point and electronic data interchange (EDI), through which Argos receives an electronic bill sent directly to its energy management system.

Eastern has also signed a three-year agreement with the Youth Hostels Association in the new sub-100 kW market. The £650,000 deal will supply 262 YHA premises nationwide.



One of the newer Youth Hostels now supplied by Eastern Electricity

United Norwest saves £150,000 with new electricity contract

Retailer United Norwest has successfully selected a new electricity supplier and made a saving of $\pounds 150,000$ with the assistance of Team Trader software, reports the Milton Keynes-based company EAA Ltd.

United is the third largest co-operative retailer in the UK employing 10,000 people and with an annual turnover of £750 million. Its annual electricity expenditure exceeds £4.8 million via the receipt and payment of 22,000 invoices.

The load portfolio consisted of one 1.5 MW distribution warehouse and thirty 100 kW hyper and superstores spread over four different electricity company areas. In preparing tender documents, Energy Manager Keith Maloney, was faced with several problems. First, he was new to the company and at the time he joined, United Norwest was reaching a critical stage in reviewing its energy strategy. Secondly, information was sparse; there was no historical billing database, half-hourly data was both limited and prone to gaps and previous tendering information was unavailable.

Team's challenge was to facilitate the construction of a billing database from which information could be extracted for tendering purposes, to produce a valid set of halfhourly profiles and to provide an efficient analysis tool enabling more time to be spent proactively negotiating with suppliers.

The first step was achieved by entering 12 months' of billing history, sites and utility

information into the Team Energy Accounting database. Each existing supplier was approached and asked for half-hourly data, the inducement being the opportunity to submit a tender themselves. The Team Energy Accounting database information was then uploaded into team Trader and an overview report was able to highlight any gaps in the data. The half-hourly profiles were imported into the trader Profile Editor and any gaps in this data were easily populated.

There were noticeable

inconsistencies surrounding the standing data that appeared on the historical bills. To eliminate the problems that this could cause suppliers, offers were requested to be priced on an energy only basis at gird supply point.

The final tender document was e-mailed to all the potential suppliers. Submitted offers showed a significant spread of $\pm 150,000$.

The Trader Profile Editor collated the half-hourly profiles and generated accurate analysis results. By removing the time element attached to traditional analysis methods, more time was available to be spent in secondary negotiations which in this case resulted in a further 2.9% reduction from the quoted price.

The process of constructing the tender to selecting the successful supplier was completed in under three weeks, with the time spent by the customer reduced from up to two weeks to only four days.

Generators dominate industrial supply market

The UK industrial and commercial electricity market (above 100 kW) remains in a state of flux, with nearly 3,000 sites switching supplier between October 1998 and March 1999, according to the latest research from Datamonitor. However, the three large generators continue to dominate.

Eastern Electricity is still the largest electricity supplier to the commercial and industrial market in the UK measured by the number of sites supplied - despite Northern Electric increasing its market share of sites by nearly 6% over the period. Northern has been lifted to second largest supplier in the commercial and industrial sector above Southern, Yorkshire and London, although the company has not had such an impressive impact on the market in terms of the volume of electricity.

Eastern Electricity remains the market leaders in terms of volume market shares, with second and third places taken by PowerGen and National Power. Even excluding contributions from EME and MEB, PowerGen and National Power together supply nearly 23% of the total electricity used in the industrial and commercial market.

These two generators continue to target large volume customers . By including the contributions from EME and MEB, PowerGen and National Power have become the largest suppliers by volume, supplying a combined 31% of all electricity to the industrial and commercial market.

A single market for electricity in Europe ?

Robert Tudway, head of the Energy Group of UK law firm Nabarro Nathanson looks at the issues surrounding the implementation of the Electricity Directive.

On 19 February this year the first steps were supposed to have been taken to implement the Electricity Directive, which is designed to create a single market for electricity within the European Union.

The Directive provides for the gradual opening of the electricity market in three steps, the first step in February 1999, the second and third steps one and four years later.

The degree of opening of the markets in each members state is determined by reference to the minima which must be achieved - in the case of the first stage of opening, the minimum being the liberalisation of the market for consumers with an average annual electricity consumption of 40 GWh and in the subsequent stages, lowered thresholds of to 20 GWh and 9 GWh.

This means that by February 2003 a minimum market opening of around 33% should have been achieved in all member states. Of course in some markets, such as the UK and Sweden, the market opening will be complete.

MPLEMENTATION

Opening the market involves implementing a series of substantial changes in the electricity supply industries of the member states. The changes require all industries to operate according to the same economic rules, and for power producers and consumers to be able to buy and sell within each member state and between different ones with equal facility. This means first, 'unbundling' large monolithic electricity companies by making them account separately for their different activities, notably electricity generation, transmission, distribution and supply.

Secondly, companies willing to supply power must be entitled to own and operate electricity generating capacity. The Directive facilitates this by setting down procedures by which electricity generators may be permitted to construct new generation capacity, through either an 'authorisation' or 'tendering procedure'. The authorisation procedure is one where the generation plant can be built if certain statutory consents are obtained - like our consent procedure for building new power stations, under Section 36 of the Electricity Act.

The tendering procedure involves tendering to an authority who will buy or procure the purchase of the power, the tendering process to be 'objective, transparent and non-discriminatory'. Third, the power provider must have access to its customers. The Directive provides for this by means of either a transmission system operator giving third party access to power providers to transmission or distribution networks, or the appointment of a 'single buyer' who buys the power and sells it on to the power generators' customer, in context of a bilateral deal between customer and generator under which the ultimate price is fixed.

To some, the 'single buyer' model is seen as a fudge - a gesture towards market freedom, but without destroying the monopoly presence of existing utility monoliths.

WHAT ARE THE RESULTS?

Despite the barriers and the cynics who may be able to persuade us of the impossibility of lowering them, implementation is underway. Some, such as the UK, who have been ahead of the game, have relatively little to do to achieve implementation - although it has to be said that in the UK's case, full implementation has not yet happened. Although in some other member states, such as France, it is more a question of what is envisaged rather than what has happened, there is a sign of promise.

The great majority of member states have chosen 'third party access' rather than the 'single buyer model' and also will permit new electricity generation to be built on the initiative of an electricity producer who has been granted an authorisation, rather than new generating capacity being subject to a tendering procedure operated by a single buyer. The threshold for eligible customers is variable, however in England, Germany, Sweden and the UK the market is open to all consumers; but in France, Denmark, Belgium and Luxembourg the threshold is as high as a 100 GWh.

Where does this leave us? The answer is some action but still a lot of promises. This year will be an interesting one, as the Commission and the member states with more progressive energy markets bid for a truly open arena in which to buy and sell power.

DIRECTIVE 'IS MERELY AN INGREDIENT' Gill Rider from Andersen Consulting adds:

The Directive provides a framework within which to move towards a single European electricity market, but it is far from the 'Big Bang' liberalisation effort we have seen in other industries like transport or telecommunications.

Economic and technological realities are the more likely catalysts of a single European electricity market:

 Large electricity users across Europe are looking to reduce costs to remain globally competitive. US utility Enron recently grabbed large industrial customers from under the noses of incumbent Dutch and German utilities even before liberalisation.

- Utilities are seeking new profit streams and growth opportunities to replace lost revenue. Frequently, these opportunities lie in neighbouring countries.
- Smaller, cheaper, cleaner forms of power generation are creating lower barriers

to entry and changing the dynamics of the industry. New generation will be increasingly localised and smaller.

 Electricity is becoming a commodity and as such will be traded like any other commodity. Trading skills will increasingly determine the success of companies in the industry.

Thus, the Directive is more an ingredient in the liberalisation 'cake' than the 'oven' which produces it.

Integrated IT systems 'essential' in new markets

by Ian Staines, General Manager and Director, Northern Aurora Ltd

The deregulation of energy market can be described quite accurately and simply as the end of the monopoly supply rights and the introduction of an open, competitive market. The simplicity of this concept could scarcely be in greater contrast with the reality of the change. The difference has been dramatic, enormous and complex. Nowhere is this change more apparent than in IT, writes lan Staines.

At the root of deregulation are the key factors which will determine the success of companies in this new competitive environment, regardless of whether they are already operating in the energy market or a new entrant. In each of these vital areas, demands and needs have changed substantially and the differences have been fundamental and wide ranging. Let's consider them.

CUSTOMER ACQUISITION

When the essence of the new market is choice, companies have to be proactive in attracting customers and tracking marketing and selling activity. For companies which traded in the monopoly era, this is a new requirement, while new entrants with experience of other competitive markets must cope with the uncertain dynamics of this new arena.

PRICING AND TARIFFS

Monopoly energy suppliers could manage comfortably with essentially rigid pricing and tariffs. The new market introduced the need to initiate tactical prices and respond quickly to competitor's tariffs and, as some companies offer to supply more than one fuel, the need to integrate information and pricing from several sources.

In this new environment where the product itself is a commodity, pricing and terms of business or payment are one of the main decisive factors in distinguishing one company's offer from another.

ADMINISTRATION

Registering a customer and arranging supply and meter reading used to be much more straightforward when there was only one company responsible for each customer's supply of gas and similarly for electricity. Now, with duel fuel supply and flexible pricing, billing can be complex and so too the sales ledger and customer records.

CUSTOMER SERVICE

Today's customer expects and demands a high level and standard of service quickly and efficiently. Many public and commercial organisations have already created the onestop call centre for all enquiries and requirements and removed the old irritation of transferring the caller from one section to another. Since price differences may be very slight, service may become the most influential criterion for the potential customer.

THE COST OF SERVICES

If the cost of the fuels themselves, distribution and metering are very similar from one company to another, it is the cost of customer services which will be the difference between one company's costs and another. So the cost of service would make the difference between not only one company's price per unit to the customer, but also its profitability.

IT systems with the capability to deliver these needs as cost-effectively as possible are the key to carefully planned customer acquisition, to fast response and flexibility in pricing, to highly organised administration and billing, and to very efficient and swift customer service.

So, as prospective entrants consider the requirements for the new market, top of the priority list would have been a single, highly integrated, comprehensive, efficient IT system. This would enable all relevant files to be updated by entering data only once, supporting not only these needs but the whole business.

But when they looked at the reality of the existing systems and then the timescale imposed by regulators, most faced a gulf to be bridged in a hurry. Quite simply, they ideally needed to start from scratch but, with perhaps only three years to be ready, it was, to say the least, a difficult task.

Instituting new systems is such an enormous and complex challenge requiring so substantial an investment that even large companies in Britain have been very cautious about taking it on. As a result, most companies are currently operating with systems far from their ideal. Instead, to make sure that they were ready for the opening of the market, they simply automated their legacy systems and manual processes.

However, now that companies are trading in the open market, the determination and urgency to consolidate and integrate is even stronger. As the only energy company which has developed and is now marketing an integrated system, (proven and in use with Northern Electric), we see this almost daily through the enquiries we receive and the discussions we have with companies which are either trading or planning to enter the UK market. They seem to be attracted by the prospect of having an integrated system faster and without having to outlay the full cost of creating their own.

Money is now not only an issue but the catalyst for change. The commercial reality of maximising revenue collection has given this need new momentum.

Historically, utility databases listed customers as premises rather than companies or individuals. This already meant that companies could be lost when they moved. With many more customers now changing supplier, the need to keep track of the individual or business is suddenly much greater.

The second urge is business retention. In the competitive market, larger established companies are wary of new entrants without legacy systems who may be better equipped to meet the new demands.

Eventually, however reluctantly, all market entrants are having to face up to the fact that, as some companies introduce integrated systems, others will have to follow. Because an integrated system will be the key to competitiveness, profit and, ultimately, to success or failure. **Contact Ian Staines at Northern Aurora,** tel: 0191 210 3801, fax: 0191 210 3900

Thermal engineering cuts energy use to speed production

Methods of saving energy in manufacturing processes are continually being sought as companies strive to reduce costs. Mannings Thermal & Environmental Engineers of Southport have discovered that cost savings are often accompanied by faster production.

Founded over 40 years ago, Mannings are one of the worlds leading manufacturers of specialised heating systems for industry. They design and manufacture furnaces and equipment for any stress relieving process and stock a vast range of products used by heat treatment companies. Over the years they have found that the same technology and expertise can be applied to other uses and numerous energy saving designs have been custom built for the manufacturing industry.

CAR INTERIORS

Dramatic improvements in efficiency were achieved in the manufacture of car interiors by a design innovation which, though based on a simple concept required specialist know-how. Mannings have been able to speed up production and reduce energy consumption by modifications to the thermoforming tool presses which are used to produce car trims, such as door panels, roof liners, parcel shelves and other moulded parts.

The presses operate by bringing together two preheated metal tools which compress the raw material between them to create contoured shapes. The improvements were achieved by embedding electric heating elements inside the moulding tools so that the heat could be directed at the point where it is required. As a result, power savings of over 75% have been recorded and heating time has been reduced by half.

The thermoform tool heating system was developed in conjunction with the Lear Corporation of Colne in Lancashire, which manufactures interiors for many major car companies such as Jaguar, Rover, Toyota and Honda. A prototype unit was produced on which flexible mat ceramic heaters were installed to heat the front working faces of the top and bottom tools. Each 'pocket' in the rear of the tool castings was then fitted with individual heating elements. Measuring thermocouples were fixed to various points on the tool and temperatures, as well as power consumptions, were monitored and recorded.

On production units, the heaters are arranged vertically and horizontally in the moulds to create separately controlled temperature zones. This enables different amounts of heat to be applied at different parts to cater for the complex shapes being formed by the press. Mannings had to work closely with the specialist tool designers so that the heating system for each new tool could be individually assessed and then custom built to suit the component to be manufactured.

So that tools can be changed after each production batch has been completed the electrical supply can be disconnected from the control system by means of flexible, quick release power and control cables. These cables connect the tool to a control panel which contains the necessary controllers, contactors, chart recorders and power unit. Digital readouts on the panel show the temperature allocated to each zone and this can be checked against the actual measured temperature.

Since each press is used to produce many different shapes, the control panel is pre-programmed with individual heating cycles for every tool. By selecting the tool number on the panel, the correct cycle is automatically initiated. Numerous programmes can be retained in a single programmer.

Graeme McFarlane, engineering manager for the Lear Corporation said: 'before installing the thermoform tool heating system we had to wait eight hours for the tool to reach the correct moulding temperature this new development has made significant improvements to our production process as well as reducing running costs'. As an added bonus it has been found that downtime between mould changes can be almost eliminated. This is made possible by the use of a standby heating system which is used to preheat moulds so that they can be made ready to be transferred to the moulding press when required. They are then simply plugged in and production of the next moulded shape can begin immediately.

SEAL PRODUCTION

Similar improvements have been made in the production of seals, with Mannings this time installing a low voltage heating unit to preheat the moulding tools for James Walker & Co. Ltd at its Cockermouth plant. This has eliminated a production bottleneck and increased output. Before installing the new unit, James Walker used steam as the source of heat but this was inefficient and caused production delays. An urgent solution to the problem was sought and Mannings carried out a study of the requirements before recommending the custom built design.

Walker seals are the UK's largest gasket and seal manufacturer. Their range starts at simple tap washers and extends to special seals of up to 2.5 m in diameter used in the petrochemical steel, power and shipping industries. Tony Magorrian of James Walker said: 'the new preheat unit has made a vast improvement, since the tools are now warm enough to form within minutes and the in-built flexibility allows production to be varied as required'.

The new facility has been specially designed to preheat moulding tools used in the manufacture of high performance rubber seals. To achieve the quality required it is essential that the tool is heated uniformly to the correct temperature. This ensures that the rubber will 'flow' to take on the shape of the mould when it is transferred to the press.



Mannings had to come up with a design which would not only allow several metal tools of various sizes to be heated simultaneously to a controlled temperature of 170°C but also maintain temperature uniformity within very tight limits. The new unit can hold up to 10 tonnes of moulds and these are placed on a refractory base which has a top layer of load bearing firebrick. A motorised, insulated cover is then moved over the base to form a sealed heating chamber.

The thermal performance of the process lies in the design of the heating system which has been incorporated into the base construction. Low voltage ceramic heating elements are laid in slots in the base brickwork so that the whole hearth area is uniformly heated. The elements were selected from the standard range manufactured by Mannings and use multistrand nickel chrome wire electrically insulated by means of interlocking sintered alumina beads. These elements have a high mechanical strength and are easily removable for maintenance purposes.

The mobile cover of the preheat unit is manufactured from sheet steel, fixed to a steel superstructure. This is internally lined with low thermal mass insulation secured to the roof and walls by inconel studs and quick release washers. The cover is motorised by an electrically powered haulage unit which enables it to be moved away from the hearth to permit access. A re-circulation fan has also been incorporated into the cover design as well as internal air distribution ducting. This helps to produce uniform heat distribution throughout the chamber. The cover is open at one end since one of the chamber end walls is fixed to the hearth base. Special seals on the cover, end wall and hearth ensure performance and energy efficiency. Control of the unit is from a panel which incorporates automatic temperature

control, temperature indicators as well as all the necessary safety interlocks and alarms.

FURNACE TRANSFORMATION

One of the most unusual and remarkable examples of energy savings was a project which Mannings have recently completed in Poland where they were able to modernise an old brick lined bogie hearth furnace and convert it from electricity to gas.

The furnace, which is over 25 years old, was originally manufactured in Russia but had never actually been used. The work was carried out for Enargomontaz - Polnoc who wanted to stress relieve large steel pipe bends of up to 1.5 m in diameter and 40 mm thick. They were looking for energy efficiency and a rapid cycle time as well as high quality end products. Mannings visited the factory in Sochaczen, to the west of Warsaw, to survey the furnace and to establish how the transformation could be achieved. After taking measurements and doing some calculations they were able to put forward an acceptable proposal which involved extensive alterations to the unit.

While the customer set about demolishing the unwanted parts of the furnace and preparing the gas supply, Mannings completed their customised design and began manufacturing the new components. A kit of parts was then sent to the site in three containers to allow the reconstruction to commence.

The furnace hearth was completely replaced using hard wearing firebrick and the internal walls were lined with modern low thermal mass ceramic fibre insulation. It was necessary to fit a new door and chimney and to install an efficient sealing system to minimise energy loss from the heating chamber. The new heat source comes from medium velocity nozzle mix gas burners which were positioned on opposite sides of the furnace. The burner ancillary equipment including flow controls, pressure regulators,

Preheat heated tooling system

shut off valves as well as an air/gas ratio balancing system were supplied as preassembled units which had been tested to the latest safety standards before despatch.

A feature of the new installation is the forced cooling system. This comes into operation automatically at the cooling stage of the stress relieving cycle. At a predetermined point in the cycle the chimney is by-passed and cooling fans blow air over the hot products through ports in each side of the furnace and this air is exhausted by special pneumatically operated roof vents.

The furnace control panel includes a microprocessor programmer as well as a multi-point chart recorder. Temperature measuring thermocouples monitor the operating temperatures inside the furnace and up to 12 thermocouples can be connected to the parts being heat treated. These thermocouples are plugged into sockets at the side of the unit so that they can be linked up to the panel. The furnace control system also includes many safety features and operation is fully automatic. Up to 15 tonnes of pipe can be heat treated to a temperature of 1150°C in a single load and the temperature uniformity is maintained to within plus or minus five degrees.

Four engineers travelled to Poland to carry out the modifications, which took six weeks to complete. Commissioning trials were also conducted to ensure that the system met the requirements of the customer. Further orders for similar work is expected from other clients who wish to improve quality and reduce running costs by replacing outdated equipment. Contact Mannings Thermal & Environmental Engineers, tel: 01704 538202, fax: 01704 545898, e-mail: services@mannings.uk.com or visit the website at: www.mannings.uk.com



Solving the policy jigsaw

UK energy policy has never been so complicated, and the Government seems to be forced to face in several directions at once at the moment. Protecting the coal industry while cutting carbon emissions; securing electricity price cuts through liberalisation while encouraging energy conservation; imposing an energy tax while exhorting industry to become more competitive - these illustrate a mass of contradictions in aim. The Government's declared energy policy - to achieve secure, diverse, sustainable energy supplies at competitive prices - itself contains similar contradictions. Against this background, The Institute of Energy's conference: Energy - solving the policy jigsaw, held at the CBI in March, was an opportunity for representatives of government, the regulators and industry to try to fit the policy pieces together into a coherent picture. Steve Hodgson was there.

A the last moment, Energy Minister John Battle had to switch his morning slot to last thing in the afternoon in order to fit in some pressing Parliamentary duties. He was soon into his now familiar storming style, even displaying a distinctly irritable mood, but started gently with a story from his childhood in Leeds. The Battle family were fond, apparently, of doing jigsaws together around the kitchen table and some of the jigsaws arrived in the home secondhand (recycled, as John Battle put it).

The most difficult jigsaws, said Battle, were those which arrived in the wrong box, leaving the Battle children to assemble the pieces without an overall plan to work to. He followed this tale with a restatement of the Government's own energy policy jigsaw - trying to fit secure, diverse, sustainable energy supplies at competitive prices into one coherent picture, and all to be achieved within privatised, liberalised and deregulated energy markets.

The day started with a contribution from Professor John Chesshire, immediate past President of the Institute and, coming from Sussex University's Science Policy Research Unit a highly influential thinker on energy policy and advisor to several Select Committees.

Chairman of BG plc David Varney then delivered a wide ranging talk, eventually homing in on an issue which hovered over the proceedings throughout the whole day - the recently-announced climate change levy or business energy tax. Varney was clear that proposals then just emerging from the Customs and Excise would harm the competitiveness of UK industry by adding, he said, around 30% to the wholesale price of electricity and over 50% to the wholesale price of gas. The levy was only a distant relation to Lord Marshall's proposals on economic instruments to cause business to play its part in tackling climate change, he added. Far from being based on carbon content, the levy is to be based simply on energy content and represents a tilting of the playing field away from gas, said Varney.

Varney continued that the levy will not be neutral in its impact; the offsetting reduction in employers' national Insurance contributions will be spread across a different and wider set of taxpayers than those subject to the tax, and it is likely to set back the advance of CHP. (See also page 8 for a discussion of the new levy).

During questions, consultant Martin Fry said that some new incentive - an *imperative* as he put it - to revitalise interest in energy efficiency was essential as much of the momentum of recent years had been lost through falling energy prices. Maybe the new tax will do. John Chesshire suggested that UK industry's failure to invest in equipment or people in recent years showed that it has little real interest in remaining internationally competitive- and so its opposition to the new tax could perhaps be ignored.

The other one of Marshall's 'economic instruments', carbon trading, will emerge over a longer timescale than new taxes can be brought in, added Chesshire, maybe not until around 2005. Even then, the scope for fraud and double dealing will be immense. Some industries might prefer to take their chances with trading and will thus fight the imposition of an energy tax.

Earlier, David Varney warned that an end to UK self-sufficiency in energy may be closer than many people think. The Government's own figures show that we have already recovered around 60% of our proven and probable reserves of oil, and nearly half the available gas. With UK gas demand rising at some 5% a year, we will be increasingly dependent on imports within the next 10-15 years, he said.

Varney was also keen to point out coal's unique - and continuing - role in power generation. While gas had become the fuel of choice for baseload generation, the capital-intensive supply chain from reservoir to consumer meant that gas-fired generation 'may not achieve sufficient capital efficiency compared, for example, with coal which can readily be stored at power stations and used as required'.

Callum McCarthy, the still relatively new combined energy regulator, ran through his organisation's priorities for 1999. Aside from getting his own new operation up and running, these are:

- a new emphasis on the social dimension,
- · electricity and gas wholesale markets,
- price reviews for the 14 public electricity suppliers,
- · industries, and
- year 2000 readiness.

OFFER/Ofgas now has a team of top managers team to take the 'cult of personality' out of regulation, said McCarthy, and an advisory board of five outsiders to deliver new perspectives.

McCarthy said almost nothing about environmental issues and, questioned on this apparent gap, replied that only the Government could really answer environmental questions and that his job was to carry out only the duties with which OFFER is specifically charged.

This is the Spottiswoode defence - the last gas regulator Clare Spottiswoode put an end to an energy efficiency levy instituted by

or at least having a go!

her predecessor, saying that 'tax raising' was a matter for Government, not her.

The senior Government representative present, Director General of Energy at the DTI, Anna Walker, who was also chairing the conference with some style, backed him up. It has to be the Government - not the regulator - which walks the environment/liberalisation tightrope, transparently and in consultation with the industry and public, she added.

PowerGen's Nick Baldwin then gave the view from one of the big players, but without giving away anything on the PowerGen view of policy issues. The generator has recently added electricity distribution to its portfolio of activities through the acquisition of MEB. This is an essential move, said Baldwin, in the company's bid to 'become one of the five or six major players in UK electricity and gas'.

Tony White, the Global Coordinator for Utilities for Dresdner Kleinwort Benson asked whether competitive markets or Government intervention is best at delivering sustainable energy, coming down firmly with the former. To illustrate the point, White said that competition in electricity generation elsewhere had successfully driven down electricity prices. However, in the UK, the big three generators (who set Pool prices for 90% of the time) are still firmly in control of the market, and the moratorium on new gasfired generation capacity is helping to perpetuate the situation. When this is ended and more new plant comes on-stream, we will see something like the recent collapse in German electricity prices, he said.

White was also optimistic that a new energy services approach, similar to that which has driven down bills in industry, could take root in the newly-liberalised domestic energy markets. This and competition among suppliers will do more for householders that government and regulators ever can, he added.

Stewart Boyle, late of Greenpeace, Friends of the Earth and the Association for the Conservation Energy but now speaking for the Combined Heat and Power Association, put the case for CHP to be at the heart of new Government initiatives on climate change. If the current renewables (10% of total UK electricity by 2010) and CHP (10 GW or more of capacity by 2010) targets were met, then the two technologies would be responsible for generating very nearly a quarter of the UK's total power demand in little over a decade from now, he said.

Boyle suggested a different answer to Tony White's question on markets versus government intervention, suggesting a 'third way' of using market forces to achieve set social and environmental objectives. This is the way the Dutch Government, for example, has taken CHP from generating 10 to 30% of Netherlands total power needs in just over a decade.

Carbon trading and energy taxes should both be part of the third way, he said, pointing to the risk of the UK being left behind in instituting a carbon trading framework if it doesn't begin work soon. As for energy taxes, Italy is introducing one this year, the Nordic countries have been operating energy/carbon taxes for years and Germany has signalled its commitment to one, said Boyle, adding that in Britain, the new energy tax would do little more than claw back some of the massive falls in energy prices experienced by consumers since privatisation.

But new proposals for a UK 'climate change levy' need considerable development if they are to make a difference to carbon emissions. Current proposals treat CHP and renewables the same as fossil fuelled electricity generation - both should receive rebates, said Boyle. And the £50 million a year earmarked to support investment in renewables and CHP is simply not enough, he added. The CHPA would like to see energy tax rebates for CHP and the recycling of some 20% of the total tax income to support CHP, renewables and energy efficiency.

Then Mr Battle arrived with his jigsaw. People in the UK are opposed, he said, to nuclear power, oil prospecting, wind turbines, CCGTs, waste-to-energy plants and just about everything else but won't give an inch in terms of access to and use of energy. So the formulation of any energy policy is bound to be both difficult and unpopular. Fundamentally, the problem is achieving the correct balance between cheap energy being good for consumers and bad for the environment, he added.

He did concede that the current structure of the electricity and gas industries, designed more than ten years ago in order to privatise them, now needs a major overhaul. Thus the fuels for power generation Review and the moratorium on gas-fired powered generation while new structures are developed.

Pressed on progress on renewables by Anna Stanford from Friends of the Earth, Battle defended his Government's record (Battle said that the fifth renewables Order was the largest yet) and said that the emergence on regional assemblies will help renewables and local CHP plants. Some regions will decide to fight the NIMBY (not in my back yard) approach and positively embrace new plant, he added.

The long-awaited Review of how to meet the 10% renewables target by 2010 will be published 'very, very shortly', said Battle, but he was seeking maximum interdepartmental support first! (The report was subsequently published on 30 March see page 7).

Battle went on to insist that the main barrier to renewables development lies at the local planning department level - the success rate for new wind power schemes was particularly low. Asked about the potential long-term nuclear contribution, Battle repeated the previous answer: the Government had not put a stop to new nuclear power stations, the people (and planners) had.

Eventually, the Minister may perhaps have fitted a few more pieces into the energy policy jigsaw than any of the other speakers, but the overall picture is still sketchy.

Conference proceedings are available from Sam Cobbina at the Institute for £20 + VAT for non-members and £10 + VAT for members.

On the brink? By Professor Ian Fells, FEng, FRSE, Finste Energy in the next millennium

Oil glut, low prices and the prodigal and increasing use of energy are in stark contrast to efforts to control and reduce carbon dioxide emissions to try to mitigate destabilisation of the weather machine. Over-optimistic assessment of the potential for renewable energy and disaffection with nuclear energy will dash hopes of reducing carbon dioxide emissions unless fiscal instruments such as carbon taxes are introduced and society's attitude to conspicuous energy consumption reversed. So said Professor Ian Fells, delivering the 1999 Melchett Lecture in March this year. Below is a slightly edited version.

Energy has always played a central role in economic growth. For developing countries every one percent growth in gross domestic product requires a 1.5% growth in energy supply; this falls to 1% and even 0.5% in developed countries. Major growth areas over the next 50 years will be developing countries where economies and population are increasing rapidly. The world population will grow from just less than six billion in 1998 to ten billion by 2040. Energy demand will double and perhaps treble from its 1990 value by the year 2050.

There seems to be a glut of fossil fuel energy at present but every year the world consumes fossil fuels that took two million years to form - and 20% of the world's population (that is, the developed world) consume 80% of world energy.

In the developing world fuel wood, a non-commercial form of energy, provides high percentages of overall energy demand. In Nepal, for example, it provides 60% of energy and world-wide it provides 12%. Ironically this renewable fuel source is actually running out in parts of India, southeast Asia and sub-Saharan Africa where a villager can take five hours a day just collecting wood for the evening meal.

This also illustrates one of the abiding problems of our times, fuel poverty. Two billion or one-third of the world's population are in the fuel poverty trap; they do not have a connected electricity supply and neither do they have safe drinking water.

POLLUTION

Emissions from fossil fuels are polluting the world. The most obvious culprit is sulphuric acid which is formed when sulphurcontaining fuels are burned. In the UK only a few years ago 250 kg of sulphuric acid was put into the atmosphere for each man, woman and child every year. Some improvement has been achieved as a result of European Union regulation.

The damaging effect of this kind of pollution can be seen in the erosion of the gargoyles on Lincoln Cathedral and perhaps more impressively on the Taj Mahal where the brilliant white marble is turning yellow, the result of emissions from a petroleum plant some 30 miles away. The difficulty here is that the polluter doesn't pay.

Perhaps the most disturbing pollution emission from burning fossil fuels is carbon dioxide. This is responsible for some 60% of the greenhouse effect; the rest is due to the other greenhouse gases, methane and nitrous oxide, ozone and so on. The result of global warming according to the latest report of the International Panel on Climate Change will be a steady 0.2°C rise in global temperature each decade through

the next century. There will be an associated 5 cm rise in sea level each decade. An increase in

to restore the atmosphere to its preindustrial, pristine state will require draconian legislation and policing

extreme weather incidents such as hurricanes and storm surges is already evident, and in parts of the South Pacific and the Caribbean it is impossible now to insure property.

The carbon dioxide problem was discussed in Kyoto in 1997 and a protocol developed which involves reducing carbon dioxide emissions by 5.2% over 1990 emissions in the developed world by around 2010. The US is a particular culprit where 5% of the world population emits 25% of world carbon dioxide. The UK is committed to a 20% reduction! This will be extraordinarily difficult to achieve and even then hardly begins to attack the problem. To restore the atmosphere to its pre-industrial, pristine state will require draconian legislation and policing.

The Global Coalition, a collection of

industrialists with interests in maintaining the sale and use of fossil fuels has taken advertising space in the US and elsewhere to suggest that although global warming may be occurring it is not due to carbon dioxide emissions. This suggestion does not bear scrutiny; it is worth remembering that without greenhouse gases in the atmosphere at all, the world would be on average 30°C colder. It is the steady increase in temperature, going hand in hand with a steady build up of carbon dioxide in the upper atmosphere which has been observed since 1900 or so, which is worrying and which is beginning to destabilise the weather machine.

Two major culprits as far as carbon dioxide production is concerned are the electricity supply industry and transport. There are 600 million motor cars in the

> world at the moment and that number is expected to increase to about 3 billion by 2020. In the UK a 50-

70% increase in cars is anticipated. The numbers of aircraft are expected to double world-wide between now and 2015. It is difficult to contemplate air transport not using hydrocarbon fuel. There is some possibility with cars of using electric traction, maybe hybrid cars or even cars with energy stored as kinetic energy in flywheels.

But hydrocarbon fuels will continue to be the basis for transport. In China, for example, there will be a five-fold increase from 10 million vehicles to 60 million by 2020; it is to be hoped it will be carried out with new technology, low emission vehicles but that will be expensive.

It is very difficult to get people to change their attitude towards private transport; the company car is a powerful deterrent to change. Provision of better public transport using tax on transport fuels to fund it and subsidise electric traction would be a start.

The electricity supply industry, despite the continuing increase in demand for electricity, which runs at between 2 and 3% per annum, has been more successful in reducing carbon dioxide by switching from coal-fired generation to natural gas. The embryonic new renewables market together with the use of nuclear power, if we continue to develop the nuclear industry, also point to a possible reduction in carbon dioxide in the future.

ENERGY CONSUMPTION

The world seems hooked on energy as though it were a drug. We cannot do without it and we seem to require personally more and more each year. The average American consumes 5 tonnes of oil equivalent per year and in Europe it is three tonnes of oil equivalent. In some parts of the world of course it is a few tens of kilograms, which reflects the wide disparity between the 'haves' and the 'have-nots'. It would seem to be impossible to reverse the technological clock; however, we can use energy more efficiently; a move in that direction is beginning to take place, but it will be a long haul.

Conspicuous waste is the order of the day, especially where energy is cheap as in the USA for example, where gasoline is less than \$1 a gallon and 4-wheel drive, 5 litre vehicles are common, even for the school run. It is going to be extremely difficult to disentangle economic growth or lifestyle from ever-increasing energy demand.

There is some concern that despite plentiful reserves of oil, at least to last another 50 years or so, it is distributed

unevenly around the world with 65% of reserves being in the politically volatile Middle East. It is not surprising, therefore, that there has been a

series of wars over the last 50 years connected with ensuring the continuing supply of oil to countries like the United States and Europe where the transport

market is huge. The US imports 55% of its energy requirements and Europe about 50%. The most recent example is of course the Gulf War, fought to protect oil supplies from Kuwait.

Gas supplies tend also be based on the Middle East and Russia, where 70% of world reserves are situated. There is ample opportunity for the formation of cartels where gas is supplied to Europe and elsewhere via pipelines. It may be that the discovery of natural gas in the form of hydrates just off the continental shelf in countries like Chile as well as in the permafrost in Russia and Canada, could provide an alternative source.

ENERGY COSTS

The current low price of crude oil, which is around \$10 a barrel and even less in some cases, has thrown the industry into a crisis of mergers, down-sizing, cutting back on new exploration and embarrassment for countries like Saudi Arabia and Oman which rely largely on their oil revenues to sustain their economies. This illustrates the effect of leaving everything to the market and not trying to introduce depletion policies and other controls on oil production. Large companies must maintain their cash flow, and in order to do that, as the price falls, generate larger quantities of oil which they sell on the open market at constantly decreasing prices.

There seems to be a reluctance to get off this roller coaster as it is presently very fashionable to deregulate and privatise all energy supplies, making it possible to sell across national boundaries, in the case of electricity and gas, and leave energy policy to the market place.

A major casualty of this process has been research and development which in

the last 50 years connected with

and Europe

many cases has been cut back sharply to there has been a series of wars over almost nothing except ensuring the continuing supply of oil what is necessary for to countries like the United States 'fire-fighting'. It has also led to lack of

enthusiasm in investing

in renewable energy. Renewable energy has been subsidised in the UK via the fossil fuel levy and that has been surprisingly productive, bringing generation costs down

to almost the Pool price, in the case of wind. However, world-wide much more could be done and needs to be done to stimulate growth in renewable energy.

RENEWABLE ENERGY

World-wide some 19% of world energy is renewable; 12% comes from biomass, 6% from hydro and around 1% from the new renewables, solar, wind and so on. As far as electricity generation is concerned hydro power provides about a sixth of world electricity, as does nuclear energy, both without generating carbon dioxide. Hydro electricity requires large up-front costs when new dams are to be developed.

The Three Gorges Dam on the river Yangtse, in China is a good example of the enormous investment required (around £25 billion). Once built, it will generate 18,000 megawatts of power and will be a formidable supplier of electricity in the Chinese market.

It is perhaps worth observing that although hydro-electric power appears to be benign, every now and again dams burst causing extensive loss of life. A recent publication by the Royal Society suggests 3,000 or so deaths over the last 90 years, but that figure may well be between 10 and possibly 100 times too small. The fishing lobby also campaigns against the building of hydroelectric stations, so that it is clear that even an apparently benign renewable source of electricity is at risk from single issue groups.

Wind power has a high profile, although it seems not to be particularly acceptable in some countries because of its environmental impact. Wind energy, rather like solar energy, is dilute and rarely exceeds 400 W/m, which means that it is necessary to have a large number of huge wind turbines if power is to be taken off in reasonable amounts. There is another problem; the power varies as the cube of the wind speed and this means that as the wind speed goes up, the power of the wind goes up enormously and this sometimes makes it necessary to tether the wind generators and stop them operating.

Despite a lot of media attention, in the UK it only supplies 0.1% of our electricity and if all the wind farms in the world, that is, across America, Denmark, Hawaii and so on were all put on the South Downs, and

assuming planning permission could be obtained, on a windy day it would only supply 5% of just the UK's electricity demand, never mind the rest of the world. So although wind energy is a good thing it is very limited in what it can actually take up of world energy demand.

Growing crops for fuel is an interesting possibility; the use of olive oil for lighting and cooking goes way back into antiquity and in northern Europe coppice willow has been used to provide wood for fires. Rape seed and flax, that is, linseed oil, are possible fuel options and can be used after some chemical treatment as diesel fuel but, as is so often the case with renewable energy, it is expensive. In this particular case extremely expensive when compared with diesel fuel from crude oil.

In Brazil which suffered a balance of payments problem a few years ago as a result of importing oil, it was decided to grow sugar cane which could be harvested, fermented and distilled to produce ethyl alcohol. Ethyl alcohol was then used, either mixed with gasoline or as pure ethyl alcohol in car engines, and has worked very well, but is, again, expensive.

One of the most concentrated forms of renewable energy is wave energy. One metre length of wave in the North Sea averages out at about 50 kW of power; it can rise as high as 3 MW when the odd 13 m high wave comes

pounding in. The problem with wave power is to find an acceptable piece of engineering which will

collect this energy, convert it into electricity and be capable of operating under very extreme conditions as occasionally occur. A new shoreline system called Limpet is being built by Professor Whittaker of Belfast University upon the Island of Islay following the successful operation there for 10 years of the Mark I device. This will be used to support the local electricity grid and also to charge the batteries for electric vehicles which are to be used on the island.

Storage of electrical energy is a

particular problem and pumped storage is attractive but depends on having the right kind of geography. Using batteries for transport is quite a sensible way of capturing renewable energy and making use of it. The island of Islay is a good example again of environmental pressures. It is a very sensitive site as far as migrating geese from Greenland are concerned and this has up to now stopped the construction of what would be a very useful wind farm in that remote island off the west Scottish coast. This is an example where risks and benefits should be balanced but pressure from the bird lobby is dominant. Meanwhile the protected goose population has risen from 15,000 to an unsustainable 53,000!

Another possibility on Islay is to take up energy from the tidal stream that flows through the Sound of Islay between the islands of Islay and Jura. This could be quite an interesting possibility around Scotland. It is worth pointing out that islanders on Islay put about twice as much carbon dioxide into the atmosphere as the average in the mainland, which is 3 tonnes of carbon dioxide per person per year. This is the result of relying largely on oil and peat as fuel.

The energy from the oceans is largely untapped. Ocean currents like the Gulf Stream, which has a flow rate of 18 million cubic metres of water per second and Kuroshivo 55 million m³/s with a flux of 4 kW/m² at 2 m/s gives some indication of

the power available if although hydro - electric power it can be tapped. There appears to be benign, every now and are also areas in again dams burst causing extensive equatorial regions of the sea where temperature gradients

loss of life

as high as 25°C occur between the sea surface and water at depths of 10 to 100 m. By using special fluid heat engines it is possible to device floating platforms that would generate about 20 MW of power. Such units would 'graze' over the ocean collecting energy where appropriate.

Some 25 years ago the French built a tidal power station on the Rance estuary in Brittany which generated at peak 250 MW of power. The UK has the second best site in the world for a tidal power station, namely the Severn estuary and if a barrage

was built on the river Severn incorporating water turbines it would be possible to generate at peak 8,000 MW of power and this could generate 7% of UK electricity. The cost would be around the same as that of the Channel Tunnel, that is, about £9 billion. This is probably the only way that the UK will meet its 10% renewable electricity target by the year 2010.

Unfortunately, the environmental lobby, which supports wading birds, is opposed to the Severn barrage on environmental grounds. It is a shame that this kind of sentimentality gets in the way of what would be a very sensible development; the wading birds would certainly go and wade somewhere else or provision could be made for them in the design of the Severn barrage project.

Photovoltaic electricity has strong support from both Shell and BP Amoco as being an important way ahead. At the moment photovoltaic cells generate electricity at between 30 and 60 pence per unit but prices are coming down. If, however, cells are used as the cladding of a building, replacing what otherwise might be expensive cladding in high profile office blocks, it can be made to pay its way if the electricity generated is fed directly into the electricity circuit in the building. There is a plan to clad one of the new stands at St James Park in Newcastle with photovoltaic converters.

Biomass is a very important ingredient in the renewable equation; in the UK twothirds of the renewable energy produced comes from biomass, which includes generating energy from waste. There is considerable potential here.

NUCLEAR ENERGY

Nuclear energy has a poor public image and countries like Sweden and Germany, although heavily dependent on nuclear energy as a result of voting in a democratic way, are intent on phasing out nuclear power. World-wide there are 430 nuclear power reactors providing 17% of world electricity; that is, around 6% of world energy. If it were to be closed down in its entirety and replaced by gas-fired power stations then world carbon dioxide emissions would rise by some 17%. This would make it well nigh impossible to achieve the Kyoto protocol

which was ratified in Buenos Aries in 1998, and is a legally binding commitment.

If one looks ahead past 2050, where World Energy Council projections suggest that nuclear might provide 14% of world energy, and postulates that nuclear energy will be closed down by then, it is difficult to see how world demands for energy will be met.

Post 2050 fossil fuels, particularly oil and gas, will be in decline. Renewable energy might provide as much as 25% of world energy by then according to the World Energy Council although Shell are more optimistic.

The way ahead would seem to be a mixture of nuclear power and renewable energy going under the banner of 'clean energy'. This would mean providing the energy that people would need for economic growth and at the same time protecting the environment by cutting down on carbon dioxide emissions. This logical way of proceeding may however not be adopted because of the public perception that nuclear power is dangerous and should be discontinued.

However, if people do begin to see that building nuclear power stations again is the way ahead there will probably be a move towards the proposed European intrinsically safe reactor and after that a move to fast reactor or fast breeder reactor which uses uranium some 60 times more efficiently than today's thermal reactors. The Russians have already adopted this route; they have had a fast reactor running, the NS 600, for 17 years despite various excursions which they have corrected and it is their intention to build a series of NS 800 reactors as the next stage in their nuclear programme.

If this way ahead is chosen the energy reserves available for use in the fast reactor would ensure that there was enough electricity around to last the world for the next 500 years or so - but it is a high technology future.

The other route, if we choose to stay with fossil fuels, could well turn out to be gas hydrates which is an interesting and, up to now, unquantifiable possibility.

But, as with all things, there are risks and benefits associated with nuclear energy as with hydro power and people and politicians have to balance up the risks and benefits and decide the route to go. It should be remembered that two billion of the world's population are without

access to any commercially available energy and rely upon fuel-wood and the like to maintain their very market forces are very powerful tools in delivering low prices but the market values the environment at zero

In the UK one could postulate an energy fuel mix of 30% nuclear, 30% coal, 30% gas and 10% renewables. As far as protecting the environment generally is concerned, bearing

> in mind transport as a major player in the pollution states, carbon taxes will almost certainly have to be levied but should be

fiscally neutral or hypothecated to improve public transport. The Treasury is of course against this kind of policy.

It is currently fashionable, before producing a White Paper on energy policy or environmental protection or any of these important topics, to consult widely. This means that there are now a large number of consultation documents about at any one time; one might be forgiven in taking a sceptical view of the consultation process. How much attention is paid to suggestions made by members of the general public? Too much analysis leads to paralysis and certainly endless consultation does slow down the process of policy making in the energy business.

THE FUTURE

The future must be a high technology future; trying to get people to change attitudes may be achieved in time but it is a long process and time is short if energy supply is to be protected in the long term. Engineers are good at providing technical fixes to problems; the fast reactor is one of them. Fusion is another possibility but with only a 50/50 chance of success as the engineering is quite extraordinarily difficult. Nevertheless the benefits, if it can be made to work, would be enormous. Renewables must play a bigger and bigger part in the energy mix and energy must be used more efficiently and responsibly.

Fiscally neutral taxes will be needed to stimulate more sensible use of energy and get away from the profligate waste demonstrated in some developed countries. A move towards a more sustainable energy economy must take place if John Gummer's, one time Minister for the Environment, aim is to be achieved: 'Development our grandchildren will thank us for'.

to maintain their very modest lifestyle. There is an obligation on the developed countries to help people in under-developed countries to realise their aga

technology until such time as local engineers can be trained. There is also the possibility of leapfrogging ahead with technology. A good example of this is the move to mobile phones in South East Asia without going through the phase of having everybody connected up via copper wires as we have

potential and the way to do this must be via

finance to support it but also support in the

technical aid but providing not only the

form of operators who can run the new

ENERGY POLICY

in the West.

When Nigel Lawson was Secretary of State for Energy in 1982 he explained that UK energy policy was to have no policy. The task of government was to remove distortions in the market place to let it operate properly. The paradox of course was that this system required very heavy regulation with profits being prescribed by the regulator. It is often said that Adam Smith advocated a free market economy, but if one comes to read the Wealth of Nations carefully he points out that 'too much entrepreneurism can damage the populace and then government has to step in to protect them'. This is probably the case for the current enthusiasm for free-forall energy policy.

There is no doubt that market forces are very powerful tools in delivering low prices but the market values the environment at zero and unless there is regulation or taxation or legislation the market will not protect the environment. So there is a need for some sort of strategic framework within which the market is allowed to operate unfettered.

Outsourcing energy services

by Tim Burns, Powerline Energy Services

Already common practice at large industrial sites, the outsourcing, energy services approach to managing on-site conversion and use of energy is now reaching many more consumers. Here, Tim Burns of Powerline Energy Services Limited (a wholly owned subsidiary of Midlands Electricity), discusses the benefits to organisations in both the public and private sectors of outsourcing energy services.

Energy users with an annual bill of more than £100,000 for the provision of fuel for plant to deliver hot water or steam for industrial processes, or purely for space heating, now have an alternative that was not available to them five years ago, the opportunity to outsource their energy services requirements.

Organisations that outsource their energy services are able to exploit the knowledge and experience of a variety of energy services professionals and negotiate individually tailored contracts that allow them to obtain the best and most costeffective energy solutions. This approach also allows consumers to concentrate their own energies on their core businesses.

Powerline Energy Services Ltd (PESL) is prepared to invest capital - anything up to £10 million - into defining a company's energy requirements and providing the solution by upgrading existing plant, investing in new equipment, and then operating and maintaining it over an agreed period - which may be as long as 25 years.

Her Majesty's Prison Service, has signed a £50 million contract with PESL to update the energy systems in eight of the country's prisons; Blundeston, Lewes, Camp Hill, Usk, Chelmsford, Parkhurst and Dartmoor adult prisons and a young offenders' institute in Deerbolt.

The PESL team spent almost two years of assessment, planning and negotiation with HM Prisons prior to being awarded the Private Finance Initiative (PFI) contract, which is seen as a pilot that will help pave the way for similar schemes for other prisons in the UK. A number of gas-fired low temperature hot water boilers are planned as replacements for the coal or heavy fuel oil heating systems currently employed by all but one of the prisons. The use of gas will substantially reduce carbon dioxide emissions, overall energy costs and will involve the installation of a major new 10 km pipeline to serve HMP Dartmoor. Installation costs alone are anticipated to total around £10 million.

PESL is also serving British Airways' state-of-the-art maintenance hangar at Manchester Airport as part of a 10 year contract to operate and maintain all building services at the site.

The system employed at the giant hangar, which is in 24 hour operation, monitors gas, water and electricity usage at the site, in addition to controlling the heating, lighting and operation of the offices boiler plant. Powerline employs a Trend building energy management system (BEMS) which enables staff to monitor services remotely from their headquarters 100 miles away in Halesowen near Birmingham.

The BEMS is linked to the hangar doors and switches the heating off when the doors are open and then switches it back on when the doors are closed. The lighting system is set up for maximum efficiency and reduces brightness in certain zones when natural light is sufficient.

In its PFI partnership with St Albans and Hemel Hempstead NHS Trust, PESL provided the finance package and expertise to replace two of the hospital's three gas boilers and refurbish the third, which together will provide nearly 10,000 kg/hr of steam. As well as replacing old ancillary plant, the contract, worth around £5 million, included the construction of a new, smaller house, which freed up valuable additional storage space.

This project was designed to ensure all civil and plant works were carried out without disrupting the steam heating and hot water supplies to any of the hospital's buildings. PESL will be responsible for the operation and maintenance of the plant during the 10 year contract. It will provide energy efficiency advice and a utilities management service for gas and electricity supplies, ensuring the NHS Trust gets the best value on all fuel purchases.

As part of its partnership with Norfolkbased transport tanker and trailer manufacturer Crane Fruehauf, PESL installed plant with minimal disruption to the business. When a survey found the company's old heating system to be neither controllable nor energy efficient, a £280,000 project was funded through a contract energy management agreement to renew it. The agreement provided a total package for the manufacturer from project design, installation, management to financing of the project for 12 years, with no risk of capital overspend on the new installation.

The company's old heating system, which had been in existence since the factory was built in 1970, comprised warm air cabinet heaters fired on gas oil and an oil-fired low temperature hot water boiler supplying convector heaters. The system was replaced by gas-fired radiant heaters within the main factory and a highly efficient gasfired modular boiler to serve the offices. **Contact Tim Burns at Powerline Energy Services Ltd, tel: 0121 423 3018**



Before and after in the Crane Fruehauf boilerhouse



May 1999

Pipeline rehabilitation and maintenance

Conference & exhibition, 9-12 May, Abu Dhabi. Details from Energy Logistics International, tel: 01628 671717, fax: 01628 671720, e-mail: enquiries@energylogistics.co.uk

How to do an energy survey Course, 10 May, London Details from Mid Career College, tel: 01223 880016, fax: 01223 881604,e-mail: courses@mid-career-college.ac.uk

Irish energy - liberalisation, competition and emerging opportunities Conference, 10-11 May, Dublin Details from SMi, tel: 0171 252 2222,

fax: 0171 252 2272

Fuel poverty: the solution? National Right to Fuel Campaign conference, 11 May, London, £150 + VAT. Details from Connect Conferences, tel: 0171 222 2176, fax:0171 222 2677, e-mail: conferences@connectpa.co.uk

UK supply

Workshop, 10-12 May, Brighton Details from Power Ink Ltd, tel: 01273 202920, fax: 01273 203720

Energy 1999 - beyond the millennium!

Conference, 12 May, London, £365 + VAT. Details from Commercial Seminars Ltd, tel: 01572 757751, fax: 01572 757752 Towards a renewable future Conference, 13-15 May, Brighton Details from the Solar Energy Society, tel: 01865 484367, fax: 01865 484263, e-mail: uk-ises@brookes.ac.uk

Restructuring for

competitive advantage Conference, 14 May, London Details from the Economist Conferences, tel: 0171 409 3296, fax: 0171 931 0228, e-mail: economistconf@eiu.com

New electricity trading arrangements Workshop, 17-18 May, London, £849 + VAT

Details from Power Ink Ltd, tel: 01273 202920, fax: 01273 203720

Clean development mechanism projects preparing for emissions trading Conference, 17-18 May, London, £899 + VAT Details from Euroforum, tel: 0171 878 6886, fax: 0171 878 6885

Monitoring and targeting energy to save money Course, 18 May, London Details from Mid Career College, tel: 01223 880016, fax: 01223 881604 e-mail: courses@mid-careercollege.ac.uk

Electricity supply handbook live 99

Exhibition and conference, 18-19 May, NEC Birmingham Tickets from Paul Lucas, tel: 01372 841010, fax: 01372 841012

Sustain 99: world sustainable energy trade fair Exhibition and conference, 25-27 May, Amsterdam Details from European Media Marketing Ltd, tel: 0181 289 8989, fax: 0181 289 8484, e-mail: sustain@emml.co.uk

Metering and tariffs for energy supply Conference, 25-28 May, Birmingham. Details from the IEE, tel: 0171 344 5472, fax: 0171 240 8830, e-mail: mates99@iee.org.uk

Utility regulation summit 99

Conference, 26-28 May, London, £1249 + VAT Details from IBC Global Conferences, tel: 0171 453 5492, fax: 0171 636 6858, e-mail: cust.serv@ibcuk.co.uk

The Africa Energy Forum: Power 2000

Conference, 26-28 May, Amsterdam, £575 + VAT Details from EnergyNet Ltd, tel: 0181 547 0698, fax: 0181 541 3244, e-mail: info@energynet.co.uk

Oil tankers: commercial

and regulatory issues Conference, 27 May, London Details from the Institute of Petroleum, tel: 0171 467 7100, fax: 0171 255 1472, e-mail: pashby@petroleum.co.uk

Power in Poland 99

Conference, 27-28 May, Warsaw Details from Euroforum, tel: 0171 878 6886, fax: 0171 878 6885

June 99

Power-gen 99

Exhibition and conference, I-3 June, Frankfurt Details from PennWell, tel: +31 30 265 0963, fax: +31 30 265 0928

Environmental technology'99

Conference and exhibition, 8-10 June, NEC Birmingham Tickets from tel: 01203 426435

Systems integration in the utilities

Conference, 10 June, London, £999 + VAT. Details from Euroforum, tel: 0171 878 6886, fax: 0171 878 6885

Energy efficiency prepares for the millennium

Conference, 10 June, Derby Details from the Council for Energy Efficiency Development, tel: 01428 654011, fax: 01428 651401,e-mail: theceed@compuserve.com

Planning for daylight and sunlight

Workshop, 15 June, Watford, £300. Details from BRE, tel: 01923 664644, e-mail: cpd@bre.co.uk

Fire hazard management in the oil, gas and chemical industries

Conference and exhibition, 15-17 June, Gloucestershire Details from Publishing & Exhibition Services, tel: 01622 850312, fax: 01622 850009



Research into energy efficiency teaching at F/HE level

The teaching of energy management and associated topics varies considerably within the academic community. Although it can be argued that environmental awareness should be included in all higher and further education programmes, it is recognised that this is currently not the case. The reason for a low or non-existent priority for energy efficiency teaching, can often be accounted for by one or more of the following:

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- Emphasis and pressure on the teaching of the core subject disciplines preventing the allocation of adequate time and resources for energy efficiency teaching;
- The lack of staff expertise to focus on the appropriate details;
- A lack of priority / interest / commitment by appropriate staff members;
- A failure in the institution's own administration to recognise the benefits of energy management and therefore a lack of organisational commitment or culture;
- A lack of impetus to incorporate environmental teaching from the Government, Funding Councils etc.

Martin R Fry and Associates, working in partnership with The Institute of Energy, through Tracey Fisher, Membership and Education Manager, has been awarded a 5 month research contract by the Energy Efficiency Best Practice Programme. The Partnership has been charged with conducting a scoping study of the higher and further education sector to establish the current level of energy efficiency teaching and learning, identifying areas of improvement and recommending priorities for action.

It has been decided to focus the study initially on the engineering sector, which has an immediate impetus to introduce energy and environmental teaching material to the curriculum. The Engineering Council has introduced, with effect from September 1999, new Standards and Routes to Registration (SARTOR), which impact both individuals seeking engineering registration and institutions providing academic courses of study requiring accreditation for engineering registration. Individuals will be required, at their professional review, to demonstrate their knowledge and application of codes of practice, relative to risks and environmental issues within the profession, recognising their obligation to society, the profession and the environment. Academic institutions will, therefore, be obliged to integrate the necessary material, knowledge and skills into their programmes.

The study will involve consultation with a number of academic institutions, professional bodies and commercial and industrial organisations. The results of the study, with recommendations for future actions in order of priority, will be fed into the training strategy of the Best Practice Programme and will be published later in the year. Academic institutions, professional bodies and commercial and industrial organisations wishing to participate in the Institute of Energy's survey should email Tracey Fisher at tfisher@ioe.org.uk

Report of the Technical and Economics Committee as at 8 April 99

Since the first meeting of the Technical and Economics Committee, a response has been submitted for the Royal Commission Study on Energy and the Environment. Two other consultation documents on Climate Change have also been responded to. The reply to the Environment, Transport and Regional Affairs Committee was published in the February issue of *Energy World*.

- A number of other documents have been considered for comment and responses will be prepared to the following:
- DTI New and Renewable Energy, Prospects in the UK for 21st Century.
- Customs and Excise Climate Change Levy.
- These will be published, as appropriate, in future issues of Energy World.

The committee has declined invitations to contribute to two Engineering Council responses on: The Reform of the House of Lords and Food Standards. Members wishing to individually contribute to the responses should contact the Engineering Council.

In terms of its composition, the Committee considers that it is weak in the areas of economics and taxation as applied, for example, to the Climate Change Levy and on practical conventional energy supply issues. It would, therefore, be pleased to hear from members who are able to offer skills or experience in these areas.

In terms of future priorities, the Committee has decided to focus on the issues of communication and education, based around the need for simple and unbiased guidelines on energy technologies and energy management. These guidelines will draw on existing publications and present unbiased comment and recommendations to act as briefing for those with no prior knowledge. It was foreseen that the guidelines will have three main applications: assistance for Institute staff in dealing with enquiries; publication on the website, as it evolves and publication in *Energy World*. The topics chosen for initial focus are: Energy from Waste; Lighting; Clean Coal Technology; Global Warming; Solar and Wind Renewables; Industrial CHP and Energy Management Monitoring and Targeting.

The next meeting of the Committee will be on 8 September 1999.

Martin R Fry Chairman, Technical & Economics Committee



The faces behind your Institute

Tracey



Deepti



Narelle



Sanjeev



rom time to time we present to you the faces behind your Institute on the staff team. The last time we did this was October 1997 and since then there have been a few changes at the Institute. Those who have read this issue's viewpoint will know that Louise Evans, former Deputy Secretary and Head of Projects & Marketing, has taken up her post as Secretary & Chief Executive from I March this year. Maria Adams now manages the Projects & Marketing team and is ably supported by a new recruit to the Institute, Katie Howe, as Projects & Marketing Officer. Katie replaces Louise Collins who left last year to pursue her career as a fund-raiser in the charity sector. Beatriz Cano has moved from the Membership department to the Projects & Marketing office to work with Maria and Katie, in addition to her new role as Art Editor of Energy World.

Derek Smith continues to manage your membership fees with support from Sam Cobbina. Sam also has responsibility for managing subscriptions to the Institute's publications. In addition Derek is responsible for building services and maintenance.

Tracey Fisher continues to head up the Membership & Education team which includes Deepti Jayawardena Wilkinson, promoted within the department since you last saw her. Sanjeev Kumar joined the team in January this year from the Crown Estate and he manages the administration of the department, together whith Narelle Bethune who is on a short term contract with us before she travels home to Australia this year.

Many of you will know Steve Hodgson, the editor of Energy World, who has worked hard to improve your magazine. In addition, please meet Janice Gordon, the editor of the Journal of the Institute of Energy, who was appointed to continue the work of the long-standing, and now happily retired, Sandy Atkinson.

So there you have it! Please use this as an opportunity to get to know the staff.

We always welcome communication with members. This is your Institute and the staff are in post to and deliver many of the services and benefits that you as members can access, in additionto fulfilling the Institute's learned society activities.

Maria





Projects & Marketin

Beatriz



Finance & Building Services

Membership & Education









Editors

lanice

Steve

Branch Events

MAY 1999

MIDLAND BRANCH

Thursday 6 May Transco Operational Centre at Hinckley, Works Visit 2.30pm Branch AGM, 5.00pm Contact Mr H Freeman, tel: 0121 353 2397

SOUTH COAST BRANCH

Wednesday 19 May (Venue to be confirmed) 1999 AGM Contact T Smith, tel: 01256 768221

SOUTH WALES AND WEST OF ENGLAND BRANCH

Thursday 20 May, 5.30pm. Coal Research Establishment, Stoke Orchard, nr Cheltenham. AGM and lecture on Desulphurisation Technologies by R Holder of EDT Ltd. Contact Dr I Weslake Hill, tel: 01222 757527

NORTHERN IRELAND BRANCH

(Date & venue to be confirmed) Annual General Meetung. Contact Dr P Waterfield, tel:01232 364090 email: p.waterfield@ulst.ac.uk for more details

JUNE 1999

SOUTH WALES AND WEST OF ENGLAND BRANCH

Friday 18 June, 9.30am for 10.00am.

Annual Lunchtime Lecture 'Nuclear Engineering - 2000 and beyond' by Mark Baker, the President of the Institute of Energy at CRE Stoke Orchard, nr Cheltenham.Contact Dr I Weslake Hill, tel: 01222 757527

NORTHERN IRELAND BRANCH

(Date & venue to be confirmed) Committee Meeting Contact Dr P Waterfield, tel:01232 364090 email: p.waterfield@ulst.ac.uk for more details

SCOTTISH BRANCH

(Date to be confirmed) Annual Energy Lecture. Contact C Boyd,tel: 0141 270 7060

New Members

EAST MIDLANDS

Mr CG Easy, MInstE Mr T Foote, Associate ABB O & M Services Ltd

LONDON & HOME COUNTIES

Mr T Dumenil, MInstE Mr EKC Lau, MInstE Cundall Johnston & Partners Mr MA Lugton, MInstE Malvern Technology Ltd Mr DE Parsley, MInstE Roche Products Ltd Mr RJ Tyler, MInstE ROMEC

MIDLANDS

Mr IA Hopkins, Graduate Dalkia Energy Management Ltd

NORTH EAST

Mr H Ali, Graduate Mr GA Wilson, Graduate Rolls Royce Plc

SOUTH WALES & WEST OF ENGLAND BRANCH AGM

Notification is hereby given of the South Wales & West of England branch AGM to be held at the Coal Research Establishment, Stoke Orchard, nr Cheltenham on Thursday 20 May 1999 at 5.30pm.

The following members are nominated by committee for election / re-election as Branch Officers for 1999-2000 session.

Chairman: Senior Vice Chairman: Junior Vice Chairman: Honorary Secretary: Honorary Treasurer: Mr Taliesin Golesworthy Mr John Whitehead vacant Mr Antony Boulton

Honorary Treasurer: Mr Roger Martin Any other duly qualified candidate may be nominated in writing

by any two branch members (plus the written consent of the nominee). Said nominations must be received by the Secretary not less than 4 weeks before the Annual General Meeting. The meeting will be followed by a free buffet at 6pm with a presentation: 'Desulphurisation Technology' by Mr Robin Holder of EDT Ltd.

NORTHERN IRELAND

Miss M Treanor, Student University of Ulster Mr RA Woodward, Student University of Ulster

NORTH WEST

Ms N Jones, Student University of Leeds

SCOTTISH

Mr K Stott, AMInstE Miss SL Plummer, Student Napier University

SOUTH COAST

Mr PT Franklin, AMInstE Hilson Morgan Partnership Ltd

SOUTH WALES & WEST OF ENGLAND

Mr JC Joseph, Student University of Wales, Cardiff Mr R Katanga, Student University of Wales, Cardiff Mr ES Roberts, Student University of Wales, Cardiff

YORKSHIRE

DrYR Goh, Graduate Dept of Chemical & Process Engineering University of Sheffield

HONG KONG

Mr YFE Chow, MInstE China Light & Power Co Ltd Mr PK Chan, MInstE China Light & Power Co Ltd Mr CF Yau, MInstE Black Point Power Station Mr KC Fong, CEng MInstE China Light & Power Co Ltd Mr YC Mok, MInstE Hung Wai (Cheung's) Co Ltd Mr YM Poon, MInstE China Light & Power Co Ltd Dr DK Tong, CEng FInstE MTR Corporation

Taking Action to Create a Culture of Energy Awareness

The Institute is pleased to announce the arrival of Action Agenda sheets - a tool for team meetings, prepared in association with The Environment Council and the Energy Efficiency Best Practice Programme.

These action sheets will benefit all organisations who wish to increase staff awareness of energy and environmental issues. They will help to inform staff of the issues and, most importantly, encourage them to take action. Most organisations have regular staff meetings and the action sheets are designed to be easily incorporated into meeting agendas. The pilot Action Agenda pack includes sheets on heating, lighting and water and guidance notes on how to use the sheets are also provided for meeting facilitators.

Estates, facilities and energy managers will find this product invaluable for staff awareness campaigns and to support the company energy and environmental policy. Anyone working within these roles will appreciate the challenges involved in encouraging staff to think and act in an environmentally responsible manner. The Action Agenda sheets have been designed to help overcome two of the most common environmental communication barriers: lack of information and low staff motivation. Through topical facts, cartoons and interactive exercises staff can quickly appreciate how much they can do within their working day to help protect our environment. With the emphasis squarely placed on maintaining momentum and encouraging feedback the Action Agenda sheets also help to ensure that energy and the environment becomes a regular topic for discussion at team meetings and not a passing fad.

The Action Agenda sheets are part of the 'Partnerships for Best Practice' initiative. The partnership currently comprises Trade Unions, Professional Bodies, Non Governmental Organisations and Government all working together to encourage energy-saving ideas and contributions from the workforce in the UK. Members include; UNISON, AEEU, IMPS, The Institute of Energy, The Environment Council and the Best Practice Programmes, Going for Green and Global Action. The partnership is a loose-alliance and welcomes input from any interested parties. The materials produced by the Partnership to date include workshops, a training course, a Partnership Guide and a pocketbook as well as the draft Action Agenda sheets.

The Action Agenda sheets are available exclusively to members of The Institute of Energy and The Environment Council in draft form as well as to a small pilot group. Piloting will take place until the beginning of summer and when the product is finalised it will be available to download from the web or from the Energy Efficiency Best Practice Programme as a hard copy.

If you would like a copy of the draft Action Agenda sheets, please contact Katie Howe, Projects & Marketing Officer on Tel: 0171 580 7124, Fax: 0171 580 4420 or Email: info@ioe.org.uk







PROCEEDINGS

Energy: Solving the Policy Jigsaw Conference

Thursday 18 March 1999

Organised by The Institute of Energy & co-sponsored by the CBI & IEE

Containing;

Mark Baker CBE, President of the Institute of Energy

Prof. John Chesshire, SPRU Energy Programme

David Varney, BG plc

Callum McCarthy, Office of Electricity & Gas Regulation

Nick Baldwin, PowerGen plc

Dr. Anthony White, Dresdner Kleinwort Benson

Stewart Boyle, CHPA

John Battle MP, Minister for Energy & Industry

These proceedings can be purchased from the Institute for £20.00 (Non-Members) & £10.00(Members) + VAT. If you would like a copy e-mail Sam Cobbina on scobina@ioe.org.uk or call 580 7124, fax 580 4420