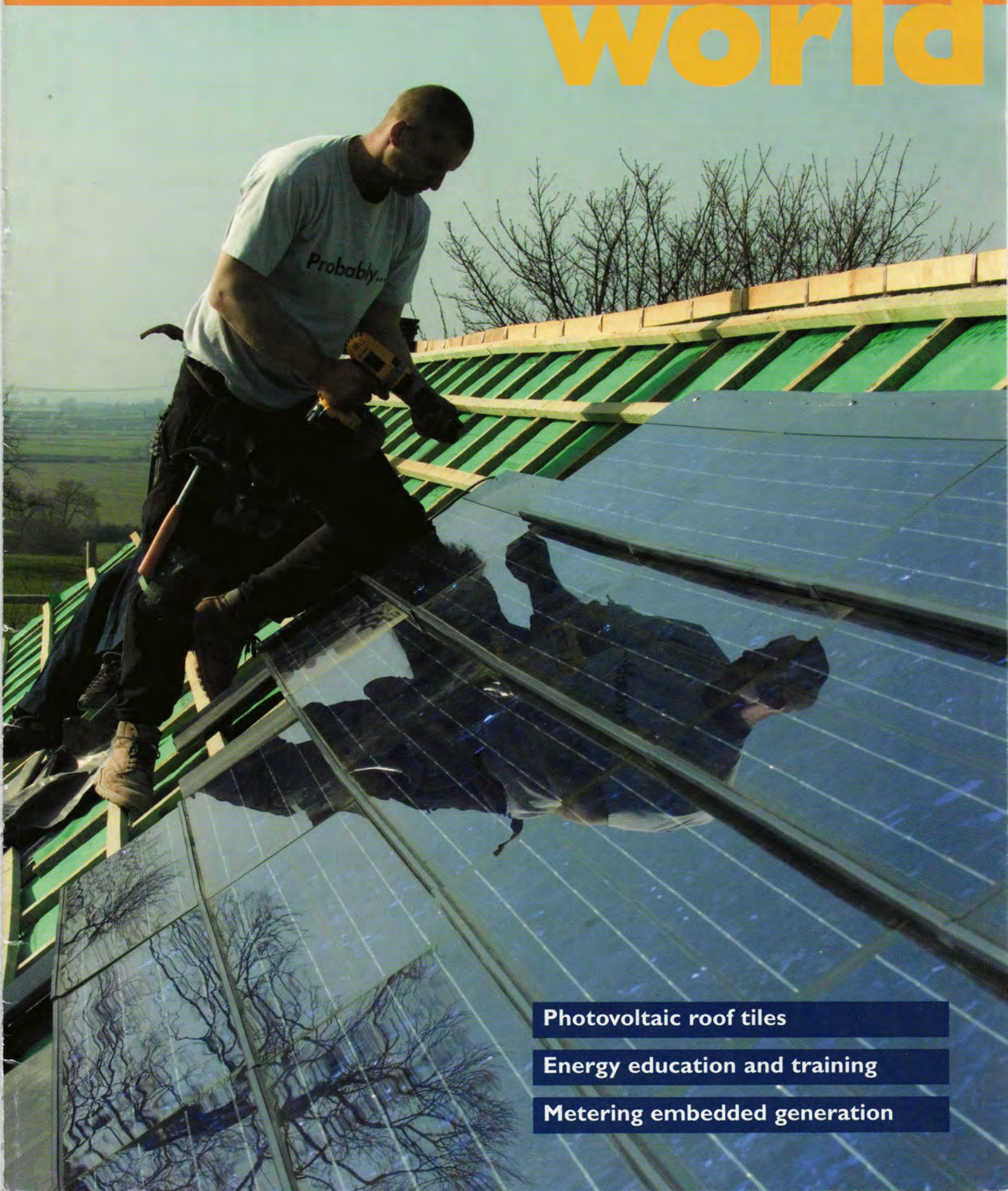
May 2004
No. 319

energy world

energy INSTITUTE



Photovoltaic roof tiles

Energy education and training

Metering embedded generation

energy INSTITUTE

Communications Director

Salary negotiable based on experience

The Energy Institute was formed in 2003 by the merger of the Institute of Petroleum and the Institute of Energy to create the leading professional membership and technical organisation serving individuals and organisations in the energy industry.

As a member of the management team you will report to the Chief Executive. You will lead and motivate a team to deliver corporate communications services both internally and externally, with additional responsibilities for the direction of library and information services and web/IT services.

You will be responsible for developing communications strategies and implementing plans to promote the EI's activities and services to all stakeholders and customers. You will be the first point of contact for all media and government relations and for developing the EI brand.

You will be an experienced communications professional with a track record in managing communications resources, budgets and projects to meet business plan objectives. A creative strategic thinker with a 'hands on' management style, you will have excellent interpersonal, writing and verbal communications skills and be database and Microsoft Office proficient. Experience and/or knowledge of the energy industry would be an advantage.

Please send a CV and covering letter, stating present salary package, to:

Miss H Sullivan,
Energy Institute,
61 New Cavendish Street,
London W1G 7AR, UK or
e: **hsullivan@energyinst.org.uk**

Closing date:
Monday 21st May 2004.

---

team

TEAM (Energy Auditing Agency Ltd), a leading UK supplier of energy management software and services are now looking to recruit

Energy Consultant

The successful candidate will have strong experience within the energy sector with a detailed understanding of the climate change strategy, energy efficiency in buildings and industry, and delivery of efficiency through monitoring and targeting.

A level of practical achievement and technical expertise along with good communication skills are required. The candidate will be able to work individually as well as part of a team with an uncompromising commitment to deliver high quality and best value for the client.

A competitive package commensurate with experience and qualifications will be offered to the right candidate.

To apply please send letter of application and CV to: Muriel Orrin, TEAM (EAA Ltd), 34 The Forum, Rockingham Drive, Linford Wood, Milton Keynes, MK14 6LY or email: morrin@teamenergy.com

www.teamenergy.com

BRUNEL UNIVERSITY WEST LONDON

Study at home for a Masters Degree

Enhance your career prospects with a

- **MSc Building Services Engineering**
  Full-time 1 year; Distance learning 3 years (or up to 5 years)
- **MSc Building Services Engineering Management**
  Distance learning 3 years (or up to 5 years)

A choice of two MSc courses, each approved as a matching section by the Energy Institute and CIBSE for completing the educational requirements for CEng registration.

- **MSc Sustainable Energy – Technologies and Management**
  Full-time 1 year

These courses are designed to develop the knowledge and skills of graduate engineers from a wide range of scientific/engineering disciplines and to appeal to experienced professionals working in this area of industry. The distance learning courses are studied by students throughout the world and require no attendance other than for examinations. Students outside the UK usually sit examinations at approved overseas centres.

For further information please contact:

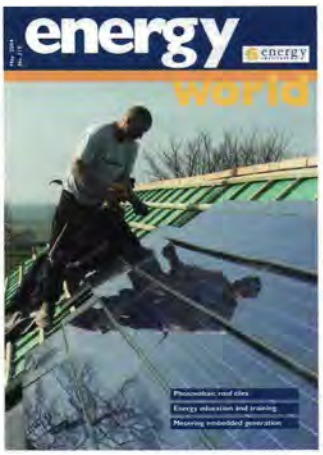
The Postgraduate Administrator
Department of Mechanical Engineering
Brunel University, Uxbridge, Middlesex
UB8 3PH, United Kingdom
Tel: +44(0)1895 203269
Fax: +44(0)1895 203266
Email: msc-building-services@brunel.ac.uk
URL: http://www.brunel.ac.uk/faculty/tech/mechanical/index.html

Please quote reference number ADC30

Brunel University exists to provide high quality education and research of use to the community

Contents

May 2004



Published by
Energy Institute
61 New Cavendish Street,
London, W1G 7AR, UK
e: info@energyinst.org.uk
www.energyinst.org.uk
Editor
Steve Hodgson
t/f: +44 (0) 129 877 601
Production
Thanet Press Ltd
www.thanet-press.co.uk
Subscriptions
Chris Baker
t: +44 (0) 20 7467 7114
e: cbaker@energyinst.org.uk
Advertisement sales
Brian Nugent, McMillan-Scott
t: +44 (0) 20 7878 2324
e: bnugent@mcmslondon.co.uk
Printed by
Thanet Press Ltd,
Margate, Kent

President
Euan Baird FEI
Hon Secretary
Joanna Wade
Treasurer
Eur Ing D Barber CEng FEI

Terms of Control
Energy World is circulated free of charge to all paid up members.
To libraries, organisations and persons not in membership, it is available on a single subscription of £115 for 10 issues in the UK and £135 for overseas subscribers. Agency Commission - 10%. ISSN 0307-7942
Energy World is printed on wood-free, chlorine-free pulp.

Cover

The new C21 solar roof tile from UK manufacturer solarcentury has been designed for maximum ease of use by house builders. And that's its main appeal; the new tile, says solarcentury, fits quickly and easily to standard battens, and integrates with common interlocking roof tiles they can be installed by any roofing contractor.

Why the lights . . . won't go out

"It is winter 2010. Peak gas demand and peak electricity demand coincide. The south-east of England is plunged into darkness following a terrorist attack on a gas pipeline in Russia – with very serious consequences." This was the premise for a disaster scenario TV programme broadcast on BBC 2 in March. Here, Daniel Norton suggests that Britain's energy supplies are not so fragile.

While the "If .... the lights go out" programme made for thought-provoking entertainment, the issues must be kept in perspective. It is important to remember the underlying fundamentals of the UK's energy market.

Gas supply

It is true that indigenous production from the North Sea will be decreasing in the coming years as reserves dwindle and the cost of production increases. In around 2005 the UK is predicted by some to become a net importer of gas. However, it is noteworthy that the EU already imports around 40% of its gas from a number of sources and has, therefore, built up infrastructure to deal with this. Most significantly, there is enough gas storage to cover the loss of a significant supply source for 30 days in the EU.

Sources of gas have been diversified and while Russia will remain the single most significant exporter, in 2010 it will be the provider of only around 30% of EU gas consumption, compared with 20% last year. This gas enters the EU via a number of routes, with three separate pipelines currently in place. Further pipeline routes will be in place by 2010, ensuring that the loss of a single pipeline would have little effect. Meanwhile, gas storage facilities in Ukraine have been built to secure supply for the EU. Therefore supply problems to the east of Ukraine would have no effect on EU supplies.

Liquefied natural gas (LNG) terminals exist, and more are planned, to further diversify the import routes for gas. In the UK, expansion of the terminal at the Isle of Grain and two terminals at Milford Haven, equivalent to 20% of current UK annual consumption, have been proposed already. Britain's first natural gas was imported from Algeria as LNG in the 1950s.

In the UK, EIC estimates that around 30% of our total consumption will come from imports in 2010 and, crucially, most of that is likely to be made up of Norwegian gas. Norway has produced only 25% of its gas reserves and plans to increase exports by 50% in the next five years, with most targeted at the UK. We are already connected to Europe via the UK/Belgium interconnector, effectively accessing excess European storage capacity in the winter. This pipeline is to be expanded to triple its capacity by 2007, when further pipelines from Norway and the Netherlands are also planned to start importing to the UK.

Should the UK's gas supply be reduced suddenly, most gas-fired power stations could switch to burning gas oil (diesel) as a back-up, decreasing total gas demand. For industrial users, interruptible gas contracts are already used by network operator National Grid Transco (NGT) to help balance supply and demand when the gas system is tight. Should the situation worsen, involuntary interruptions could take place to non-critical supplies. Hospitals and key infrastructure are classed as critical supplies, plus they have their own back-up systems in place with alternative fuels for heating and electricity generation.

Electricity supply

NGT attempts to keep a 20% margin of spare generation capacity above peak demand levels to allow for unexpected failures. Peak demand is forecast using the scenario of extremely bad weather conditions - a one in twenty bad winter. Therefore, when NGT highlights capacity concerns, this is done on the basis of an extreme scenario. During last year, for example, NGT issued a number of warnings that the supply cushion was not large enough. But, despite a number of unexpected and extended closures at generating plant, supply remained secure.

Liberalisation of the market has meant that when prices are low, higher cost plant is taken offline, as we have seen since 2001. But as prices increase as electricity effectively becomes scarcer, this plant is brought back on line when it is economic to do so. EIC agrees that new plant will need to be built over the medium term and plans are already underway for a number of new gas-fired power stations.

It is not possible under any system to provide 100% security of supply. Therefore, any reasonable debate over the level of security to provide must weigh the costs of supply interruption against the costs of providing additional security. Additional costs are always borne by consumers, so should not be incurred lightly or when cheaper alternatives may be available to the consumers themselves.

Whilst the historical security standard in the UK has always been one interruption in supply in every twenty years, actual interruption has been much less than this. Many industry observers believe that monopoly utility companies have historically over-invested in the security of both gas and electricity systems, assuming one in twenty security was the true goal. Often this over-investment was encouraged by regulated tariffs that rewarded capital invested.

Market liberalisation would, therefore, naturally be expected to reduce this over-investment but whether this will result in security standards below the historic level is not clear. Good regulation of liberalised markets is likely to be key to future supply security, as was good management of the incumbent monopoly supplier in the past.

While there cannot be 100% guarantees, the facts show that we should not be too fearful either.

Daniel Norton, Market Analysis Manager, Energy Information Centre
Contact the EIC Market Analysis Team on tel: 01638 554935, e-mail: mat@eic.co.uk

Europe 'unlikely' to meet its renewables target

Germany is the only EU country likely to attain its target for the share of renewable energy in its overall electricity consumption by the end of the decade, according to research published by the European Renewable Energies Federation (EREF).

Under the Renewable Electricity Directive, the EU-15 states should reach a collective 22% share of renewables in electricity consumption by 2010. According to EREF, this will only be attained under the most optimistic of its scenarios – the Federation's 'realistic' scenario, which reaches 17.8%. And, while Germany may reach its 12.5% target, no other country is close, according to EREF, and the share of electricity sourced from renewables will actually fall in several countries due to rising electricity consumption. Spain is probably the second-placed country in terms of reaching its target.

One reason for the disappointing performance so far has been an over-reliance in some countries on one form of renewable energy, says EREF. Both France and Greece suffered in 2003 as low rainfall and high temperatures caused their hydropower industries to generate considerably less power than usual.

BP Solar has launched its Saturn 7 Series solar power modules, claiming them to be, with an energy conversion efficiency of 14.3%, the most efficient solar cells commercially produced in Europe. Manufactured in BP Solar's state-of-the-art plant in Tres Cantos, Spain, the cells have a low reverse leakage current that gives excellent low-light performance, says the company.

World wind power growth at 35%

The world saw 8,133 MW of wind power installed in 2003, according to figures released by the American Wind Energy Association (AWEA) and European Wind Energy Association (EWEA), bringing the world's total wind power generating capacity to over 39 GW.

With an annual growth rate of more than 35% over the last five years, Europe leads the world in wind energy development. The country with the most wind capacity is Germany, followed by the US, Spain, India, and Denmark. Global cumulative capacity increased by 26% in 2003.

In Europe, Germany has more than 14 GW of installed capacity – by far the largest installed base in the world. Spain more than 6 GW of turbines; Denmark more than 3 GW, while The Netherlands, Italy and the UK follow; all short of 1 GW of installed capacity. Germany comfortably exceeds California, the US state with the largest wind generating capacity (2 GW); Texas is next at 1.3 GW of capacity.

PV power for two Californian wineries

Two Californian vineyards are now relying on sunshine for more than its propensity to ripen grapes. A 766 kW solar photovoltaic system built by PowerLight Corporation and covering 6000 m² of roof space at Rodney Strong Vineyard's barrelhouse recently began providing a significant portion of the winery's power needs. The system went online earlier this year

PowerLight is now completing the installation of a similar, 457 kW system for St Francis Winery in Santa Rosa, California. Vineyards may be particularly appropriate for solar power applications due to their customary flat-roofed storage areas and sunny locations, suggests the company.

PowerLight is also responsible for installing the largest city-owned solar installation in the US, a similar 6000 m² flat roof installation on San Francisco's Moscone Center. Installation of the 675 kW system was completed in March. In addition to the solar array, the Moscone Center installed new building controls and energy efficient lighting.

Biogas-fired fuel cells for New York City

New York City has completed installation of eight 200 kW fuel cells at four of the city's wastewater treatment plants. The cells are fuelled with the biogas produced in anaerobic digesters at the treatment plants. That biogas – a combination of methane and carbon dioxide – is not only a very potent greenhouse gas, but is also a source of noxious odours. The US Department of Energy provided partial funding for the installations.

While New York uses anaerobic digesters to process its wastewater, a growing number of US dairy farms are using the same technology to convert manure into biogas, which can then be used to power a motor-generator set to produce electricity. Microgy Cogeneration Systems Inc, a subsidiary of Environmental Power Corporation, has recently won five orders to install its digester systems at dairy farms in Wisconsin. The digesters are being installed as part of an agreement between Microgy and the Dairyland Power Cooperative. Microgy is also exploring the feasibility of installing up to 4 MW of generating capacity at two farms operated by the Gallo Cattle Company in California.

Soft starters from the UK-based Fairford Electronics Ltd are providing an effective, low-cost and reliable solution for synchronising the operation of wind turbines to distribution networks in several wind farm projects in Costa Rica, Panama and Nicaragua. Working in conjunction with Spanish partner Desccarrollos Eolicos, Fairford has supplied hundreds of its QFE soft starters, control cards and keypads.

The function of the soft starters is to bring the wind turbine generators on-line smoothly, achieving synchronisation to the power network without massive inrush currents on the supply, and without the harsh shocks that can damage and break mechanical equipment such as bearings, couplings and gears.

American companies start ocean energy R&D

While European companies have up to now led the way in developing new ocean energy – wave and tidal – technologies, this may be about to change as US companies are working on three new ocean energy projects. The project developers claim that all three will provide power to electrical grids.

New Jersey's Ocean Power Technologies Inc (OPT) has signed an agreement with Spanish utility Iberdola SA to build a 1.25 MW wave energy plant that will provide power to the Spanish power grid. OPT's device uses a buoy to capture wave energy and convert it into electricity in an ocean-floor-mounted generator.

Meanwhile, the US Navy is working with Florida Hydro Power and Light to test an innovative turbine that captures the energy of ocean currents. The open-centred turbine will be deployed in the Gulf Stream, and the Navy intends to connect it to the Florida power grid.

And the US engineering company RW Beck intends to work with Baltimore's Solar Sea Power International (SSP) to build a 10 MW ocean thermal energy conversion (OTEC) plant on a Caribbean island by 2007. OTEC plants use the temperature difference between the sun-warmed surface of the ocean and the cold ocean depths to produce power, and can also produce desalinated water as a by-product.

US Department of Energy research in OTEC technology culminated in a 50 kW plant in Hawaii in the early 1990s, but the high cost of power from that system led the research programme to be shelved.

Kuwaiti oil contracts go the British company

Kuwait's oil field projects are to managed by the UK-based AMEC for the next five years under a contract worth up to $5 billion, with an option for an extension for two years. The contract, with the Kuwait Oil Company (KOC), was won by a non-US company for the first time – previously its equivalent was held by Parsons and Bechtel.

The contract covers project management of KOC's upstream oil assets in the south of the country. It will be carried out by AMEC's Oil & Gas division, recently created to bring together AMEC's upstream and downstream capability to provide clients in the energy sector with an integrated asset support service world-wide.

AMEC's team of between 70 and 80 people based in the UK, and up to 160 in Kuwait, will project manage all KOC activity in the south of Kuwait, where KOC is seeking to develop existing oil fields using enhanced recovery techniques.

Working closely with KOC personnel, AMEC will assess the fields and how to improve their performance, and will prepare contracts for KOC to award, overseeing all engineering and related activity. This will include Front End Engineering Design, preparation of documentation, assessment of tenders, project management, construction management, contract administration, consultancy on environmental issues and risk management and training of KOC staff and local support personnel, says AMEC.

The contract covers not only oil fields and related assets but also the infrastructure KOC needs to support its 5,000 staff working in the region.

- AMEC's joint venture with the US-based Fluor Corporation, Fluor/AMEC LLC, has won a contract worth up to $500 million from the US Department of Defence to provide design-build services for the construction, rehabilitation, operation and maintenance of power generation facilities throughout Iraq. Fluor and AMEC are already working together in the US, Canada, Angola, South Korea, the Philippines and Australia.

Largest private power plant opens in Vietnam

Vietnam's largest privately operated power plant has been built and commissioned by Siemens Power Generation in the Phu My industrial park. The plant was released to the operating consortium comprising British Petroleum, Sembcorp and Kyushu Power/Nissho Iwai last month.

The consortium will operate Phu My 3 for 20 years. The plant is also the country's first power plant that was built as a build-operate-transfer (BOT) project. Siemens also has a maintenance agreement for the plant covering a 12-year period.

The Phu My 3 combined cycle power plant, located about 70 km southeast of Ho Chi Minh City, will make a major contribution toward alleviating the country's power shortage. Since January, the station has been providing approximately 720 MW of power to the grid, which is operated by the state-owned power supplier Electricity of Vietnam (EVN) under a long-term supply agreement. The combined cycle power plant, which is fired with natural gas from two newly developed offshore gas fields, is operated in base-load duty.

The Siemens PG scope of supply included two V94.3A gas turbines with associated auxiliary systems from the PG manufacturing plant in Berlin, one steam turbine and three generators. The gas turbines were synchronised with the grid on schedule in late August 2003. The steam turbine was connected to the grid for the first time in November 2003.

At the same location, Siemens PG had already built the 300 MW gas turbine power plant Phu My 2.1 Extension for EVN. The total installed power plant capacity in Vietnam currently amounts to approximately 8,250 MW.

Dutch companies work towards 200 MW fuel cell plant

Dutch chemicals company Akzo Nobel is collaborating with local fuel cell developer NedStack to investigate the feasibility of a large-scale power plant based on fuel cells to be sited at Nobel's chlorine electrolysis plant in Botlek, the Netherlands.

With a peak capacity of 200 MW, it would be the world's largest fuel cell plant. The three year project would allow both companies to gather knowledge on a fuel cell plant linked to a chlorine electrolysis plant.

It is expected that the application of fuel cell technology to the production of chlorine could yield electrical power savings of approximately 20%. In addition, an important environmental gain will be achieved by limiting undesirable emissions.

Akzo Nobel Base Chemicals, producer of chlorine, caustic soda, and hydrogen among other products, will supply the expertise on hydrogen and the electrolysis process, while Akzo Nobel Energy, producer of electricity and steam, will contribute to the know-how on the generation of energy. NedStack will develop and produce the hydrogen-based fuel cells.

GE turbines for Irish cogeneration plant

GE Energy is to supply two gas turbine generator sets for a 150 MW cogeneration plant to be built near the city of Limerick, Ireland. The gas-fired plant will provide power and process steam for a large aluminium refining facility owned by Aughinish Alumina Limited of Ireland, as well as power for the Irish grid.

GE Energy will supply two Frame 6FA gas turbines, featuring dual fuel capabilities and advanced Dry Low NOx emissions systems, and two 50 Hz, GE 6FA generators. The equipment will be manufactured at GE Energy's facilities in Belfort, France. The two gas turbine packages will be shipped to the project site in September and October of 2004, respectively.

Once the new cogeneration plan begins commercial operation, scheduled for December of 2005, Aughinish Alumina expects to be able to reduce operations of older oil-fired boilers at the site, thus reducing emissions.

The 75 MW class Frame 6FA is the mid-sized member of GE's F technology fleet of gas turbines that has surpassed nine million hours of commercial service worldwide.

Worldwide orders for diesel generating sets are currently booming, with the Middle East, Africa and the Far East all producing record orders, according to UK genset manufacturer Indamex, part of the VibroPower Corporation of Singapore.

Orders are mainly for the larger size of unit, ranging in output from 500 kVA to 2 MVA, suggesting a rise in power demand from major civil engineering projects, factory and industrial expansion – and local power shortages. China is a particularly strong market, says the company, partly due to power shortages from the public supply.

Indamex and VibroPower manufacture gensets from 15 to 2500 kVA using diesel engines from Cummins, Deutz, MTU, Perkins and Volvo.

Major UK power failures 'unlikely' but more investment needed

Major power failures like those experienced in North America and Italy last year are unlikely to happen in the UK, according to a new report by the Trade and Industry Committee, although investment levels in the network may be insufficient to properly replace equipment which is reaching the end of its life.

The Parliamentary Committee's investigation and report: *The resilience of the national electricity network* followed a series of less serious power cuts in the UK in August to September last year. Some commentators had expressed concern about the resilience of the UK electricity network and suggested that there was an imminent and growing danger of blackouts. While the DTI and the industry regulator, Ofgem, launched inquiries into the causes of the incidents in England, the Committee decided to initiate a more general inquiry into the condition of the electricity infrastructure, and the challenges likely to be faced by electricity companies over the next 20 years or so.

While major power failures were found to be unlikely, the Committee noted both under-investment and pressure to minimise operational expenditure. This pressure, while doubtless resulting in reducing some inefficiencies, may be counter-productive for network performance. Ageing assets are likely to require more maintenance, says the report, and the Committee also raised concerns about a likely shortage of highly skilled staff both to maintain and to reconstruct the network.

The Committee also noted that there is a pressing need for extra investment to ensure that the network is able to cope with the expected closure of a number of large nuclear plants, and the growth in renewable generation, over the next 10 to 20 years.

'No interest' in North Sea EOR project

There is no real interest among North Sea oil producers in participating in a demonstration project on enhanced oil recovery (EOR) using recovered carbon dioxide, concludes a new DTI report: *Implementing a Demonstration of Enhanced Oil Recovery (EOR) Using Carbon Dioxide*.

The report nevertheless fulfils the Department's commitment in the Energy White Paper, says the DTI, to "set up an urgent detailed implementation plan with developers, generators and the oil producers to establish what needs to be done to get a demonstration [of EOR] project off the ground".

But the report concludes that, under current market conditions, there is little interest in CO_2-based EOR amongst North Sea oil producers, so a full implementation plan has not been developed. Carbon dioxide-based EOR remains a potential option for demonstrating carbon dioxide capture and storage (CCS), adds the DTI. And CCS is a central element of the development of near-to-zero-emissions fossil fuel combustion plant,.

The DTI is currently reviewing its strategy for the development of such a plant.

Carbon emissions rose in 2003; oil and gas production fell

UK emissions of carbon dioxide were 1.5% higher in 2003 than in 2002, according to provisional figures for the year released by the DTI and published as part of the March issue of *Energy Trends*. However, carbon dioxide emissions for 2003 were 7.5% lower than in 1990, despite a 34.5% increase in GDP. The fall was due to fuel switching and increased energy efficiency, including generation efficiency at power stations, says the DTI.

The increase in emissions from 2002 to 2003 was caused by the greater use of coal for electricity generation. This in turn was caused by the higher gas-to-coal price differential, which has increased the commercial attractiveness of coal.

Total energy consumption, on a temperature corrected basis, increased by 7% between 1990 and 2003, compared with the GDP increase of 34.5% over the same period. Energy intensity fell by 20.5% during the same period, whilst carbon intensity fell by 31%, reflecting the switch in fuels, says the DTI.

Total indigenous UK production of crude oil and NGLs in 2003 decreased by 8.5%, compared with 2002, to 106 million tonnes. Ten new fields started production. Although production from these fields accounted for 2% of total production, this was insufficient to make up the general decline in production from the older, established fields.

Total indigenous UK production of natural gas in 2003 was 0.7% lower than in 2002. Overall, gas production has started declining as UKCS reserves deplete and this trend is likely to continue. Compared with 2002, exports of natural gas in 2003 increased by 17.5% while imports increased by 43%. However, UK indigenous natural gas still accounted for 92% of gas supplies in 2003.

Coal production was 5.9% down on production in 2002, at 28.2 million tonnes, with deep mined production down by 4.6% and opencast production down by 7.8%. Imports of coal in 2003 were 12% higher than in 2002 at 32.1 million tonnes, the second highest ever level.

Switching to total energy data (and all on temperature-corrected annualised rates):

- indigenous production of primary fuels was 260.4 million tonnes of oil equivalent in 2003, 4.5% lower than in 2002;
- total inland consumption on a primary fuel input basis was 236.7 million tonnes of oil equivalent in 2003, 1.2% higher than in 2002;
- between 2002 and 2003, coal and other solid fuel consumption rose by 7.1%, oil consumption increased by 2.0%, gas consumption fell by 1.3%, and primary electricity consumption increased by 1.4%.

Energy Trends ***is available at www.dti.gov.uk/energy/inform***

NOx reduction plant to put Drax in the lead; FGD at Cottam

Mitsui Babcock has been awarded a contract to lower NOx emissions at Unit 1 of the Drax Power Station in Selby, North Yorkshire. Drax is the largest thermal power station in Western Europe and one of the first to reduce emissions in line with the EU Large Combustion Plant Directive, which will control the levels of permissible NOx emissions from power stations, becoming effective in 2008.

Meanwhile, Energy Minister Stephen Timms has approved a proposal from EDF Energy (Cottam Power) Ltd to fit flue gas desulphurisation (FGD) plant at its 2000 MW coal-fired power station at Cottam in Nottinghamshire. The consent is for the final two units at Cottam – the first two obtained consent in August 2002 and FGD plants are currently under construction.

The moves follows recent announcements of NOx reduction equipment to be fitted at Powergen's Ratcliffe-on-Soar power station near Nottingham, and FGD plant to be fitted to Rugeley Power Ltd's coal-fired power station in Staffordshire.

Gerald Wingrove, CEO of Drax Power Limited commented, "We awarded the contract to Mitsui Babcock after carefully considering not only the potential for NOx reduction, but also increased fuel flexibility, minimum plant disruption and cost. The Mitsui Babcock technology offers the best combination of all three, allowing Drax to be one of the first to take the lead in meeting the LCPD emission reduction targets ahead of their formal implementation."

McKean is Energy Manager of the Year

Barry McKean, Energy Conservation Manager at the Metropolitan Borough Council of Knowsley, is the new Energy Manager of the Year. The Award was presented by Energy Institute Vice President, Martin Fry, at the Gala Dinner of this year's annual energy management conference and exhibition (Nemex), hosted by Louise Kingham, Chief Executive of the EI.

Barry McKean is responsible for developing, implementing and monitoring the Council's corporate energy and water conservation strategy, as well as meeting the requirements of the Home Energy Conservation Act. Originally working as a team of one, Barry has attracted £1 million of external funding to install measures that have resulted in the Council reducing its annual carbon dioxide emissions from 30,000 to 21,000 tonnes and saving householders approximately £150 per year.

Sue Davies, Premises Manager at the Astley Cooper School, was also highly commended for her work that has included teaching the importance of reducing global warming to staff and students and developing a sound energy policy to reduce the school's energy usage.

Carbon emissions targets: 'UK must not go it alone'

The risk to UK business from tough new Government environmental targets – carbon reduction targets in particular – could become excessive if other European Union economies do not deliver on their targets, says the CBI.

The employers' organisation is stressing that none of the other EU countries that have so far announced their emissions allocation plans have yet demonstrated how these will meet their Kyoto commitments. Some EU members, Denmark and Austria for example, will fail to meet their Kyoto targets, with Austria actually increasing emissions.

The CBI points out that the UK is the only member state pledging to go beyond its Kyoto commitment.

CBI Deputy Director-General, John Cridland, said: "British business is already demonstrating it takes the threat of climate change very seriously. But it is extremely concerned that the UK is making too large a commitment if other countries do not deliver. This could damage business competitiveness in key industrial sectors, especially if electricity prices rise faster than the government expects.

"Germany is expected to protect its electricity generation sector while the UK's will bear the brunt of the emissions reduction obligation with the extra costs passed to UK power users.

"The CBI supports emissions trading and does not want it to be discredited. The Government must implement rules and targets for the UK that do not undermine the ability of companies and plants to compete and it must ensure consistency across the EU. If the Government cannot achieve this and all member states cannot meet the EU deadline the Government must be prepared to revisit the UK's proposed plan."

John Cridland added: "The UK produces about 2% of the world's greenhouse gas emissions. Even the severest reductions here would mean very little in global terms. The UK is putting itself on the line, expecting others to follow but it's increasingly clear that they are not going to. For this small but important gain, the government risks driving jobs abroad to countries where conditions are less onerous."

Barry McKean (left) accepts the Award from the EI's Martin Fry

Second CHP/ community heating scheme planned for Southampton

Southampton City Council has approved plans for what would be Britain's largest CHP/community heating scheme. The proposed scheme is a joint development between the City Council; Utilicom, which operates Southampton's city-centre CHP/community heating scheme; and Nursling generation, a company established to developed the central CHP station.

The CHP station is to be based on a 50 MW gas turbine – the largest used to date in a community heating application in the UK.

The first phase would provide heat to over 3000 council-owned homes and the scheme would ultimately supply low-cost heat, via a network of over 200 km of buried heating pipelines, to residential and commercial premises throughout the west of the city. When operating at full capacity the plant would deliver one-third of the city's target for carbon dioxide emissions reduction.

Funding for larger solar projects

Local councils, higher education, businesses and housing are among those set to benefit from the latest, £2 million round of Government funding for investment in solar energy projects throughout the UK. The new grants will apply to medium to large scale solar electric power installations under the Government's £25 million Major Photovoltaics (PV) Demonstration Programme.

The larger projects include the national Trust HQ in Swindon, Middlesborough Football Club, and the Imperial War Museum site at Duxford, which will incorporate a 215 kWp PV system into the roof-lights and building envelope of its new airspace museum. Others are the first solar powered fire station at Richmond in Surrey, Birmingham Art Gallery and Edinburgh University.

Barriers to distributed generation 'falling' as Ofgem backs renewables

Energy regulator Ofgem has reaffirmed its commitment to supporting electricity distribution companies in removing barriers for distributed generation connecting to distribution networks.

Ofgem Chairman, Sir John Mogg, said: "Companies running regional electricity networks are facing a period of significant change and great opportunity, particularly with the Government's drive to develop renewable generation. We have been developing a regulatory framework that will give real incentives to the distribution companies to invest efficiently and quickly to secure maximum value and benefit for customers from the growth of distributed generation."

The regulatory framework will provide incentives for distribution companies to take a proactive and positive approach to generators wanting to connect. Companies will have real opportunities for high returns if they connect distributed generation in a timely and cost-effective manner. The framework will also provide strong protection against any downside risk they may face, says Ofgem.

Sir John added: "Experience over the past years has shown that companies have invested very little in research and development. This needs to change in response to the increasing pace of renewable development. Technical innovation should form part of the network companies' response to the greener energy challenges ahead."

Meanwhile, Ofgem and the DTI have also published the second annual report of the Distributed Generation Co-ordination Group (DGCG), which shows that at least half of the 24 barriers to the development of small scale distributed generation identified by the DGCG when it was founded have been removed. Many, but not all, of these distributed generators are wind farms or other renewable generation schemes.

Energy Minister, Stephen Timms said: "The DGCG has made real progress in addressing many of the barriers faced by distributed generation and is to be congratulated on its work to date. However, much more remains to be done, particularly in addressing the significant barriers to the connection of smaller-scale generation that remain in place."

The focus of the DGCG has been the removal of barriers to the development and connection of distributed generation. Barriers that have been removed include a lack of:

- a standard approach by distribution companies where more than one generator is seeking connection to the same section of the distribution network;
- standard technical guidance on the connection of distributed generation; and
- a modern methodology for assessing the contribution of modern types of distributed generation to network security.

Meanwhile, Ofgem has announced the buy-out price for the third year of the Renewables Obligation at £31.39 per MWh. The buy-out price allows electricity suppliers to make up any shortfall between the amount of their obligation and the number of Renewables Obligation Certificates presented. It is adjusted each year to reflect changes in the retail prices index. The Government set the buy-out price at £30/MWh for the first year of the Obligation and at £30.51/MWh for the second year.

Budget proposes VAT cuts for micro-CHP and heat pumps

The Government's spring Budget contained several small but significant measures to encourage the sustainable energy industry – affecting micro CHP, ground source heat pumps and expanding the list of technologies that qualify for enhanced capital allowances (ECAs).

The Energy Saving Trust welcomed the commitment to reduce VAT on ground source heat pumps from June this year and, potentially, micro CHP in 2005 – depending on the results of field trials of the domestic-scale technology currently underway. The announcement means that micro CHP units and heat pumps would be taxed at the same VAT rate as other energy efficiency products and domestic energy supplies.

Ground source heat pumps take heat from the ground to provide heating in the home and are particularly appropriate for rural areas without a gas supply. Units are highly efficient; for every one unit of electricity used to power the pump, three to four units of heat are produced, giving an efficiency of 300 to 400%, compared to condensing gas boilers which are around 90%.

Meanwhile, the Budget also resulted in three new technologies proposed to be added to the Government's list of energy efficiency products that qualify for ECAs – air-to-air heat recovery systems, compact heat exchangers and HVAC zone controls. The additions, along with a series of new sub-technologies, were proposed by the Carbon Trust, which manages the Energy Technology List.

Details of the Energy Technology List can be seen at: www.eca.government.uk

Where else can we put solar photovoltaic (PV) panels? This 11 kWp, 50 m long system, installed by solarcentury on the sound barrier on the M27 near Portsmouth for the Highways Agency, will generate nearly 10 MWh of electricity each year. The electricity generated will be fed into the local electricity grid and used locally for street lighting, street signage or simply sold back to the electricity suppliers.

solarcentury worked with CORUS Building Systems to develop the two installation systems; one uses standard modules and the is other based on unique 'peel and stick' technology which is simply bonded to the aluminium sound barrier. The technology contains no glass and is robust enough to withstand impacts from stones, stray beer cans and other motorway debris, says the company.

"The solar panel trial is the only one of its kind in England, and could revolutionise the way we power our motorway 'furniture'", said Les Hawker, Highways Agency Project Manager for the scheme. "The fences are easy on the eye; they will also help us to test safety issues and see how they affect motorists."

solarcentury has already installed hundreds of solar lighting systems in bus shelters and stops across the country and is currently trialling the use of solar powered bus ticket machines on Waterloo Bridge in London.

New posts for Green, Plowman, Gallagher

David Green, Chief Executive of the UK Business Council for Sustainable Energy and Director of the CHP Association (and a Fellow of the Energy Institute), has been appointed to chair the steering group of the London Energy Partnership.

Launched by Mayor Ken Livingstone in January, the Partnership aims to ensure that London minimises its impact on global warming by transforming the city into a "world class site for sustainable energy".

Meanwhile, Powergen's General Manager of Energy Production, Keith Plowman, is the new Chairman of the CHP Association and has promised to take the case for growth and development of the CHP market directly to the top. Keith will be the focal point in lobbying the Government for improvements in market conditions for CHP projects.

And Ed Gallagher, formerly Chief Executive of the Environment Agency, has been appointed Chair of the Gas and Electricity Consumer Council - energywatch. Gallagher will play a key role in energywatch's strategic engagement with the energy industry, the regulator and Government to improve the service received by energy consumers.

Education and training for

The Energy Institute runs an enormous range of training courses and accredits many more from external organisations. There is a strong tradition of courses in energy management and sustainability from the old Institute of Energy – these now lie alongside a substantial programme of courses with roots in the old Institute of Petroleum, covering everything from the fundamentals of the oil and gas industry to price risk management.

Here, Sarah Beacock discusses some recent developments.

By Sarah Beacock, Professional Affairs Director, Energy Institute

One of the most exciting aspects of working in the energy industry, and indeed education and training, is the vast amount of new developments that there are to learn about. The energy industry doesn't stand still and this presents energy professionals with a constant challenge to keep themselves up to date. Particularly with a newly-merged professional body, EI members have a wider pool of expertise from which to enhance their knowledge and this broader membership has brought many advantages to our potential for learning about new parts of the industry.

Activities at branch level, for example, have already shown the immense scope there is for learning about new aspects of the industry. Regular readers of *Energy Network* will have seen the reports of recent meetings, which have ranged from new exploration of UK gas fields to the first steps on implementation of the UK Energy White Paper.

As well as members' input to their professional development (PD) activities through branch events, there are plenty of more formal opportunities for PD through specific energy-related training and education programmes. The EI runs over 50 useful training courses a year on topics which range from *Introduction to Petroleum Economics* to *Advanced Energy Management*. For those who prefer distance learning programmes there are further learning opportunities in energy management which aim to provide PD for those both at an early stage and further along their career.

The EI views professional development as essential for members at all grades, and hopes to widen its range of training opportunities still further in the future. We also hope to be able to continue to signpost members towards the best and most appropriate learning experiences that are provided by others. To do this we are able to accredit and approve courses offered by higher education establishments both for membership of the EI and towards Chartered or Incorporated Engineer status. 2003/2004 has been a very busy year for our accreditation activities as you will see from the box.

Another way in which the EI can identify useful potential sources of learning for members is by approving the training offered by other organisations in areas that are of interest to our members. Activity here is picking up rapidly and below are details of two recent organisations and how they gained approval.

External professional development courses

The Centre for Sustainable Energy in Bristol has developed and run a highly successful *Renewable Energy* course aimed primarily at HECA officers who

EI accredited academic courses

The Energy Institute is licensed by the Engineering Council (UK) to offer Chartered, Incorporated and Engineering Technician status to engineers. It is also licensed to accredit course that have been determined to meet the academic requirements of ECUK.

You can find a list of these course on our website.

Courses recently accredited or approved are:

- Heriot-Watt University:
  - MSc / PGDip Building Services Engineering
  - MSc / PGDip Environmental Services
  - MSc / PGDip Building Services Facilities Management
  - MSc / PGDip Building Services Engineering Management
  - MSc / PGDip Built Environment
  - MSc Energy (FLAME programme)
- UMIST:
  - MSc Sustainable Electrical Control and Lighting Building Services Engineering
- South Bank University:
  - BEng (Hons) Building Services Engineering
  - BSc Building Services Engineering
  - BSc (Hons) Building Services Engineering
  - HND Building Services Engineering
  - MSc Building Services Engineering
  - MSc Sustainable Energy Systems
- Strathclyde University:
  - MEng Enviro-Mechanical Engineering
  - BEng (Hons) Enviro-Mechanical Engineering
  - BEng/DiplEng (Hons) Enviro-Mechanical Engineering
  - MSc Energy Systems and the Environment
- University of Sheffield:
  - MSc Environmental & Energy Engineering
- DeMonfort University:
  - MSc Climate Change and Sustainable Development
- City University (London):
  - MSc Energy and Environmental Technology & Economics
- Loughborough University (CREST centre):
  - MSc Renewable Energy Systems Technology
- University of Ulster:
  - BEng (Hons) Environmental Engineering
  - BEng (Hons) Building Services Engineering
  - MSc Energy management (Previously Energy Technology)
  - MSc Renewable Energy

the energy industry

work closely with the public sector and particularly with the domestic use of energy. The course was visited by the EI in October and was found to be well put together and presented, with useful practical calculation exercises and opportunities for trainees to gain a good basic understanding of how renewable technologies operate and their possible uses.

Meanwhile, National Energy Services Ltd in Milton Keynes has developed and run the well-known *National Home Energy Rating* scheme, which is considered the industry standard for energy efficiency surveyors. It is a course and qualification taken by a wide range of people and qualifies them in the principles of assessing and evaluating the energy efficiency of homes. The EI visit team found the quality of the training on the course to be very good, with excellent teaching staff. The NES has a policy of continuous improvement in its course implementation and were pleased that the EI was able to contribute to that process through this approval.

For further information on potential approval visits for energy-relevant training courses please contact: education@energyinst.org.uk.

Energy management courses

Effective energy management is now a key feature of all businesses and the EI specialises in introducing organisations to the best ways of implementing good practice.

Discussions with our customers has revealed a need for courses which develop some of these introductory themes in more detail. In 2003 we launched a number of *Advanced Energy Management* courses on particular areas such as *Energy Auditing* and *Monitoring and Targeting*. The success of these, and particularly the highly successful *Renewables* course held at West Beacon Farm have led to requests for repeats which will be available throughout this year. Another course that has sprung from the desire of previous trainees for something to provide the 'next step' for their own career development is the *Energy Leader* course.

Energy Leader course

This course is aimed at those who have the responsibility for implementing energy management practices and changes in their organisation but need extra ammunition in order to carry it out effectively. The crucial element of the energy manager's role as a leader is to use experience and insight to consider their organisation three to five years ahead. Many business leaders see their role as anticipating trends years in advance and creating a sense of urgency within their organisation, but this alone would not achieve results. For energy managers with a realistic strategy and action plan to address these issues, this exercise will energise those involved to make changes to deliver a step change in energy performance. An energy manager needs to think like a business leader.

The *Energy Leader* programme is designed for energy and environmental managers employed in the private or public sectors whose organisations require a step change in energy and environmental performance. This could be as a result of stakeholder pressure, legislation or business driver. The Energy Leader approach addresses and forms essential linkages between each of these to create the platform for change.

Students on the Renewable Energy course visiting Prof Tony Marmont's farm to see an electric vehicle (top) and fuel cell (bottom).

The aim of this course is to find means to create a paradigm shift in the way energy managers operate, which is made more difficult during a cycle of cheap energy. Energy managers know the difficulty of engaging senior management to support energy efficiency and in many cases even the environmental agenda. This course helps them gain the skills and knowledge to address this pressing need.

The first of these courses was run in February and will be repeated in September, with a further spin-off course focusing on waste minimisation following later in the year.

Another new development for 2004 is the *European Energy Management* course.

Current Energy Management courses/education programmes available from the EI TEMOL

The Training in Energy Management through Open Learning (TEMOL) course is a flexible, practical and employment focused distance-learning programme covering both technical and managerial aspects of energy management, aimed at those relatively new to energy management. Past students have worked for universities, local authorities, energy consultancies, utility companies, government departments, manufacturing organisations .... and many more.

National Vocational Qualification (NVQ) Level 4 in *Managing Energy*

The NVQ Level 4 in *Managing Energy* is a formal national qualification, developed by the Management Charter Initiative, recognising your competence and expertise based on the National Occupational Standards in Managing Energy, which draw together the key functions of managing activities, people, resources, information, energy and quality.

One-day *Energy Management* courses

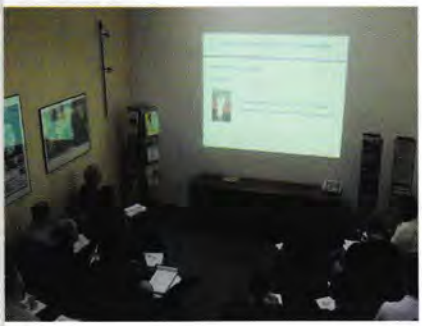
Energy Institute one-day *Energy Management* courses enable energy professionals and newcomers to the industry keeping up to date with recent developments in energy management. We provide an *Introduction to Energy Management* course, as well as *Advanced Energy Management* courses. These courses provide delegates with practical solutions to assist in producing an effective energy management strategy, increasing energy efficiency and reducing energy consumption.

The *Introduction to Energy Management* course covers the following basic concepts:

- energy policy;
- investments for energy efficiency;
- emissions targets;
- climate change levy;
- energy technology; and
- energy efficiency accreditation.

Advanced Energy Management courses cover the following areas:

- Part L Building Regulations;
- educating the workforce;
- monitoring and targeting;
- renewables; and
- energy auditing.



European Energy Management course

The Energy Institute began a two-year EU-funded project in April 2003 to develop a qualification for European energy managers. The partnership comprises three Chambers of Commerce in Germany, Austria and Portugal and the Energy Institute as the UK partner. The intention is to develop a qualification that will be recognised nationally throughout the four countries in the partnership and ultimately be extended for use with other countries throughout the EU.

The qualification will be tailored predominantly to the needs of the manufacturing sector and is being piloted initially with a selected number of energy managers over the next few months. The training towards each module of the qualification will comprise attendance on a course backed up by practical application of the learning through a work-based feasibility study.

The course provides 12 days of training for just £1700 plus VAT (or less for EI members) and training is held in four lots of three-day sessions. There are a number of benefits for those who participate on the pilot project, including the opportunity to network with their European counterparts via an e-forum, the provision of written support materials, including case studies, checklists and calculation tools, and the compilation of a feasibility study for a project which could save their company an average of 400 MWh per annum.

There is still an opportunity to join this course for members who feel this would be a useful addition to their existing portfolio of energy management training.

If you need a recognised qualification in Energy Management, you can contact us at education@energyinst.org.uk for further information on our courses.

The EI is also offering a broadened range of oil and gas courses in 2004, particularly those looking at economic factors and trading. Current developments in risk management and health and safety issues in the oil and gas sector make these key topics of new courses this year. For further information on any of these courses contact training@energyinst.org.uk.

Some of the new oil, gas and energy courses for 2004

Price Risk Management in Traded Gas and Electricity Markets
Hazardous Area Classification
Economics of the Oil Supply Chain
Economics of Refining and Oil Quality

Training to assess building energy performance

The Energy Performance in Buildings Directive requires that all buildings have an energy performance certificate when they are "constructed, sold or rented out". It also requires those certificates to be prepared "in an independent manner by suitably qualified and/or accredited experts". Meeting these requirements demands new qualifications and quality assurance frameworks, and presents significant challenges to both industry and the professional institutions whose members are involved in auditing the energy efficiency of buildings.

The energy profession has an extraordinary opportunity to establish a comprehensive national qualifications framework around the competency to undertake energy efficiency audits of buildings and provide appropriate recommendations for improving energy efficiency. This could create new career opportunities for individuals and provide employers and clients with a clear indication that an individual has demonstrated the necessary skills.

Residential sector

In the residential owner-occupied sector, the Government intends to satisfy the Directive through the planned introduction of Home Information Packs, which all prospective vendors will have to prepare before they can market their home for sale. The packs will include a Home Condition Report (HCR) that will incorporate an energy performance certificate. All HCRs are to be prepared by licensed Home Inspectors, who must successfully complete the new Home Inspector Vocationally Related Qualification (VRQ) and be subject to the code of conduct and rigorous quality monitoring by the Home Inspector Certification Board (HICB).

Amongst the many competencies required for the VRQ will be the ability to undertake an energy efficiency assessment of a dwelling; compile an energy report using an approved methodology; determine appropriate recommendations for improving the energy efficiency of the dwelling; and to communicate all of this information to the recipient of the report.

The objective is to ensure that all elements of the HCR, including the energy efficiency component, are robust and reliable. That means that whichever Home Inspector prepares the report, it will be to the same standard. Anything less than this would undermine the confidence that recipients could place in the report and therefore the likelihood of them acting on the recommendations.

It is estimated that there will eventually be a need for some 7,000 Home Inspectors. Each one will need to qualify for the VRQ and to demonstrate competence and consistency in undertaking an energy efficiency assessment and preparing a report.

If we get it right, the HCR will help to increase public awareness of energy issues and stimulate the market for energy efficiency improvements. As such it has the potential to make a significant contribution to delivering the objectives in the Energy White Paper.

Government plans for delivering the requirements of the Directive in other sectors are much less clear.

In the residential new-build sector it is anticipated that a new competent persons scheme will be established. However if this is to be in place by the time that the Directive and new Building Regulations come into force in early 2006, urgent action is needed to establish both a suitable training and qualifications framework and a suitably accredited quality assurance framework.

In the residential rental sector there are no clear proposals for how the Directive will be implemented. A legal framework will need to be established requiring landlords in both the social housing and private sectors to provide energy performance certificates to prospective tenants. Irrespective of how this is achieved, the energy efficiency auditing competencies required to prepare the report will be comparable to those being put into place for the Home Inspector VRQ.

Of course the Home Inspector VRQ is a much wider qualification and requiring all those providing energy performance certificates in the residential rental sector to be licensed Home Inspectors would be needlessly restrictive. Work is therefore underway to explore the possibility of establishing a stand-alone qualification for the energy efficiency audit and reporting component. Holding this stand-alone qualification would then be recognised as fulfilling the specific element of the Home Inspector VRQ, providing a route to building up one's qualifications and career.

By Brian Scannell of National Energy Services Ltd.

Non-residential buildings

The situation in the non-residential buildings sector is even less clear. Inevitably the difficulty of providing energy performance certificates for large buildings with complex services tends to dominate considerations. But it is worth remembering that the vast majority of non-residential buildings are not particularly large or of esoteric construction, or fitted with complex services. The high street in most towns is full of non-residential commercial and retail buildings that have more in common with a residential building than with Canary Wharf.

It is time to recognise that the ability to undertake an energy efficiency audit and to prepare an energy performance certificate is no longer a trivial competence that can be assumed to follow from some more general academic or professional qualification. What we need is a coherent hierarchy of focused, competency-based qualifications that will allow an individual to develop their skills and thereby enhance their career opportunities. Creating this requires input from industry, academics and the professional institutions and it is needed now.

Contact National Energy Services Ltd on tel: 01908 672787 or via the website: www.nesltd.co.uk

New course for condensing boiler installation

By Helen Beardsley of the Energy Saving Trust

In any industry, changes in policy place an onus on employees to adapt in order to survive, and the heating industry is no exception. When the changes to Building Regulations in England and Wales are implemented in April 2005, it will be compulsory to install high efficiency condensing boilers in most situations.

The Energy White Paper paved the way for a new direction in energy policy and energy efficiency has been recognised as the key to cutting carbon dioxide emissions by 60% by 2050. It is expected that half of all the carbon savings delivered by 2020 will come from energy efficiency, with the Government aiming to install 5 million high efficiency condensing boilers by 2010.

Of course, the Energy White Paper could have gone further by introducing fiscal incentives to encourage people to buy high efficiency boilers. At present, 17% of all boilers fitted in the UK are A and B rating condensing models. The market share must jump to 80% if the Government is to meet its target. To bring about this radical change, reducing the VAT on A and B rated boilers, would support a significant increase in consumer demand through 2004. The Energy Saving Trust (EST) is encouraging Government to make this change and to ensure the transition to condensing boilers is smooth.

In some cases, the changes will present a real problem, as individual installers do not know how to fit condensing boilers or specify high efficiency heating systems. Although there has been a significant increase in the number of condensing boilers fitted in the past year, this is largely due to specifiers such as architects rather than installer recommendations.

The EST, in conjunction with the Skills for Business Network, the Learning and Skills Council, the Energy Efficiency Partnership for Homes, the HHIC, IDHE, CORGI, and City & Guilds has developed the *Certificate in Energy Efficiency for Domestic Heating* (6084) to train installers how to advise consumers on high efficiency heating systems. This is essential if the energy savings of a condensing boiler are to be maximised and the new Building Regulations adhered to.

In order to achieve the Certificate, installers can attend a one-day workshop, run by accredited manufacturers, colleges and other training providers nationwide. The workshop will be followed by an assessment and those who pass will receive a City and Guilds Certificate (nationally accredited at Level 3). There is also an option for installers to take the test independently of the training.

Eighty-five installers were involved in eight pilot training sessions last year where the course content was tested and improved before going live at the boiler manufacturer Worcester Bosch in March this year. The overwhelming verdict from installers who attended the courses was that it was "worth the investment" as it helped them understand the new Building Regulations.

Many pilot installers emerged from the course feeling more enthusiastic about to energy efficiency.

Installers are permitted to take the assessment independently of attending the workshops, however initial research has shown that 90% of people who attended felt that they would not have been able to reach the required pass mark without the training.

Installers who would like to pre-register for the courses should contact the Energy Efficiency Hotline on 0845 727 7200 or visit: www.saveenergy.co.uk/pipeline

New C&G course for PV installers

The new nationally-recognised course for installers of grid-connected photovoltaic (PV) systems: City and Guilds 2372 – *Certificate in Installing and Testing Domestic Photovoltaic Systems*, will soon be delivered by a number of UK colleges.

Aimed at experienced electricians who either have, or are working towards NVQ Level 3 or equivalent, the course will become part of a route to provisional accreditation under the Solar Grants Scheme. The course runs for five days full time and will cost the student of the order of £500 per person.

The course will cover both theory and practical elements of PV projects, and will end with a written and practical assessment. The training project is being developed by IT Power, CREST, TNEI and ISPQ with the support of The Carbon Trust.

The first courses will be run in May and June this year at Bedford College in London, Empower Training (Nottingham), and Guildford College. To enable colleges to set course dates, any electricians interested in taking part are asked to contact their nearest college to register their details and indicate their availability.

Bedford College: www.bedford.ac.uk
Guildford College: www.guildford.ac.uk
Empower Training Services Ltd: (Nottingham) www.empower-training.com

Training Safeway staff to save energy

Plug in to Save Energy' is the slogan used by Safeway's energy efficiency teams throughout the country. And it has proved to be a fast route to success, with the supermarket chain on track to save an estimated 1.5% off the stores' £45 million annual energy bill.

Safeway is a member of the food manufacturing sector Climate Change Agreement for its in-store bake-off and chicken rotisserie units and currently spends around £2 million a year on improving energy efficiency. The Safeway energy management team brought in Future Energy Solutions (FES) to identify areas for even more improvements to help stores meet targets.

Giles Barwell of FES is a firm believer in people power. He says, "People often represent a huge untapped resource when it comes to energy savings – technology offers solutions but people deliver results." Staff training is a relatively cheap, but effective and fast route to economising on energy consumption. Most of the practices are very easy to introduce and apply. By making simple changes to habits and work routines all businesses can make substantial energy cost savings. Staff awareness of these issues is the key to producing results, especially for long-term benefits.

The 'Plug in to Save Energy' campaign was devised by Future Energy Solutions in partnership with the Safeway energy management team and introduced at 100 Safeway stores to:

- increase awareness of climate change and the importance of energy efficiency for Safeway shop floor staff;
- identify and implement typical low- and no-cost actions at stores to achieve energy savings; and
- encourage staff participation at all levels by implementing simple energy saving measures and by coming forward with new ideas.

Each participating store had a small energy team, led by an energy 'champion'. This approach has been crucial to the success of the campaign.

Sonia Clark was the energy champion at the Petts Wood store in Kent. She led a team of five, selected from the meat, bakery, delicatessen, front end (cashiers) and produce departments. The campaign was introduced to the team with a training session which explained why and how energy could be saved within the store.

Armed with material from an Energy Pack, individuals then went back to spread the message to staff within each department.

The top five opportunities identified were:

- better control of ovens, for example improving the use of timers and turning ovens off at the earliest opportunity;
- refrigeration – closing cold store doors and reporting damaged strip curtains;
- lighting – turning off unnecessary lights in the car park and back of store and checking store timers;
- store heating – improved time and temperature control in back of store and reducing heat losses from the store entrance; and
- turning off extract fans when not baking.

Energy consumption figures for 2003 at the Petts Wood branch are excellent, showing a 6% reduction against 2002.

Contact Future Energy Solutions on tel: 0870 190 6037 or visit the website at: www.future-energy-solutions.com

Energy education for all

Energy education needs to start early on in the school careers of our children. This is where CREATE's work was originally focused. But the organisation now develops and provides energy courses and education resources for a wide variety of organisations. Its Chief Executive, Mike Wolfe, take us through the curriculum.

Children at Mengham Infants School in Hayling Island, Hampshire were told the Six Sunbeams story, as part of the Hampshire Energy Wise programme, funded by Havant Borough Council, and it led to a whole term's work on energy. The children collected data on energy use at home, made posters and stickers to remind everyone to turn off lights and taps around their school and even investigated alternative energy sources such as wind, solar and waterpower.

by Mike Wolfe, Chief Executive, CREATE

School-focused activities

Children from as young as five can understand that most of our energy comes from the sun, helped by a simple, interactive story called 'The Six Sunbeams', written by John Rodway, CREATE's Education Officer.

This is just one example of projects CREATE has initiated, managed and delivered on behalf of local, national and international clients, to promote a responsible attitude towards energy use. Details of some other activities are described below.

Developing curriculum resources

The Department for Education and Skills (DfES) supports energy education and in September 2003 Charles Clarke, Education Secretary, launched the DfES Sustainable Development Action Plan, which is organised around four key objectives:

- education for sustainable development;
- environmental impact of DfES and its partner bodies;
- environmental impact of the education estate; and
- local and global partnership activity.

As part of the implementation of the Action Plan CREATE worked with DfES on the development of curriculum resources to support energy studies in schools. The educational material is now available through the popular Teachernet website: www.teacherne.government.uk/wholeschool/sd/focus on/energy/curriculum.

Here teachers will also find a valuable curriculum map that will assist them with planning their teaching programmes. It shows where energy is required by the National Curriculum for England and can be used as a context for delivering stipulated topics. Maps for Scottish and Welsh curricula are also available on the CREATE website. www.create.org.uk/schools/teachers_resources.asp.

Monitoring energy use

As all good energy managers will tell you, to manage energy properly it is vital to have the correct data. The best way to collect reliable data is to read the meters. Regular monitoring will provide essential information to help:

- compare consumption against benchmarks and determine potential savings;
- detect waste and take preventative action;
- correct invoicing errors; and
- provide feedback to end users on savings achieved.

Reading meters and analysing data also provides an ideal teaching opportunity and enables young people to get involved in the management process. The Energy Monitoring Chart, that CREATE produced when running the 'School*Energy*' programme, is suitable to display prominently for all to see, in a school, youth club or even a small business operation. Monthly meter readings can be plotted to make a visual picture of energy use in the building. The monitoring charts are available though CREATE, tel: 01942 322271.

To monitor energy use by individual electrical appliances, CREATE has sourced an easy-to-use, plug-in energy meter. This device is ideal when collecting data on the running costs of all sorts of equipment, including televisions, computers, heaters, cookers and kettles.

Working with industrial partners

Marketing campaigns are often aimed at schools and young people. CREATE has supported the development and delivery of energy education programmes for several energy companies, in an effort to help promote their commitment to energy efficiency and green energy supplies.

Most recently, CREATE has been providing help, advice and resources to schools in Hampshire, Surrey, Fife and Aberdeen on behalf of ExxonMobil. The ExxonMobil Energy Efficiency programme for schools offers on-site support for developing energy projects that will enhance the curriculum to 47 'link schools'. Workshops with teachers and pupils have generated a variety of energy related activities that have resulted in whole school and community projects to spread the word about using energy wisely.

'Energy Chest Tool Kits' will be offered free of charge to all 47 ExxonMobil link schools and CREATE will deliver workshops for teachers and pupils, to introduce activity ideas that will make full use of the equipment.

The tool kits consist of over £370 worth of materials and the contents are appropriate to the level of each school. The primary version is currently being delivered to schools in England and Scotland. They include: a book on energy and the environment that can be used to introduce energy saving concepts through literacy, a weather vane, anemometer, light meter, digital thermometer, wind kit, data logger, and a specially-produced energy board game. There is also an Energy Chest website: www.energychest.net to support teachers and pupils working on interactive energy projects.

Raising awareness of renewables

The first production of clean, green energy produced by the North Hoyle Wind Farm, off the coast of North Wales, was complemented by a series of workshops organised by CREATE.

Pupils across North Wales found out about climate change, energy efficiency and renewables through a project sponsored by National Wind Power. Schools chose from a range of options, which included scientific experiments, design and technology activities, artwork and drama presentations.

Working in partnership with National Wind Power and sister company npower, CREATE developed activities for their new educational website: www.natwindpower.co.uk/education.

The activities help students to examine the following areas of renewable energy generation:

- location of wind farms;
- turbine construction;
- power distribution; and
- public awareness of sustainable energy issues.

CREATE is also providing educational support to the Green Energy business at United Utilities and working with Renewables Northwest on a renewable energy software package for secondary schools.

Community programmes

Young people enjoy getting involved with energy projects and research carried out by the Centre for Sustainable Energy has shown that teaching about energy efficiency in schools has the potential to change behaviours across two generations. Their Energy Matters programme, in partnership with CREATE, has proved successful in securing energy-saving behaviour in 75% of participating homes.

Although schools obviously provide an ideal environment for learning about energy, CREATE, believes in a 'cradle to grave' philosophy for energy education and is actively involved in working with people of all ages, through community groups and work-related training.

A three year community energy education programme in Staffordshire has recently come to a successful close. During the course of the programme, CREATE's project worker, Zoë Kulczcki, has spoken to over 7,000 people living in 46 communities across Staffordshire, raising their awareness about energy efficiency. The Staffordshire BEE (Being Energy Efficient) project was funded by Staffordshire County Council and supported by Scottish Power and Millar Pattison. Some 3,000 low energy lamps and 60 jug kettles have been distributed to householders at a variety of events in rural schools and community centres.

Zoë is now working with the Staffordshire Youth Service and commercial partner B&Q, delivering workshops for budding DJs, artists and DIY specialists, proving that energy efficiency is far from the dull topic that many people perceive it to be. This new project will help to keep the energy efficiency message in the public eye in Staffordshire.

The Energy Saving Trust's Community Action for Energy (CAfÉ) programme has developed a database of community energy projects across the UK, some of which CREATE has been involved with and has made 20 case studies available on the website: www.est.co.uk/cafe.

Adult training

Designed to be informative and fun, energy awareness training sessions have been devised and delivered by CREATE to employees of Barclays Bank and ExxonMobil.

Thameside Sports Centres in Greater Manchester also commissioned CREATE to train centre managers on good housekeeping at their community and sports facilities. It didn't take long for them to realise how they were wasting energy, not least by finding doors open to get rid of some of the heat.

Other training clients have included housing associations and local authorities.

A future for all

As a 'virtual' organisation, a company whose members are geographically separate, with a small head office in the North West, CREATE works efficiently and effectively, setting up partnerships where required, to deliver a comprehensive service of energy education to all.

With backing from government and industry, the overall aim of this educational charity is to ensure that action for sustainable development, in all its forms, remains on everyone's agenda.

CREATE believes that energy provides a valuable and exciting mechanism for learning, bringing communities together, and offers long-term careers for future generations.

Contact: Mike Wolfe, Chief Executive, CREATE, tel: 01942 322271 e-mail: info@create.org.uk.

CREATE

Established in 1988, the Centre for Research, Education and Training in Energy (CREATE), is a registered charity, funded by the Government's Department for Environment, Food and Rural Affairs (DEFRA), through its Environmental Action Fund. The Founder Members of CREATE were the Energy Efficiency Office of the then Department of the Environment, British Gas, the British Nuclear Forum, Esso UK, the Institute of Energy as it was then, National Power, PowerGen, Sainsbury's and Yorkshire Electricity.

Over the past 15 years CREATE has delivered inspirational programmes to organisations across the public and private sectors, from village schools to multi-national corporations. The charity works with business and communities to help individuals and organisations to build a sustainable future, by giving advice on energy efficiency, renewable energy, waste minimisation, transport and water conservation.

Although set up initially to provide a service to schools, CREATE now offers consultancy, and project management to help ensure that messages about how people can make a difference are given in clear terms that reflect the key objectives of school curricula and company policies.

The core funding received from DEFRA enables CREATE to provide information and support for energy education through its enquiry service (www.create.org.uk) and via a newsletter, which is sent to every school in England once a term.

Energy White Paper

Awaiting the implementation plan

It should have been published by the time you read this – the detailed plan of how the Government is to implement last February's Energy White Paper, together with the first annual report of the Sustainable Energy Policy Network established by the same White Paper. Speaking at the NEMEX conference in Birmingham on the last day of March this year, Director of Energy Strategy at the DTI, Rob Wright, said that both documents would be published just after Easter. Steve Hodgson reports on what the plan needs to say – according to representatives of the energy efficiency and renewables industries.

The White Paper implementation plan could barely be more eagerly awaited. The White Paper: *Our Energy Future – Creating a Low Carbon Economy* was widely welcomed for its bold and radical vision. But it was also heavily criticised for the lack of specific details on how we get from here to a 60% cut in carbon emissions by 2050. As Gordon MacKerron wrote in *Energy World* at the time: "The White Paper marks the *beginning* of a process, not a culmination . . . The really important part is at the end – the promise to produce a fuller implementation plan within a year, and to report annually thereafter."

So there has been considerable interest in the proposed plan. Enough for the organisers of the NEMEX conference to ask representatives of the energy efficiency ands renewables industries to speak on how the White Paper had already affected them, and what was still required.

Energy efficiency

Joanne Wade, Research Director of the Association for the Conservation of Energy (and Hon Secretary of the EI) had a simple message: let's get on with it. The energy efficiency industry is ready and willing to meet the challenge but must be confident of secure, consistent and long-term backing from the Government. There are precedents, said Wade, of industry investing in expansion and then being left high and dry as support dries up.

In particular, we need novel policies to focus not just on the fuel-poor but on the whole population, and on the 80% of people who to date have no interest in energy efficiency, rather than currently-targeted the 20% who do know and care.

Why not incorporate energy efficiency standards into stamp duty and/or council tax. These are potentially unpopular measures but people would not have to pay for selling or letting inefficient homes – they could upgrade them instead. Or why not use the implementation of the Energy performance of Buildings Directive to deliver improvements. It's about time we had energy labels on homes, said Wade, we've got them on fridges.

Renewables

Philip Wolfe, Director of the Renewable Power Association, was more worried, characterising the White Paper as a "small nudge in the right direction" rather than the visionary leap towards a bright new future that it appeared to be on paper. Wolfe's advice that the Government was in danger of "dropping the ball" by doing nothing to support renewable technologies that are not yet ready to take their place in competitive energy markets.

A graph of slowly increasing renewables capacity revealed that the growth rate itself needs to increase six-fold to reach the 10%-by-2010 target, said Wolfe, and to deliver this we also need a step-change in investment levels. Yet the main instrument supporting renewables today, the Renewables Obligation (RO), by being technology-blind supports the technology that is currently cheapest – landfill gas, hydro and onshore wind.

But renewable technologies are at widely different stages of development: landfill gas and onshore wind are doing very well and offshore wind is near to take-off, while biomass is stalled, marine technologies still need developing and PV is too expensive. And the arrival of the RO in 2001 has made no difference, except to wind.

Does this matter? Yes – diversity of renewables is essential to achieve a balanced generation portfolio (in which predictable tidal energy, for example, can back-up intermittent wind power and biomass plants can be run as base-load stations).

The wider renewables industry support to allow technologies to bridge the divide between research-funded RD&D and RO-supported building of capacity. Perhaps a return to something like the Non Fossil Fuel Obligation, said Wolfe.

His example was the wave/tidal sector. Wind power was (re)invented in the UK in the 1980s, said Wolfe, but the technology needed a market which simply didn't exist. So the Government of Denmark stepped in with transitional support and on the back of that the Danes have become the world-dominant manufacturer of wind turbines. We are at a similar stage now with wave and tidal energy – four wave and two tidal devices already built, all British, all six looking for a market within which to build the first full-scale farms.

And, so far, only Portugal has offered a feed-in tariff for wave devices and the UK companies are considering taking it up. The UK Government should do the same or risk "dropping the ball" by doing nothing.

Speaking on behalf of energy managers, Leicester City Council's Don Lack gave an entertaining description of some of the excellent work being done in Leicester to build a new, large-scale community heating network partially fuelled by renewable wood waste. His take on the urgency of the issue was: "If climate change was an asteroid we would all be taking cover."

How better metering could facilitate embedded generation and energy savings

Embedded generation is a key element of the Government's strategy to meet the country's carbon reduction targets. Embedded generation at larger sizes is well established and has a long track record. Much of the current interest, though, is related to microgeneration. A number of groups are working to develop products for this market, using a variety of different approaches: micro-CHP, photovoltaics, wind and hydro. These products are not aimed at commercial or industrial sites, but rather at individual homes and they have power outputs of a few kilowatts. These products are, or soon will be, commercially available and attention is moving from the laboratory to issues around how they will fit into existing electricity networks.

A key part of these networks is the electricity meter. The meter provides both a physical link to the electricity network and a data link into the commercial processes that calculate charges for electricity. These links have to be re-arranged to deal with microgeneration. But, having made these adjustments, innovations in metering technology and the networks they connect to could enhance the benefits of microgeneration in the future.

Today's domestic electricity meter has a fairly simple and well-defined function. It must measure power flows into a property and must do so reliably and accurately. The meter should be tamper-proof, easy to read and may need to support a number of tariff structures (such as Economy 7). The cost of the meter and the data processing it supports must also be proportionate to the value of the electricity being metered. Embedded generation is likely to affect most of these requirements.

Accuracy

Dealing with very small-scale embedded generation is challenging because it can fundamentally change the way the electricity distribution system works. This is because it can reverse the direction of power flows at the very ends of the distribution system and this can have unpredictable consequences.

Designers of microgenerators find it very convenient to run their generators in parallel with the power grid, because the grid can meet peak loads and provide back-up to the generator. However, the ability to import power when needed means that, whenever the generator output is greater than the properties' consumption, the excess power will be exported onto the system, reversing the power flow at the meter. For the low voltage distribution system under consideration, this is something that neither the meters nor the distribution system were designed to deal with.

In practice, how an existing meter will behave when faced with a reverse flow will vary from one design to another. Modern electronic meters will not register the export power, but will indicate that a reverse flow has been detected. Some older electro-mechanical meters may simply run backwards and become net meters – cancelling imports with export. However, energy regulator OFGEM has rejected net metering so this situation would break the rules.

It is the responsibility of the electricity supplier to ensure that imports are metered accurately, from which it follows that the supplier would need to check the type of meter and replace it if necessary. The cost of the new meter would be charged to the customer. The cost of the meter, at around £10, should not be a deterrent, although the cost of fitting it may be several times this.

A potential problem is that the supplier won't necessarily know that a microgenerator has been installed. The new Engineering Regulations covering the connection of microgenerators, G83 and G77, require that the local Distribution Network Operator (DNO) should be informed of the generator. But there is no requirement for the customer to inform the supplier, and the DNO is not required to pass on the information. This issue is being addressed by OFGEM.

When these issues have been dealt with there should be no reason to worry about the accuracy of power import readings. But these won't deal with the exports from the property, which is another source of inaccuracy. These changes only deal with a customer who wants to be able to export electricity without receiving any payment for the power. Why wouldn't you want to be paid for your exports?

One reason is that it can be difficult to find a supplier willing to enter into a contract to purchase the power. More importantly, though, is that the cost of claiming for the exports is greater than you might expect to be paid for them. For micro-CHP, exports in the range of £30 per year might be expected, which would be significant compared to overall savings of around £100 per year.

However, the existing costs for metering and settling the exports from larger conventional generators are of the order £600 per year. Clearly, if these were the costs for domestic installations, exporting would not be economic and until recently this was the situation. However, there are other much more cost-effective ways to achieve appropriate

The way electricity is generated and used is changing fundamentally, with moves toward small-scale generation by consumers. Metering arrangements have to keep up with the changes and, at the smallest domestic scale, this is not straightforward.

Here, John Parsons looks at how a switch to more intelligent metering would not only facilitate the growth of small-scale embedded generation, but also give consumers and generators considerable additional benefits in terms of information useful for energy management purposes.

By John Parsons, Senior Project Manager, BEAMA

metering for these domestic sites and these are currently being developed.

It should be understood that the meters themselves are just one element in a complex process needed to bill customers. Most of the costs for existing larger systems quoted above relate to the communication and processing of the data after it leaves the meter. This area has recently been changed to simplify and reduce the cost of metering, but to appreciate these developments, some understanding is required as to how domestic users are now metered.

The cost of electricity varies every half hour. Calculating the supply cost over any period requires a complete record of half-hourly demands – the demand profile. For larger users this is indeed what is measured. Sophisticated meters record the power demand every half hour and this data is transmitted to a central allocation business and the bill calculated. By definition, these large users have large power bills, so the cost of the metering is an acceptably small fraction of the total charge; not the case for small domestic-sized generators.

Demand profile

For domestic consumers it was decided in 1998 (when the market was opened to competition), that it would not be feasible to introduce such a system. The decision was taken to leave the existing meters in place and to carry on recording only the kWhs registered between meter reads. This left the settlement process short of information about when the customers were using their power. A simplification was made – it was assumed that, for each domestic tariff, all customers had the same demand profile.

A profile administrator sampled the power demands of typical consumers and produced a series of standard profiles (eg one for domestic customers on a standard supply and one for Economy 7). Data was also provided to correct the profiles for the effects of ambient temperature and daylight hours. To calculate a customer's profile, this corrected standard profile would then be combined with the kWh figure from the meter.

The metering of exports on the other hand never had this option, largely because, in 1998, very small generators didn't exist and weren't allowed for. Thus, all exports have had to be metered using non-domestic meters and systems, which is why getting paid for the exports costs so much.

New process

Elexon, the body responsible for the Balancing and Settlements Code (BSC), which sets out these mechanisms, has now introduced a new process, referred to as P81. Under this rule change, small generators can have the value of their exports dealt with in a similar way to imports.

A new meter will be fitted that will have a register for exports as well as imports. The single kWh value for the exports will be combined with a new export profile to reconcile the power – in much the same way as the imports. At present, for micro-CHP, the profile assumes that all export occurs during specific periods. It is recognised that this is just an approximation that may lead to increasing errors as the numbers exporting rise. BEAMA is leading a project supported by the DTI to gather export profiles for a range of embedded generation technologies. This is expected to improve the accuracy of the profiles.

A new metering code of practice (COP9) has been developed by the industry for the new import/export meters. This came into force during April 2004. It allows for either a single meter registering import and export, or for an additional import-only meter connected in series with the other meter and with reversed connections so that it records all exports. Meters compliant with COP9 are already available at prices consistent with the domestic sector. Figure 1, reproduced from COP9, shows the wiring arrangement with two meters.

Based on COP9, compliant metering accuracy will

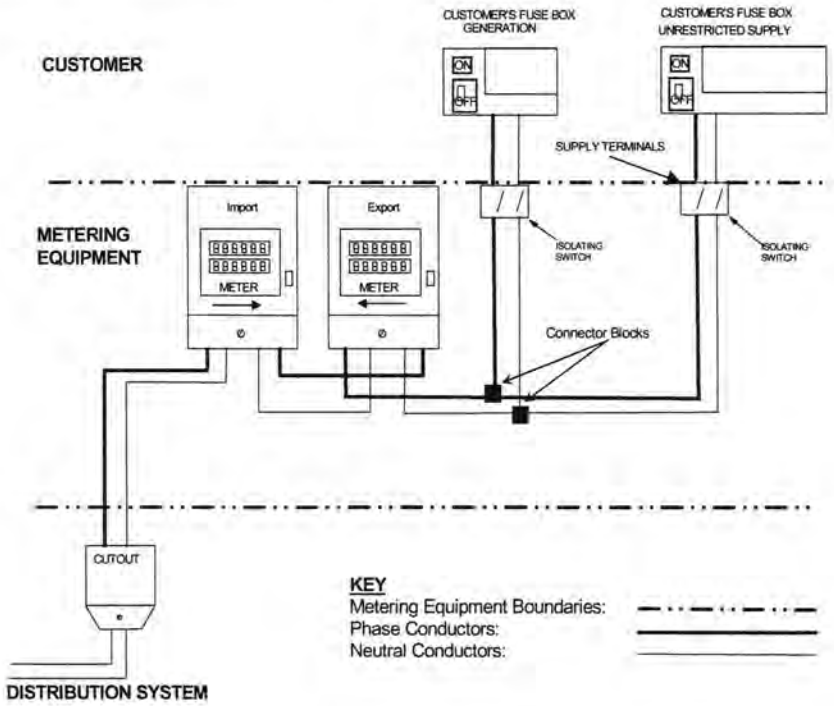


Figure 1. Two meter import export arrangement as in COP9 (Courtesy of Elexon Ltd)

have been restored for both import and export. This leaves a further issue around generation, the total output from the generator. Under COP9, separate metering of the generation output is not needed. This was decided, because there was no requirement under the BSC to measure generation and microgenerators did not qualify under any of the incentive schemes; Renewables Obligation Certificates (ROCs), Levy Exclusion Certificates (LECs) or the Energy Efficiency Commitment (EEC).

However, with the recent amendment to the ROCs, small renewable generators will come under the ROC scheme and there is pressure to bring micro-CHP within either the LEC or EEC scheme. This probably means that generation output metering will be required. OFGEM is currently considering how the revised ROC scheme will be implemented for small generators, and how generation metering will be dealt with in this.

Assuming that generation metering will be required, it can be expected that the meter industry will produce a meter with separate registers for import, export and generation. The cost of the meter is again unlikely to be a deterrent. More likely it will be the need to take the generator output cable back to the meter that costs most, although such a connection may be a requirement to meet other regulations such as the IEE Wiring Regulations. An alternative would be to fit a separate meter at the generator output, or indeed, incorporated into the generator. The issue would then become one of providing access for the meter reader.

Adding value

Many changes will be needed for metering to adapt to embedded generation. However, there is also a range of ways metering could add to the value of embedded generation.

Most of these extra functions depend on two-way communications links with the meter and this is generally linked with automated meter reading (AMR). This enables accurate and timely meter reads that would reduce customer complaints.

Aside from a more sophisticated meter, all these schemes depend on creating a communications link with the meter. Once that link has been established, then a whole host of other functions becomes possible. Sweden has chosen to install full AMR for its domestic customers in order to provide timely and accurate billing data.

What if this were implemented in the UK? Firstly, the cost of half-hourly metering would be much reduced and could probably be implemented for export and generation output. Meter reading accuracy would be significantly improved, and so would potential worries over having different suppliers responsible for import, export and generation in the one house – no need for three meter readers. Meter installation geometry would be simplified, as there would be less need for the meter reader to get to the meters.

Although collecting the data would cost less, processing it would still cost the same. There would be the potential to generate a lot of data, with associated high processing costs, if the market took off. It has been suggested that this could be mitigated by allowing the meter itself to carry out the first stages of data processing, thus reducing the volume of data to be transmitted and processed.

Another concern over embedded generation is the lack of control that network controllers have over the generators. Groups are exploring the possibility of controlling groups of distributed generators, treating them as a virtual power station. To test this idea, a European Union-funded field trial is underway to operate distributed fuel cells as a virtual power station.

In theory, though, less direct methods could be used, based on meters. Meters could be used to provide real-time market information – continuously variable tariffs. As the export price of the power went up, customers could increase their export, perhaps by shedding some of their load.

Another benefit for metering is that giving customers real-time feedback on their energy usage could lead them to reduce their consumption. Modern meters can readily give customers much more – and better – information about their energy usage. There is evidence that consumers can reduce their consumption by between 5% and 10% when given real-time information concerning their energy use. Consumers achieve the savings, because they can make better-informed judgements on their energy usage. BEAMA is leading a field trial to examine whether better information will lead SMEs to save energy.

Customers with embedded generators have another degree of freedom to exploit – with greater potential benefits. Meters could provide them with detailed information on their consumption and generation patterns and these could both be managed to maximise their savings.

In conclusion, in the short term, the electricity meter has an important role to play in enabling embedded generation to reach its potential. Future innovation could see it significantly enhance the potential for embedded generation.

BEAMA

Consists of 14 associations; represents 350 UK sector companies and an industry with an annual turnover of £64 billion, employing 450,000 people. Founded 1905. Still retains its prime purpose – serving members and the national industrial base as the recognised electrotechnical industry association.

Part of BEAMA, BEAMAEnergy is the trade association for the controls, metering and energy-related communications industries.

For more information on BEAMA and its constituent parts, visit: www.beama.org.uk

Contact: John Parsons at BEAMA, tel: 0207 793 3000, web: www.beamaenergy.org.uk

CHP and community heating -

Denmark has long been linked with the success of CHP and community heating, being one of the first countries to champion the technology and introduce it to its public and private sectors. But while Denmark has been flying the flag, other parts of Europe have suffered CHP set backs. One such example is the UK.

By Ian Whitelock, Commercial Director, Vital Energi

The UK CHP market is currently described as stagnant, suffering recently from a combination of high gas prices and low electricity prices (the effects of NETA), which have impacted significantly on the new build rates for CHP community heating schemes. So why have our European cousins seen such success in environmental, economic and social terms while the UK is still lagging behind? And what does the future have in store for CHP and community heating in the UK?

Denmark's extensive CHP coverage (60% of housing powered by CHP and community heating) is the result of decades of persistent Government backing delivered through a combination of strategic, regulatory and economic incentives and voluntary agreements within the local energy sector. Historically, Danish energy policy has been strongly influenced by environmental policy objectives and, until November 2001, one minister was responsible for both energy and environmental policy.

For Denmark, the oil crisis of 1973 was the main catalyst behind the acceptance of CHP/community heating, as the country was at that time largely reliant on imported oil for its fuel supply and needed to lower its energy consumption. Prompted by an immediate need to ensure security of supply, the Danish Government looked to CHP.

This was largely enabled by the existence of community heating networks, (commonly referred to then as district heating) established in the mid-1930s, and Denmark's high levels of public ownership of housing. The addition of CHP was a quick and efficient solution to implement.

The country's population density also presented favourable conditions for CHP and community heating development, in that 80% of the population lives in urban areas, generating high heat densities and high heat consumption levels, particularly in the cold winters. The proximity of large-scale power plants also enabled the supply of heat to the district heating networks.

Denmark is now the best-performing European country in terms of CHP development and, after three decades of CHP operation, has achieved an estimated carbon dioxide emission reduction of 7–10 million tonnes per year, as well as being a net exporter of energy since 1998. But, while Denmark has been forging ahead, the UK has been left to contemplate the failure of its embryonic CHP and community heating schemes of the 1970s. The milder UK winters, the exploitation of north sea oil and gas and lower energy prices have all the development of CHP. The situation is compounded by the UK's lack of a coherent energy policy, financing and project evaluation barriers, and unhelpful social attitudes.

Policy

The UK's single biggest hurdle to an increased uptake of CHP has been the lack of governmental support, a factor which is vital in creating the right market conditions for CHP to survive and grow, as the Danish example proves.

It was not until the very poor, post-NETA market conditions in 2001 that the Government was forced to look at the importance of CHP in the context of its climate change obligations and carbon dioxide targets. Since then the Government has given CHP some support, in part through the launch of the Community Energy Programme to distribute capital grant funding, but it has still to give CHP the long-term commitment it needs.

However, changes within Government policy are now being made, and policy improvements are expected in the following areas – each of which will help to raise standards and re-educate the market:

- Building Regulations (2005) which will call for increased energy efficiency standards and new commitment from the building industry and could potentially help to tackle the drop in new-build rates;
- planning policy, with an expected rise in increased urban housing density and mixed community living, as 'city living' becomes more popular; and
- ongoing focus on climate change and fuel poverty targets.

Within public sector bodies (according to research conducted by Vital Energi) there is still a lack of awareness regarding energy efficiency and green power targets they must achieve, or how they should meet them. This is a telling sign that although legislation exists, market awareness for CHP and community heating as a form of green technology needs to be promoted more vigorously and policies that are put in place need to be enforced.

Lessons can also be learnt from Denmark, where the Government has taken a firm view on ensuring the long-term viability of CHP by capping electricity and gas prices to create the right market conditions. This saw discounts being given to low-emission forms of energy to not only create demand, but to incentivise the development of new build CHP schemes.

- importing the Danish model

Project evaluation

The costs associated with implementing CHP and community heating schemes have also been perceived as a barrier, with key audiences weighing up the cost of connecting to the UK gas network (originally funded by the public purse) compared to installing a community heating network.

Whilst the Government's Community Energy Programme does help to bridge this cost and perception gap, it is a mere drop in the ocean – especially when you consider that CHP/community heating market penetration is currently less than 2% (compared to Denmark's 60%).

The reality is many of the key audiences are evaluating projects by their simple short-term payback criteria, or even worse, from their initial capital cost, where community heating typically performs very poorly. Community heating comes into its own when the 'whole life cost' of ownership is taken into account. There is still a belief, however, that CHP should deliver in simple payback terms, suggesting that key decision makers need focused training and re-education about the long-term viability and payback of CHP.

The benefits of CH are, of course, not limited to economics. There are significant social and environmental benefits that the wider community will gain from; particularly the provision of affordable warmth for households suffering from fuel poverty.

For the UK market, social attitudes have also presented constraints to the development and uptake of CHP and community heating. A shared boiler is often still associated with social housing and 'the working classes', unlike in Europe where rented housing is much more common. In the UK, the public sector controls less than 23% of domestic housing stock, which means that there are limited opportunities to raise capital to invest in CHP.

Many of the UK's negative perceptions about community heating stemmed from its small-scale experience – with some of the high-profile failed schemes of the 1960s and 1970s largely based in social housing developments. These poorly installed and maintained schemes presented a PR disaster for the industry, and despite considerable technological advances since, have restricted the acceptance of CHP. This suggests a significant opportunity for specialist contractors and service providers to help enable CHP to reclaim credibility – as they showcase their technical installation and maintenance expertise and inspire confidence in the industry once again.

Part of the Buckland estate

Contact Vital Energi, based in Bolton, Greater Manchester, on tel: 01204 554 500 or via the website: www.vital-energi.co.uk

Great expectations

Located north of Portsmouth city centre, the Charles Dickens District Heating Scheme is situated in the Buckland estate, which covers approximately two square miles and includes some 5,000 properties including houses, bungalows and high, medium and low-rise blocks of flats. As part of the Government's Community Energy Programme (CEP), Portsmouth was awarded £435,000 of funding to provide affordable warmth and improve energy efficiency on the Charles Dickens estate. The scheme started with two medium-rise blocks with 154 flats and was later extended to include a further 384 flats and other buildings, including a local primary school, nursery and leisure centre.

A team of consultants, suppliers and specialist contractors were brought together through a 'collaborative working charter'. Vital Energi, PB Power and social housing contractor United House, all signed up to the charter agreement which would provide a partnering framework based on open book accounting, performance targeting, measurement and benchmarking.

The initial feasibility study conducted by PB Power recommended a community heating scheme to replace the existing ageing communal gas heating and underfloor heating. Vital Energi undertook the design and installation of the scheme which, at its core, included an energy centre utilising a 500 kWe reciprocating engine powered by natural gas, to generate both heat and electricity. As much heat as possible is captured and used to provide hot water 24 hours a day, 365 days a year.

Vital Energi also installed a new pre-insulated underground heat distribution network, utilising pre-insulated piping from Alstom Power FlowSystems. The pre-insulated piping protects against heat loss during distribution and ensures that the system runs as efficiently as possible. The heat distribution network installation includes fusion welded joints, which reduced the number of joints needed throughout the network and extended the lifespan of the pipework from 30 to 50 years.

A state-of-the-art surveillance system was also installed to monitor the piping network. This triggers an alarm if a leak occurs and identifies the fault to within one metre. The accuracy and predictive nature of the system allows the operator to intervene before any problems occur, dramatically reducing the overall maintenance cost and downtime, as well as disruption to resident's supply of heat and hot water.

As a result of the installation of the CHP scheme at Charles Dickens, more than 840 tonnes of carbon emissions per year will be saved and residents are expected to enjoy annual fuel bill reductions of approximately £120 per household.

Events

This page lists some of the energy events being held around the world that are the most relevant to Energy World readers, including major events organised by the Energy Institute.
A listing of events organised by EI branches can be found in the new Energy Network, distributed with Energy World.

To submit your event for inclusion here, please send brief details to eworld@energyinst.org.uk

May

6 May
Energy management in buildings
Conference, London, free
Details: ESTA
Tel: 07041 492049
Web: ww.esta.org.uk

10-12 May
Gasification
Conference, Brighton
Details: IChemE
Tel: 01788 578214
Email: rcragg@icheme.org.uk

11 May
Energy management in buildings
Conference, Merseyside, free
Details: ESTA
Tel: 07041 492049
Web: ww.esta.org.uk

11 May
Worldwide electricity R&D
Workshop, Brussels, Belgium
Details: Eurelectric
Tel: +32 2 515 1000
Web: www.eurelectric.org

11-14 May
WindEnergy 2004
Exhibition and conference, Hamburg, Germany
Details: Hamburg Messe
Tel: +49 40 3569 2123
Email: info@windenergy-hamburg.de

20 May
Energy management in buildings
Conference, Edinburgh, free
Details: ESTA
Tel: 07041 492049
Web: ww.esta.org.uk

20 May
CHP in buildings
Seminar, London
Details: CIBSE CHP Group
Tel: 0208 675 5211
Web: www.cibse.org/chp

25 May
Energy management in buildings
Conference, Harrogate, free
Details: ESTA
Tel: 07041 492049
Web: ww.esta.org.uk

25 May
Energy management in buildings
Conference, Coventry, free
Details: ESTA
Tel: 07041 492049
Web: ww.esta.org.uk

25-27 May
All-energy opportunities
Exhibition and conference
Aberdeen, Scotland
Details: Media Generation Events Ltd
Tel: 0208 241 1912
Email: info@all-energy.co.uk

25-27 May
Power-Gen Europe
Conference and exhibition, Barcelona, Spain
Details: PennWell Corporation
Tel: 01992 656616
Web: powergeneurope.com

30-31 May
World Renewable Energy Forum
Conference, Bonn, Germany
Details: World Council for Renewable Energy
Tel: +49 228 362373
Web: www.wcre.org

June

7-10 June
Resource 04
Exhibition of renewable and energy efficiency technologies
Building Research Establishment, Watford
Details: BRE
Email: resource04@bre.co.uk

situations/wanted

HEATING DEGREE DAYS
to 15.5C base temperature

	Region	Jan 03	Feb 04	Mar 04
1	Thames Valley	285	264	253
2	South East England	324	298	281
3	South Coast	297	271	265
4	South West England	244	261	247
5	Severn Valley	294	275	263
6	Midlands	323	292	278
7	West Pennines	310	282	266
8	North West England	379	307	286
9	Borders	316	283	281
10	North East England	321	287	291
11	East Pennines	323	285	272
12	East Anglia	336	297	281
13	West Scotland	322	312	290
14	East Scotland	338	309	288
15	North East Scotland	356	321	305
16	Wales	285	281	276
17	Northern Ireland	332	314	283
18	North West Scotland	324	309	278

For earlier data see http://vesma.com/ddd/history.htm

Towards Zero Carbon: Sustainability in Practice

21 September 2004, London

Following on from last year's successful conference, held jointly by the Energy Institute (EI) and the UK Solar Energy Society (UK-ISES), the EI is pleased to announce that the it will be continuing the discussion with a second conference entitled *Towards Zero Carbon: Sustainability in Practice*.

While some argue that the vision of moving to renewable energy from the fossil fuel economy will be successful, many say that the necessary technology and resources are still yet to be committed to achieve this. This 1-day conference aims to discuss the continued progression in these technologies with case studies demonstrating sustainbility in practice with additional speakers addressing the skills requirements and the issue of enabling society to accept change.

Including case studies examining photovoltaic applications, low energy building design, biofuels, wind and combined heat and power, other speakers will discuss the challenge of meeting the Government's 2050 targets of reducing carbon dioxide emissions by 60% and whether a zero carbon economy is achieveable and in what timescale.

Drawing together speakers with experience of new energy systems, together with those at the forefront of technology developments and policy development, this is a conference that should not be missed for anyone involved in the supply, utilisation and management of energy in the UK in both private and public sectors, and who want to know more about how these low carbon technologies can be achieved in practice.

energy INSTITUTE

in association with

Solar Energy Society

For further details please contact the EI Events team,
t: +44 (0)20 7467 7100,
f: +44 (0)20 7580 2230
e: events@energyinst.org.uk

Securing Energy for Britain – 2010 and beyond

22 September 2004

In the period to 2010 the sources of Britain's energy supplies are set to change rapidly as North Sea oil and gas production declines. By 2010 the UK will already be a large-scale importer of gas and coal while oil imports will be increasing steadily.

Organised jointly by the Worshipful Company of Fuellers and the Energy Institute, this 1-day conference features two keynote addresses;
- Industry Perspectives by Sir John Parker, Chairman, National Grid Transco
- Government Perspectives by the UK's Energy Minister Stephen Timms.

It brings together an unrivalled group of industry experts to examine all aspects of the supply challenge, including:
- Boaz Moselle, Managing Director, Corporate Strategy, OFGEM
- Ken McKellar, Deloitte Petroleum Services,
- Paul Cuttill, Chief Operating Officer, Networks, EDF Energy,
- Professor John Gittus,
- Simon Stringer - Director Homeland Security, BAE Systems
- John Ritch, Director General, World Nuclear Association (invited)

The speakers will examine the challenge of ensuring reliable and secure fuel supplies and the likely implications for the UK economy of rapidly evolving fuel supply patterns.

For anyone involved in the supply and utilisation of fuel in the UK this is a conference that should not be missed

energy INSTITUTE

in association with

The Worshipful Company of Fuellers

For further details please contact the EI Events team,
t: +44 (0)20 7467 7100,
f: +44 (0)20 7580 2230
e: events@energyinst.org.uk

training courses 2004

energy INSTITUTE

FUNDAMENTALS OF PETROLEUM REFINING PROCESSES

COURSE DATES:
11 - 14 May, 2004
COURSE VENUE:
London, UK
EI MEMBER:
£1900.00 (£2232.50 inc VAT)
NON-MEMBER:
£2100.00 (£2467.50 inc VAT)

This **four-day course** examines the composition, main characteristics and new trends of petroleum products, examining the roles of the different refining units and their process characteristics. Participants will gain an understanding of the main manufacturing schemes encountered in the oil refining field and look at the overall economic context of this industry. Subjects covered include: petroleum products; refining processes (crude oil fractionation, catalytic reforming and isomerisation, hydrorefining processes, conversion units); manufacturing schemes; and main economic features of refinery operations.

WHO SHOULD ATTEND?

Anyone working in the oil and gas and related sectors whose activity, whether technical, commercial, legal, financial, or human resources, is in some way connected with oil refining.

PRICE RISK MANAGEMENT IN THE OIL INDUSTRY

COURSE DATES:
17 - 21 May, 2004
COURSE VENUE:
The Møller Centre, Cambridge, UK
£2800.00
(£3290.00 inc VAT)

During this **five-day course**, delegates become part of Invincible's fictional trading team, identifying and then managing the exposure to price risk. They trade the full range of derivative markets, including the live futures markets, which are received on-line through Telerate and Reuters. Options are traded using a simulation programme. Delegates compare the performance of different instruments over time and in changing market conditions and learn how to choose the appropriate instrument to match their objectives.

The course explains the workings of futures, forwards, swaps and options markets and how they can be used for hedging and price management purposes. The costs and relative benefits of the instruments and the implementation of risk management strategies are explored as well as technical analysis and the principles of management control. Exercises are performed in syndicates, with comprehensive debriefs to study the consequences of the decisions made. The course expects a high degree of participation from delegates.

FINANCIAL PERFORMANCE MANAGEMENT IN THE OIL BUSINESS

COURSE DATES:
26 - 28 May, 2004
COURSE VENUE:
London, UK
EI MEMBER:
£1400.00 (£1645.00 inc VAT)
NON-MEMBER:
£1600.00 (£1880.00 inc VAT)

This **three-day course** provides a good understanding of the essentials of the successful management of financial performance in the oil industry, combining a theoretical framework focused on rigorous benchmarking of competitive position, with real-life, practical examples and syndicate exercises. Subjects covered include: the financial framework and key measures; benchmarking of performance; and managing capital.

WHO SHOULD ATTEND?

The course is suitable for experienced management and staff who wish to gain a broader perspective and to learn about current best practices; new recruits to the industry who need to learn how performance management processes are adapted to this highly competitive business; people from outside the industry who require a thorough introduction to the performance management processes.

FUNDAMENTALS OF RETAIL MARKETING

COURSE DATES:
1 - 4 June, 2004
COURSE VENUE:
London, UK
EI MEMBER:
£1900.00 (£2232.50 inc VAT)
NON-MEMBER:
£2100.00 (£2467.50 inc VAT)

This **four-day course** provides delegates with a broad understanding of the key components of Retail Marketing, placing these in a strategic and competitive context, using examples from Europe and global markets. Participants will learn through presentations, videos, syndicate work and pictorial illustrations about the nature of competition globally and in Europe, extending their knowledge and appreciation of the retail challenges.

WHO SHOULD ATTEND?

Junior or potential managers in Retail who need to understand the concepts and techniques of Retail Marketing and the competitive challenge from both traditional and non-traditional fuels' marketers.

OIL AND GAS INDUSTRY FUNDAMENTALS

COURSE DATES:
23 - 25 June, 2004
COURSE VENUE:
London, UK
EI MEMBER:
£1400.00 (£1645.00 inc VAT)
NON-MEMBER:
£1600.00 (£1880.00 inc VAT)

This **three-day course** comprehensively covers the oil and gas supply chains from exploration through field development, valuation and risk, production, transportation, processing and refining, marketing, contracts, trading, retailing, logistics, emerging markets and competition with alternative energies. As such, it provides understanding and insight to the processes, drivers, threats and opportunities associated with the core industry activities.

WHO SHOULD ATTEND?

Personnel from a range of technical, non-technical and commercial backgrounds, new industry entrants and those with expertise in one area wishing to gain a broader perspective of all industry sectors. It also provides a valuable industry overview for those requiring an informed introduction to the economic and commercial background and general trends within the oil and gas industry.

INTRODUCTION TO PETROLEUM ECONOMICS

COURSE DATES:
28 - 30 June, 2004
COURSE VENUE:
London, UK
EI MEMBER:
£1400.00 (£1645.00 inc VAT)
NON-MEMBER:
£1600.00 (£1880.00 inc VAT)

This **three-day course** concentrates on the economic issues facing the oil and gas industry, their geopolitics and the workings of their principal markets. It provides an introduction to the economic and commercial background and general trends of the upstream and downstream sectors of the petroleum industry, underpinning an understanding of oil and gas products and their markets with an awareness of global and strategic economic issues. Participants will gain an appreciation of the issues fthrough a series of regional case studies spread throughout the course.

WHO SHOULD ATTEND?

Professionals from a wide range of technical and commercial backgrounds; those employed by financial, commercial, legal, insurance, governmental, service, supply and advisory organisations; analysts, economists, new starters, engineers and risk managers.

For more information, see enclosed inserts or contact Nick Wilkinson

t: + 44 (0) 20 7467 7151 f: + 44 (0) 20 7255 1472

or visit: www.energyinst.org.uk e: nwilkinson@energyinst.org.uk