THE MAGAZINE OF THE INSTITUTE OF ENERGY

energy world

the institute of energy

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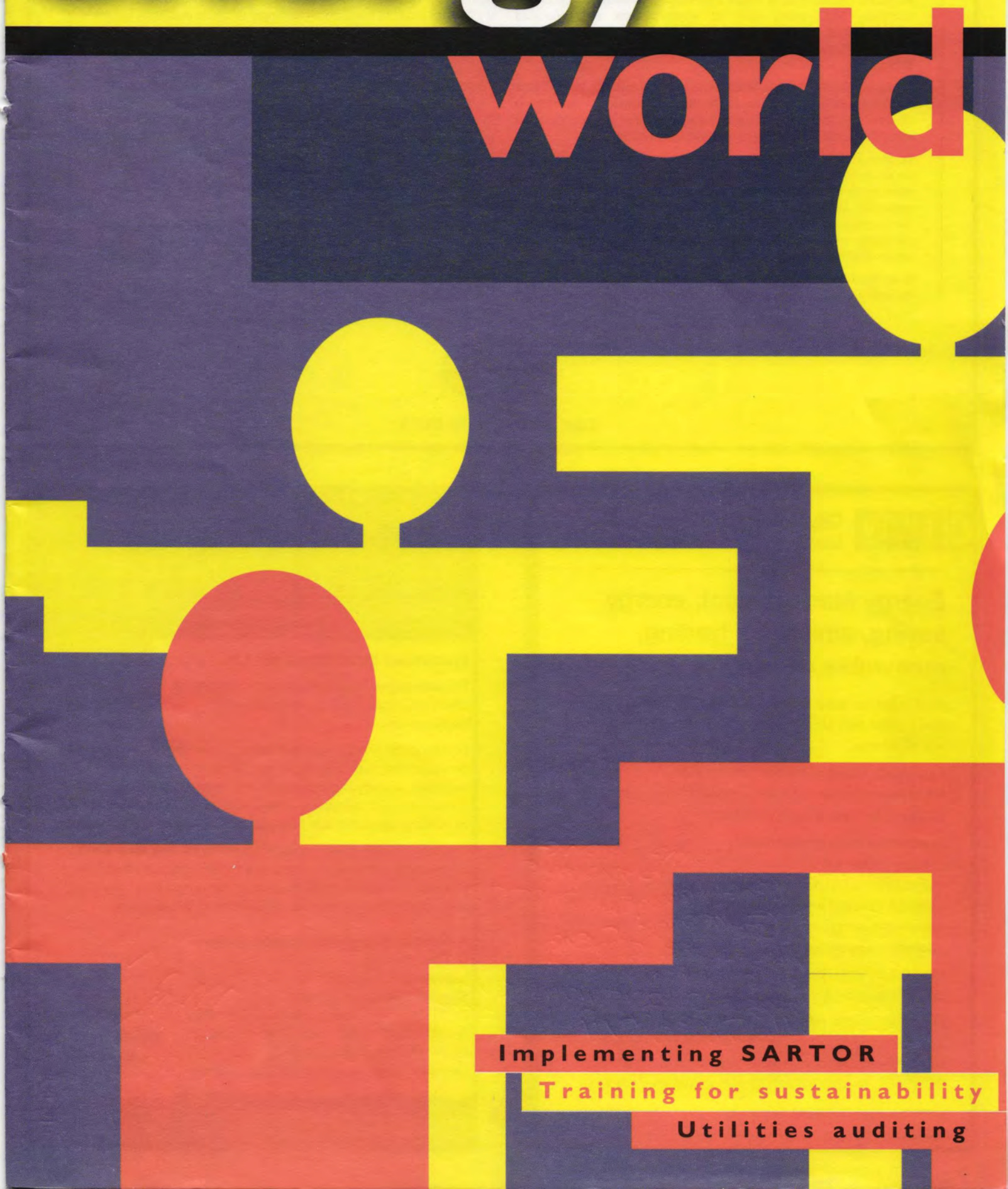

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COVER

Partnerships for Best Practice – the Institute of Energy is among several organisations working to develop ways of delivering information and training on energy and environmental matters to non-managerial staff members. The programme aims to create an awareness of energy and resource efficiency among the whole workforce of an organisation. Among the elements are 'Action Workshops' to solve workplace energy and waste problems, which can be led by a team of Institute staff and members. Alternatively, the Institute has produced a workbook to support the workshops, and a facilitator's guide to help you run your own.
Further details from Maria Adams, tel: 020 7580 7124, e-mail: ***madams@instenergy.org.uk***

Viewpoint

Continuity for the coming year

Brian Chamberlain, President, Institute of Energy

As the well-worn cliché goes: "I have been involved with energy related matters all my working life", and during that time have seen fashions come and go. I thought that, as incoming President of the Institute, it might be useful to reflect on the past 40 years or so from my own viewpoint, which will give an indication of what I will be seeking to achieve during the forthcoming year.

Back in 1974 we had a quadrupling of energy prices and were assured that this would mean the end of the industrial world as we knew it. Following this, in 1976 it was predicted that the supply of natural gas would end within fifteen years. In the mid-70s we also had the "Plan for Coal" drawn up by the great and the good which planned for 160 million tonnes of coal to be produced and utilised in the year 2000. Not to be outdone, in the 80s the Energy Efficiency Office were telling us that a 20% energy saving was available to industry and commerce from using readily available technology.

The industrial world survived, natural gas is still with us, and, were we to be burning 160 million tonnes of coal this year, we would be in deep trouble with the global warming lobbyists. Even more amazing, we are still being told that a 20% energy saving is still available from readily available technology. Either technology has changed radically, or very little has been achieved. I suspect that people are overstating the possibilities in the mistaken belief that consumers will take action. If we are not careful the message will be lost as people start to doubt the rhetoric.

We are now in a similar position with climate change. There is no doubt that the climate is changing, it always has, but whether this is due to the burning of fossil fuels is still to be proven. If we are to be cautious, not a bad thing, then we should be looking to take action to actually achieve reductions, and not simply produce reports and platitudes. Recent statements by Andrew Warren of the Association for the Conservation of Energy regarding tax reductions on energy saving equipment are to be applauded, along with the reduction in VAT on insulation etc. Perhaps we should be looking to take action to mitigate the consequences of climate change, which could be an unstoppable natural phenomenon. This being the case, we should maximise the benefits – all the changes may not be bad.

Hindsight is a wonderful and exact science, but if any lessons are to be learned from the past it should be to plan our futures based on facts, and not facts as presented by lobbyists with vested interests. There is certainly a need to be more efficient in the way that we produce and use energy, and there has been a vast improvement in air quality etc. over the past 40 years. The drive for improvement should be based on common and commercial sense. When, in the early 60s it was predicted that we were moving into another ice age (another fact!), I did not hear the government or the scientific world suggesting that we should keep our fires lit and use more fossil fuel to save the world.

This is where the Institute can play an important role. The advent of new technology such as email and the internet, opens up a whole new range of possibilities to communicate and seek opinions from our members. The growth in non-engineering members and group (company) members also ensures that we have feedback from an excellent and broad-based forum.

Anyone who has known me over the years will have realised that I always prefer to see a measurable result to any activity that I am involved with, rather than an advisory report. I am therefore especially pleased to see that, during the past few years, the Institute has achieved some very positive changes based on an agreed business plan namely:

- an increase in individual membership,
- an increase in group membership,
- living within its means,
- Engineering Council's approval of our licensing and certification procedures, and
- the production and delivery of energy training courses and distance learning programmes

All of which reflect the business like approach being taken by the staff.

There are also areas where we have had a significant input. The Energy Efficiency Accreditation Scheme, which now has accredited over 100 companies and is still the only independent scheme that measures a company's energy performance. The scheme has now been proven over more than five years and should, in my opinion, be used as a model for the government's Climate Change Levy (carbon tax) exemption, which should be available to ALL companies who can show a measurable improvement in energy efficiency.

During my year as President I intend to continue to build upon the work started by my predecessors and ensure that we meet our objectives, with perhaps a flavour of my own ideals being added to the brew. We now have an excellent staff and management team at the Institute, and I see the role of the President being one of support and guidance, rather than the leader, as has often been the case in the past, resulting in a change of direction from year to year.

So there it is, a personal, and slightly jaundiced view of energy over the past forty years, a belief that, in general, the energy community has delivered a better standard of living to the population of the earth. We have, and are, moving to mitigate the possible downside of burning fossil fuels, and we will deliver alternatives when required. The world will probably not come to an end in the foreseeable future, and we will be leaving our children a better place to live in than the evil, smoke filled cities of past times.

Competitive fuel cell vehicles by 2010?

Automotive fuel cells will have nearly 4% of the total US vehicle market share, with 608,000 vehicles, by 2010, according to a new study by Allied Business Intelligence - and market penetration could rise as high as over a million fuel cell vehicles. Fuel cell power will reach tens of thousands of vehicles by 2003 to 2004.

Proton exchange membrane (PEM) fuel cells will dominate, with 80% of all automotive cells by 2010.

One of the major issues with automotive fuel cells is bringing down the costs, with real manufacturing capacity starting at 100,000 units. A critical challenge facing fuel cell developers is to climb the learning curve to achieve high volume production. Currently, none of the fuel cell developers have the production capacity for what is now being designed and built. However, mass production will be reached by the end of the decade, says ABI, when fuel cells will become fully price-competitive with internal combustion engines.

Following market penetration in the US, automotive fuel cells will gain similar market shares in Japan and Europe, particularly in Germany, says ABI.

Biomass-based district heating for US city

The largest US district heating system fuelled by biomass energy will be operating in St Paul, Minneapolis, by the end of 2002, according to District Energy St Paul and Trigen-Cinergy Solutions, who expect to break ground on the project by the end of this year.

The project will burn wood waste to produce 25 MW of electricity, and 73 MW of thermal energy to supply roughly 80% of the energy needs for the St Paul district energy system, currently fuelled with coal, oil, and natural gas.

Economies of scale allow district heating and cooling systems to operate at high efficiency, cutting building energy use and emissions. In St. Paul, for instance, more than 75% of the downtown building space is served by the district energy system, which cut carbon dioxide emissions by 50% when it first went into service, say the two companies.

Three hospitals in the Spanish city of Pamplona have installed standby generating sets from Cummins Power Generation.

Built in the early 1970s, the 1000-bed Clinica Universitaria now has two CS1000-5 Cummins standby generating sets rated at 832 kW (1040 kVA), and a third, older unit, all powered by Cummins KTA38G3 12 cylinder direct injection diesel engines.

Working in parallel, the three standby generating sets are equipped with a Cummins Power Command System which ensures in the event of a mains power failure the units will be on-load within seven seconds. The sets are installed in the hospital basement and housed in a sound-proof enclosure to reduce noise levels.

Meanwhile the Virgin del Camino hospital in downtown Pamplona and the Hospital de Navarra have each been fitted with a 906 kW unit powered by a Cummins KTA38G5 12 cylinder direct injection diesel engine. All the generating sets were supplied by Cummins Ventas y Servicio of Madrid.

Seven sisters cooperate on CO_2

Seven global energy companies have joined forces to research and develop advanced carbon dioxide separation and geologic storage technology aimed at reducing greenhouse gas emissions.

BP Amoco, Chevron, Norsk Hydro, the Royal Dutch/Shell Group of companies, Statoil, Suncor Energy and Texaco will all participate in the $20 million, three and a half year CO_2 Capture Project. BP Amoco will act as project coordinator.

The oil industry has extensive experience of handling large volumes of carbon dioxide, which is injected into some 70 oilfields to enhance oil recovery. The intention is to extend this by capturing significant amounts of carbon dioxide from power generation and industrial sources and store the gas in geologic formations below the earth's surface.

Neutral earthing resistors (NERs) from Cressall Resistors recently installed at a substation in Mie Prefecture, between Tokyo and Osaka, are believed to be the first from a non-Japanese manufacturer.

Two identical NERs will protect Chuse substation, which is operated by the Chubu Electric Power Company, from potentially damaging currents in the event of an earth fault. Each unit is designed to handle a current of 400 A at 77 kV for a maximum of 15 seconds, making them among the highest rated NERs ever built by Cressall.

Prior to the installation at Chuse, the resistor units underwent rigorous testing for thermal and seismic stability at the Yokosuka and Abiko laboratories of the Central Research Institute of the Electrical Power Industry. As well as meeting the demanding requirements of Japanese standards, the units conform to the internationally recognised American National Standard IEEE-32.

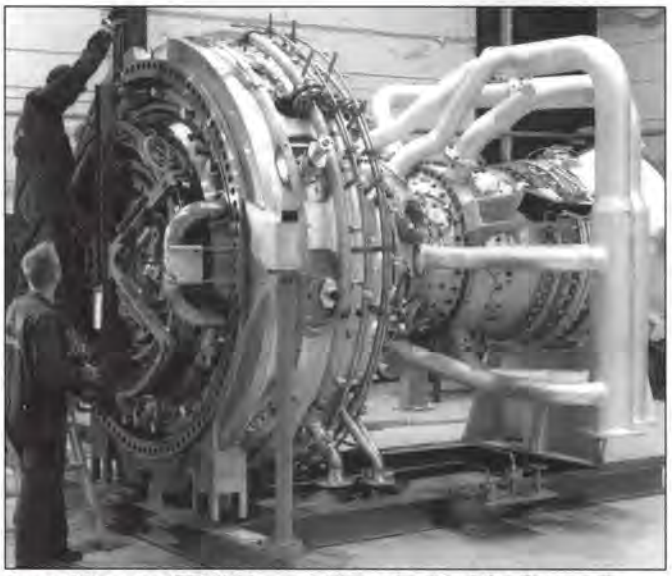
New power stations in Europe, Canada, India

ABB Alstom Power has received an order worth approximately 25 million euros for the turnkey supply of a CHP plant to Solvay in Portugal.

ABB will supply a 43 MW GTX100 gas turbine, featuring dry, low-emission technology, a heat recovery steam generator, as well as ancillary electrical and process equipment for the plant, which will be built at a chemical mill owned by Solvay Portugal in Povoa de Santa Iria, north of Lisbon.

The plant will produce 89 tonnes of steam per hour and 42 MW of electricity, which will be used to power the chemical mill. Excess electricity will be exported to the grid.

Meanwhile, Alstom has announced that the ECKG Kladno Project, the second largest power plant built in the Czech Republic since 1989, has been handed over to the customer. Located just outside Prague, the two 124 MWe coal-fired and 68 MW gas-fired power plant is an expansion of an existing 21 MWe electric generating plant.



Assembling the GTX100 gas turbine destined for Portugal

Alstom has also received an order, from Manitoba Hydro and worth more than 50 million euros, to supply two GT11N2 gas turbines and associated equipment with a combined rating of 260 MW. The simple cycle plant, to be located in Brandon, 230 km west of Winnipeg in Canada, will supply standby power for dry seasons when hydropower supply is limited.

And Alstom has also been awarded a contract worth 80 million euros to supply and build two 125 MW circulating fluidised bed boilers at a lignite-fired power plant being developed by Gujarat Mineral Development Corporation Ltd, an Indian utility and mining company.

Oil power for the Dominican Republic

Financing of the proposed 300 MW oil-fired San Pedro de Macoris (SPDM) power plant in the Dominican Republic, expected to come on line in spring 2002, has been closed by CDC Capital Partners and Cogentrix Energy Inc of the US.

SPDM will be the largest single power plant in the Dominican Republic and the last plant to benefit from a long term power purchase contract with the newly privatised state utility, Compania Dominicana de Electricidad, and backed by a sovereign guarantee. San Pedro will be one of the lowest cost generators on the island at a time when the power market has been deregulated and generators face open competition.

Construction of the plant has started, with Siemens AG taking full turnkey responsibility for the power plant construction. Motherwell Bridge Group of the UK is providing the fuel handling facilities, under a separate contract. Cogentrix will operate the plant and a long-term fuel supply contract has been signed with Exxon.

Round Table condemns 'complacency'

The UK Round Table on Sustainable Development has urged the Government to take immediate action on climate change, and several other fronts including traffic and waste, in a report on the Government's own indicators of sustainable development. The Round Table, soon to be subsumed into a new Sustainable Development Commission, highlights areas in which the indicators are, or should be, flashing red.

Introducing the report, Chairman Derek Osborn said: "In our view, more of the indicators should be shown as red for danger than the Government has admitted. For instance, the Government is complacent in awarding itself a green light for making good progress towards the targets for reducing greenhouse gas emissions agreed at Kyoto in 1997. Those targets are not nearly ambitious enough for the scale of the climate change problems facing the world. We believe the signal is showing red not green. The Government should set a target for much larger longer term reductions in emissions and take vigorous measures to promote the necessary changes in behaviour".

Meanwhile, a new report by the Government's Advisory Committee on Business and the Environment (ACBE): calls on the Government to establish a 'Kyoto Mechanisms Office' to advise business on opportunities arising from two Kyoto mechanisms proposed to deal with climate change, Joint Implementation (JI) and the Clean Development Mechanism (CDM).

The report: *Assessment of Joint Implementation and Clean Development Mechanism: Potential Opportunities for UK Business* also outlines how UK business could benefit from projects to reduce greenhouse gas emissions in other countries.

In response, Government has relaunched its 'virtual office' website to advise business on the Kyoto mechanisms and has appointed an 'Export Promoter for Energy and Environment'. The website gives advice and support on how to develop emission-reducing projects overseas and identifies what business can gain from these projects.

Copies of the Round Table report are available, free, from the secretariat, tel: 020 7944 4964, or at: www.open.government.uk/roundtbl
Copies of the ACBE report are available from DETR Free Literature, tel: 0870 1226236, or at: www.environment.detr.government.uk/acbe

Schlumberger acquires TEAM

The migration of energy data management services onto the world wide web has continued with the acquisition, by Schlumberger Resource Management Services, of energy analysis and management software and services provider TEAM (Energy Auditing Agency Ltd).

Schlumberger intends to accelerate the introduction of advanced web-based data management services (DMS), which it sees as fundamental to the utility industry's long-term strategy. TEAM currently serves more than 600 customers.

The utility industry is seeing a huge upsurge in interest for web-based DMS, says Schlumberger, especially in Europe and the USA as utility companies seek to differentiate themselves from their competitors in deregulated markets. Most utilities now regard the provision of sophisticated customer-focused services as a key competitive element in their business strategies, says the company.

Welsh coal-fired power station returns

New control technology from ABB has helped a Welsh coal-fired power station to be taken out of mothballs. The Fifoots Point power station near Newport, previously known as Uskmouth B, uses an ABB Advant OCS to provide boiler control, burner management and systems to control the flue gas desulphurisation plant.

Built in 1962, the station was taken out of service in 1995, but is now being refurbished by its new owner, American company AES. ABB has refurbished the boilers and installed the new low NOx burners and the flue gas desulphurisation system.

Uskmouth B, now known as Fifoots Point has reopened with a lower environmental impact

The enhancements to the boilers, along with changes to the turbines and generators, have raised the combined maximum output of the three units from 360 to 393 MW.

Low profile cooling towers have also been built, enabling efficient cooling without using water from the nearby river, which would raise the water temperature and impact on river life. The cooling tower uses secondary treated sewage, from a local utility company.

The station will be fuelled with 800,000 tonnes of coal annually, 70% of which will be sourced from local mines.

Magnox stations 'to close by 2010'; Sellafield reprocessing 'to end by 2012'

Operator of Britain's Magnox nuclear power stations BNFL has announced that the generation of electricity from Magnox stations is now planned to end by 2010, except for reactors at Oldbury and Wylfa which will require a new 'Magrox' fuel to be developed. A decision on Magrox will be taken in 2003.

The 'lifetime strategy' (below) provides a phased programme for the closure of the eight stations, most of which began operating in the 1950s and 1960s. This early announcement of the company's strategy for the lifetimes of the stations will allow operational plans to be optimised, says BNFL, adding that "both market conditions and technical issues could result in earlier closure".

Three other stations in the Magnox fleet are already undergoing decommissioning – Berkeley (which closed in 1989), Hunterston A (1990) and Trawsfynydd (1993).

The announcement means that the Magnox reprocessing plant (B205) at Sellafield will close once all Magnox fuel has been reprocessed. It is expected that this will be around 2012, says BNFL, although this could be later depending on throughput schedules achieved.

BNFL's announcement came just days ahead of a major public consultation by the Environment Agency on emissions from the Magnox stations. EA Chairman Sir John Harman said: "The end of Magnox reprocessing will bring a major reduction in radioactive discharges from Sellafield and from the UK as a whole, but it will not change or plans to achieve significant reductions in the period up to closure through our imminent Sellafield site review. The move will help the UK significantly in meeting its commitment to reducing radioactive discharges under the OSPAR Convention."

Station	Licensed lifetime	Age at cessation of generation	Latest date for end of generation
Calder Hall	50	50	2006-2008
Chapelcross	50	50	2008-2010
Bradwell	40	40	2002
Hinkley Point A	40	35	2000
Dungeness A	40	40	2006
Sizewell A	40	40	2006
Oldbury*	40	45	2013
Wylfa*	33	45/50	2016/2021

**Depending upon the development and use of Magrox fuel, in which uranium is used in ceramic oxide rather than metal form. Oldbury and Wylfa will also need to undergo a Periodic Safety Review in order to secure operation to these dates.*

More activity offshore; methane onshore

The UK Offshore Operators Association (UKOOA) has reported the first signs of confidence returning to Britain's offshore oil and gas industry, following the recent rebound of oil prices from last summer's $15/barrel to the current $25-30.

A UKOOA survey suggests that expenditure on both exploration and development in 2000 is set to rise above 1999 levels. The number of exploration and appraisal wells drilled this year is anticipated to rise to 48, compared with 31 in 1999.

Meanwhile, Energy Minister Helen Liddell has welcomed the large number of applications for on-shore oil and gas licences. The 9th landward petroleum licensing round attracted 57 applications from 30 companies for a total of 141 blocks. Just under half the blocks applied for have a coal bed methane or vent gas focus.

Clean Exhaust Emissions Limited (CEEL), has announced the completion of its first cooperation with Isuzu Truck (UK) Limited – for a diesel/gas dual-fuel option on Isuzu's successful NQR 70L 7.5 tonne model.

Early trials of the vehicle have confirmed retention of the NQR's excellent driveability, with power output and torque virtually unaffected. Development work has been based on the shortest wheelbase version available to ensure that gas tanks, ancillaries and pipework adapt easily to all model variants. The launch vehicle carries two 90 litre gas tanks, one either side, mounted outboard of the chassis frame and Isuzu's standard 100 litre diesel tank has been replaced by a smaller 75 litre version.

The engine is Isuzu's direct-injection, 4.8 litre, four-cylinder overhead camshaft 4HE1-XS, in its turbo-intercooled guise.

Sheffield's Sheafpower has won the contract to supply a fourth back-up generator at the prestigious BT Tower in London (pictured). The site is arguably the most important communications centre in the UK, trafficking a high revenue of day to day business for customers world wide.

The generator, an MTU 16V 4000 G20 1500 kW unit, will provide the BT stated requirement of 70% first step load acceptance and will start if mains power is interrupted or fluctuates for any reason. The standby generation backs up BT UPS and DC power plant to give an uninterrupted and seamless power solution.

Predicting the cost of climate change

Strengthening coastal and river flood defences to withstand climate changes could cost £1.2 billion over the next half century for England and Wales, according to a new report: *Potential UK adaptation strategies for climate change*, commissioned from Environmental Resources Management (ERM) by the DETR.

The study identified for the first time the likely priority areas - water resources, flood protection, building and infrastructure, habitats and species and planning - most likely to be affected by climate change in the UK over the next 30-50 years, and some of the potential costs of tackling them.

Published at the same time, a summary report of the DETR's three-year UK Climate Change Impacts Programme concluded that "climate change will have to become part of the currency of every decision-maker, not just the experts".

Environment Minister Michael Meacher said work on adapting to climate change was at an early stage throughout the world but that the UK was as far ahead as anywhere.
He cited four areas where the Government had already taken action:

- requiring water companies to submit 25-year water resource plans that take climate change in to account,
- incorporating estimates of sea level rise into guidance on project appraisal for sea defences since 1989,
- beginning work on a best practice guide for those involved in land use planning, and
- Commissioning ERM to assess priority areas for adapting to climate change in the UK.

The ERM report includes a cost benefit analysis of the five priority areas to estimate both the costs of adapting to climate change and the costs if no action is taken. In summary:

- Water resources – it is cheaper to reduce demand, eg more efficient domestic appliances, water meters, recycling and changes in behaviour than to increase supply eg building more reservoirs, bulk transfer schemes and desalination plants.
- Flooding – it is more cost effective to improve flood defences than incur flood damage. Costs of providing current protection levels current levels of flood protection around England and Wales could increase by three or four times from £120 million per annum to £400-600 million per annum (or £1.2 billion over 50 years).
- Building and infrastructure – it is more cost effective to design new buildings and infrastructure, such as the electricity supply network, to withstand climate changes than strengthen current assets. This could add 1-5% to current construction costs.

Copies of both reports are available from DETR Free Literature, tel: 0870 1226236

Behind the bike shed - the opening of the 1.4 kWp solar electric bicycle shed at the offices of Dulas Ltd in Machynlleth, Wales in May. The photovoltaic system will produce about one tenth of the company's annual electricity needs and, at weekends, the surplus can be used elsewhere in the Dyfi valley.

Small scale 'grid-connected' solar arrays like this are still rare in the UK, says Dulas, but his is just the first of several renewable energy schemes being developed with help from the Dyfi Eco Valley Partnership including wind, solar thermal and hydro-electric schemes. This type of development keeps money circulating longer in the local economy, supporting local jobs, says Dulas. It gives people some control over their natural resources, it helps farmers diversify; it reduces pollution; and it delivers what people need – warm houses, hot water and power for appliances.

The Dyfi Eco Valley Partnership is a locally-controlled, not-for-profit initiative for sustainable development assisted by the Welsh Development Agency, Powys County Council and the Shell Better Britain Campaign. The renewable energy schemes are being grant-aided with £210,000 from the European Regional Development Fund. The Partnership is now turning its attention to energy saving measures and other local economic initiatives.

How to become an engineer -

Want to be an engineer? Then you need to understand SARTOR – the Engineering Council's prescribed standards, and routes to registration for both chartered and incorporated engineer status, particularly as there have been major changes over the last three years. SARTOR affects both the universities and the engineering professional bodies. Both have been grappling with the new arrangements. Here, Tracey Fisher outlines the changes which SARTOR has brought, and the Institute of Energy's part in its delivery. Before that, we have personal views from Leeds and Cardiff on how academia is coping; neither article necessarily represents the view of the university concerned.

A view from Leeds

by E Hampartsoumian, Director of Undergraduate Studies, Department of Fuel and Energy, University of Leeds

The Department of Fuel and Energy at the University of Leeds offers a wide range of integrated undergraduate and postgraduate modular courses concerned with energy, the environment, fire and safety. There are nine undergraduate degree programmes, of which approximately half are MEng courses which have a common first two years with the equivalent BEng course. The remaining courses are BSc programmes, for example Fuel and Combustion Science.

The department has a strong tradition of delivery of science-based fuel courses, going back over nearly one hundred years, in addition to delivering engineering programmes. Both the type and number of courses have expanded considerably in recent years, and this can present unique and particular circumstances when it comes to compliance with SARTOR, for some of the more specialised engineering degrees which do not readily fall into the mainstream engineering disciplines.

Clearly, since SARTOR has to some extent been driven by the larger engineering institutions, there is a danger that in trying to satisfy its requirements, for example the minimum entry requirements, some academic institutions may find certain less popular courses excluded from accreditation altogether even though those courses produce graduates which are both in demand and highly qualified. Whilst there is provision in SARTOR, on an exceptional basis, for such courses, it is more likely that departments will choose to no longer seek full accreditation, with obvious consequences for the longer term, not to mention the potential fall in membership of the smaller specialist professional institutions.

Cutting courses

Alternatively, academic institutions may be forced to reduce numbers on certain programmes in order to maintain the required entry profile, leading to the loss of some potentially good students, or to move to offering BEng or MEng only programmes. The latter would have to be a factor if universities were to implement the philosophy of SARTOR in full, for example with respect to the question of the extent that students on accredited and non-accredited programmes may share lectures and practical classes. SARTOR 3 does not define the extent to which this is acceptable beyond the use of the word 'significant'. Furthermore, the expectation is that there are fundamental differences in learning outcomes and the depth and breath of modules for MEng as opposed to BEng courses, with implications on staff time and workloads in developing courses.

Such requirements can sometimes conflict with the progression rules laid down by university faculty boards, particularly with respect to students falling short of the higher progression standards and pass marks set for MEng courses. Whilst these factors may be an intended and welcomed aim of SARTOR, there is a risk that some courses will, within the financially driven environment of all universities, have to close. Alternatively if the MEng cohort is not viable in terms of numbers, universities may only offer a BEng degree programme. SARTOR mentions a figure at entry of 24-plus students on a course for a viable MEng stream after bifurcation at the end of level 2. If implemented, this would see the closure of many specialist courses accredited by and associated with the smaller institutions.

Subjective accreditation

A factor in the whole accreditation process in which accrediting institutions have a responsibility will be the consistency of the process as applied to different universities. There is already anecdotal evidence that many decisions of accrediting panels are based on the opinions and personal interpretation of the panel members of the SARTOR guidelines and standards. Also, differences are beginning to emerge in the approach to the application of SARTOR by different professional bodies, as exercised through the visits of the accrediting panels. This is inevitable since many aspects of the accrediting process are subjective and do not lend themselves to precise definition or measurement.

It could therefore be argued that it makes no sense for panels to then try to evaluate the delivery or content of courses by setting numerical targets to, for example, the minimum number of students in a cohort or the extent to which teaching may take place in common with other non-accredited courses.

Matching sections

A final consideration is in the interpretation and approval of 'matching sections'. Whilst SARTOR provides a benchmark route to chartered status via MEng, an alternative path is via a BEng(Hons) plus matching section. There is a recognition by SARTOR that the matching section may be provided through a full or part time separate programme delivered by a university. There is also the prospect that a part of the educational base for CEng may be obtained during the course of employment, being provided by the employer solely or in partnership with a university.

Ultimately, the professional institutions will have to decide on what form of matching section is appropriate and to endorse them by way of accrediting them

implementing SARTOR

at the same time as the original programme.

Academic institutions can submit a matching section which, in their judgement serves to expand the educational experience by a broadening in depth as well as breadth of the technical and academic content so as to achieve the CEng educational base requirement. However, without specific input from the licensed accrediting institution, the section will be open to subjective interpretation by accrediting panel members. The smaller specialist professional institutes and academic institutions need to work together in order to better define the final academic requirements of a matching section and the ensure a consistency of approach. It is clearly in the interests of all concerned that the variety of routes is minimised if high consistent standards are to be maintained.

On the whole, the Department is supportive of the aims of SARTOR, as it is of any attempt to raise academic standards and the professional standing of our graduates. We have already made alterations and improvements to our programmes of study in order to bring them even more into line with the objectives and learning outcomes required by SARTOR. It remains to be seen whether SARTOR results in a greater number of student applicants being motivated to take up the opportunities offered to study for a four year MEng degree programme leading to full chartered status, than have done so in the past.

Cardiff's experience

by Professor Nick Syred, Head, Division of Mechanical Engineering & Energy Studies, Cardiff University

In 1988 it was agreed that two Cardiff Institutions: University College and the University of Wales Institute of Science and Technology (UWIST), should merge to produce the merged Cardiff University, still part of the federal University of Wales. As part of the merger agreement, major redevelopment of the old University College site at Newport Road occurred for all engineering subjects, with the expenditure of more than £30 million and in particular, in energy terms, the provision of brand new combustion and environmental engineering laboratories for large scale combustion and related research.

Upon merger, Mechanical Engineering staff were drawn from staff of both of the previous institutions and as a result a very strong grouping emerged with energy and environment research interests. This has helped to attract over the last ten years more than £8 million of funding, primarily from the EU and the various research councils

Certainly the UK Government's Research Assessment Exercise has given a major boost to Mechanical Engineering at Cardiff, with very high ratings, and this is reflected in the funding awarded.

Top three rating

In terms of teaching after 1988 we found that our strong research interests and ratings, combined with new infrastructure and a small but close knit teaching team (now at 15 with about 30% of teaching being sourced from outside Mechanical Engineering) created a strong and vibrant undergraduate course, whose number and A level scores gradually improved over the last ten years. In the early 1990s we were fortunate enough to use a number of external examiners, who made us look very introspectively at our management, tutoring systems and learning resources, and the interrelationships between teaching and research.

Although a traumatic experience at the time, the Higher Education Funding Council for Wales (HEFCW) teaching quality assessment of Mechanical Engineering at Cardiff in 1994 was a watershed in our development. We were fortunate in obtaining an excellent rating. Mechanical Engineering at Cardiff has always been in the top three in the UK, according to ratings published in the Times, since then and certainly we notice that potential students are very aware of this.

In terms of entry we still run BEng/MEng courses, fully accredited under SARTOR 3 for Chartered Engineer registration by both the Institution of Mechanical Engineers and the Institute of Energy. We have no problems in meeting the A level entry requirements for new SARTOR, either at BEng or MEng level; at the moment our entry requirements for MEng (now by far the largest course) are AAB, or 28 UCAS points. We retain the BEng course for a number of reasons, including the requirements of overseas students, but also those from UK and Europe who for a number of reasons, often financial, sometimes academic, find it impossible to complete a four year course. Typically 30-35% of our students come from Wales, the rest from England, with a small but variable proportion from overseas.

There can be little doubt that our success in meeting new SARTOR, at a time of nationally declining student demand for entry to engineering courses, is based on the following combination of factors:

- a small, strongly knit teaching team, good tutoring system, externally recognised as being excellent;
- a very strong, internationally recognised research team, especially in energy, which strongly interacts with the undergraduate course;
- a funding system, which via a pipeline model more or less channels funding to subject areas in relation to their teaching performance, ability to recruit students, and research performance. The funding system at Cardiff University also returns 80% of any contract overheads generated back to the subject area and individual researcher, where they are normally used to fund further research.

Alternating modules

In terms of the development of the MEng and BEng courses the recent accreditation visits by the Institute of Energy, IEE and IMechE have focussed our minds on how to provide the different and distinctive provisions for the

year three of the BEng and years three(M) and four of the MEng. Up to this point for the first two years of study the courses are identical, with final decisions on who should be allowed to proceed (if desired) into year three(M) and four of the MEng course.

The MEng course is obviously characterised by more in-depth study of chosen subjects, both core and optional, with an intense double design module and a double module group project. An unusual feature of our course structure, based on concepts borrowed from the Welsh Department of the University, is the provision of certain optional modules in alternate years, such that both the year three(M) and year four students can participate, thus allowing all MEng students to have access to a wider range of options, whilst allowing better utilisation of scarce teaching resources. Commonality with the BEng in year three is now less than 50% and is expected to reduce even further in the future. Both courses continue to thrive.

As a member of the Senate of the Engineering Council and from experiences at Cardiff I personally believe that, under pressure from changes in the structure and form of A levels in England and Wales, SARTOR has already forced considerable changes in engineering education and professional structure, both intended and unintended. Registration at both Chartered and Incorporated Engineer level with the Engineering Council are falling, but proportionately more at Incorporated level. It appears to me that many students who were originally intended to take Incorporated Engineer courses have found places on BEng/Chartered Engineer courses and a bigger gulf than exists at the moment will emerge between the Chartered Engineer accredited BEng and MEng courses.

Clearly, great attention will need to paid to the so called 'matching sections' for BEng graduates when, in say six to seven years time, these graduates start to seek full Chartered Engineer registration

Matching sections are thus an area where we feel that dialogue with professional institutions is especially important. Our view is that much assessment and learning experience will be work based, probably involving universities in distance learning programmes.

For the future, Mechanical Engineering at Cardiff looks forward to a long and fruitful relationship with the Institute, it intends to maintain and improve its performance in the future, investigating and incorporating new technologies and techniques in teaching, whilst expanding and improving its already strong research base.

The Institute's position

by Tracey Fisher, Membership and Education Manager, Institute of Energy

In the summer of 1997 the Engineering Council published its revised 3rd edition regulations for Standards and Routes to Registration (SARTOR) for Chartered and Incorporated Engineer and Engineering Technician levels. The Standards defined the educational, training and professional experience requirements for individuals seeking registration at each of the three levels of the register and was to be effective from September 1999. This provided academic establishments and engineering professional bodies with a period of two years in which to prepare for and incorporate the necessary changes to academic programmes and institutional membership criteria.

The major changes between the 2nd and 3rd editions of SARTOR were in the educational requirements for candidates for Chartered and Incorporated Engineer registration. As of September 1999, all newly enrolled students are required to meet specified standards for entry qualifications and to undertake an additional year of academic study. Students aspiring to Incorporated Engineer status are now required to complete a minimum of a three year ordinary engineering degree as opposed to the previous HNC/D qualification requirement. Similarly, students ultimately seeking Chartered Engineer status now need to complete a four year MEng programme rather than the previous BEng(Hons) qualification. Students electing to enrol onto the HNC/D or BEng(Hons) programmes will subsequently have to undertake additional learning, equivalent to one full-time year of academic study, in order to meet the benchmark educational requirements for Incorporated and Chartered Engineer registration.

Further significant changes include the requirement for differentiation of the learning outcomes of the benchmark qualifications from the HNC/D and BEng(Hons) programmes which may be run in parallel.

Despite the two year preparation period for implementing new SARTOR, many of the academic establishments and professional bodies did not begin planning their revised provision until the eleventh hour. As such, they have found it difficult to incorporate the necessary changes to their engineering programmes to ensure compliance with the new SARTOR regulations. The requirement for minimum standards of entry qualifications has penalised many of the educational establishments which traditionally recruited students with lower academic qualifications on entry, but who possessed high levels of motivation and therefore received significant added value from the courses. In recent years, timetabling, resourcing, funding and viability issues have encouraged educational establishments to offer a range of programmes with a number of common units to permit parallel teaching. The requirement of new SARTOR for differentiation between programmes means that parallel teaching is now more difficult. This, again, is creating difficulties for a number of universities.

Although the Institute of Energy is not in full agreement with the philosophy of new SARTOR, as a nominated and licensed body of the Engineering Council, it is bound to uphold the regulations and ensure that they are implemented. As such, the Institute has taken a proactive approach and has modified its membership and educational procedures to fully support the Standards. The Institute is actively working with its accredited universities and colleges during this difficult period of transition to assist them in the development and implementation of their modified courses to comply with 3rd edition SARTOR.

In search of lifelong learning

by Uly Ma

Why are we so training-averse? Is it because we energy professionals are too busy to learn new things? Or is it because much of the training we get generally falls into 'pointless time wasting'.

We are usually victims of the 'too-busy' syndrome. After all, we macho energy professionals are just too busy to deal with training. Furthermore, since training implies some inadequacies in our portfolio of skills, we want to avoid it at all costs! We've probably all been victims of the latter, I remember going on a training course to learn how to use a telephone. That can put you off training forever.

Identifying the skills gap

Unfortunately, there probably are significant gaps in our skills portfolio. Very few engineers I know are familiar with marketing, just as very few managers are good at leading and very few marketers understand industrial processes. However, all these people can be experts in their own field, but just don't know much about anything else.

Does that matter? We are hired to do our specific jobs, right? Wrong. More and more, organisations need people who can translate their knowledge and ideas from one area to another. To enable that, we need to have skills broader than our original technical discipline. This is where lifelong learning comes in, to get us ready for the ever-changing workplace.

In fact, lifelong learning goes beyond the workplace, we 'do' lifelong learning, well, all our lives. Remember how we learnt to use the video machine (OK, that nearly crippled us); now we are about to get internet-enabled WAP fridges. Aside from social inadequacy of not being able to talk to your fridge, failing to adapt can mean that we're out of the knowledge economy too. If that happens, we don't need to worry about the WAP fridges - we won't be able to afford them.

The important thing about lifelong learning is that whilst technical knowledge will always form the foundation for our progression, it is no longer enough to keep up to date. We need to have broader skills if we want our voices heard. This means that we energy professionals need to know about leading people; need to understand marketing; and have an inkling about how internal rates of return are established. To put it bluntly, we need a skills portfolio that allows us to make valid contributions in almost every situation within our organisation.

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Continuous development

That's a tall order. We cannot expect to be demagogic populists; consumer goods marketers; derivative whiz kids and a macho energy professional as well. What is needed in real terms is to be aware of what is happening in our organisation and to shape ourselves such that the lawyer, the marketer and the whiz kid all want us around in whatever they are doing. This means skills like leadership; team-working; marketing (that is, presenting yourself effectively); and negotiation.

In developing all these skills, the basic requirement is a sense of organisational awareness, a knowledge of what is going on. Once we have knowledge of the situation, we can then perform the roles of a leader or team member more effectively. Similarly, awareness of the direction the organisation is heading will to present our ideas in convergence with corporate direction. More knowledge about the organisation will also allow us to work with our colleagues better as we would understand the constraints and demands that they face.

To a practical extent, all these skills can be learnt. I would suggest that we should treat this type of skill development as continuing professional development or lifelong learning. Whilst it is relatively easy to go on a finance course; a marketing or a leadership course may be more difficult if you have short-sighted managers. My alternative suggestion is to browse through a good bookstore (or on the web). There are books on skills for virtually any management topic.

To make your learning effective, you need to find out how you, as an individual, learn best. Do you learn by absorbing; by doing; by analysing? Your learning method will determine the way forward for you. One of the best ways to discover your learning process is by using the system licensed by the Institute for its Energy Management CPD pack. There is no reason why the Institute of Energy should not develop some of these life-skills programmes to assist its members. If there is sufficient interest, maybe we can form a Lifelong Learning network within the Institute of Energy's membership.

Ever since the early 1990's, the talk is of a future based on knowledge. Well, the future is here now and lifelong learning makes it possible to be part of it.

Finally, if you're invited to a telephone training course, make sure it covers WAP-enabled fridges!

If you want to discuss these points further, please email me at *uly.ma@aeat.co.uk*

This article represents Uly Ma's opinions and not those of the DETR, the Energy Efficiency Best Practice Programme or AEA Technology, his current employer.

Training for sustainability –

by Louise Evans, Secretary & Chief Executive, The Institute of Energy

I recently read an article in a national newspaper with the headline *"Cops swoop on couple in No 10 fiddle"*. Such obscurity suggests a sensational piece, but the core content should concern all that credit themselves as qualified energy professionals. For those who did not have the pleasure, the article described an 'energy efficiency consultant' who was allegedly paid a large sum to advise Government on energy efficiency measures – work that was never completed. Scotland Yard is now investigating a criminal case. I do not highlight this to embarrass Government or any customer in such unfortunate circumstances. My message has much more serious points to explore in the interests of both the customer and the genuinely qualified energy professional.

The purpose of the introduction is to highlight that a little knowledge can be dangerous, but also to convey, on the flip-side of this, that the right expertise and education can bring great rewards

For example, we have supported the Government's recent work on the Draft Climate Change Programme. I wish to focus on two areas; proposals for a Site Specific Advice (SSA) programme and the gearing-up of education and training provision as part of the proposed £50 million package of energy efficiency measures.

Site specific advice

The aim of a programme of Site Specific Advice is to provide quality, accredited expertise to organisations so they can identify *and implement* appropriate energy efficiency measures. I stress the word implement because, for those with long memories, this will be the fundamental difference to audit schemes of the past, where reports by consultants were left to gather dust on the MD's bookshelf and little measurable action was taken. This has been recognised and Government is keen to learn from the past to ensure future success.

In the winter of 1998 the Institute, together with other representative organisations, was invited by DETR to begin discussions on the shape of a proposed SSA programme. Since then, the Institute has hosted meetings for the energy consultancy community and canvassed views of sister organisations that, like itself, have been in the business of accreditation in its broadest sense, for some years. Accreditation here is defined as recognising and qualifying the appropriate expertise required by customers. We were all in agreement on the first point – accreditation, in this sense, is not the business of Government. This led to the first conundrum – if not Government then who? A number of organisations like The Institute of Energy already have lists of professionals working in the field, but some co-ordination will inevitably be necessary.

A further point - various levels of skill will be required to meet the needs of different customers and the tasks at hand. There is clearly a role for the bright graduate and the experienced Chartered Engineer to work side by side, sharing and building knowledge. However, one single qualification or professional registration should not form criteria that exclude some from lending their skills and knowledge. Carefully constructed assessment criteria are needed to ensure regulated, but open access to such a programme. However, we were also agreed that any registration scheme should focus on registering the *individual* consultant.

Turning to the customers, they need clear communication of the services available and an effort to demystify the subject of energy. Past efforts to promote the worthiness of energy efficiency do not have a great track record. This time a creative and innovative approach is required to communicate the benefits that will in turn encourage action. The customers' achievements then need to be monitored, recorded and celebrated, so that tangible evidence of success is used to attract others.

The Institute's proposals to Government have included a pilot scheme to develop assessment criteria; consultation between energy experts and illuminated current customers to develop the appropriate operating system and communication approach; and the broader involvement of interested parties to develop a programme that suits all. In addition, the consultancy profession has requested that The Institute of Energy be considered the professional home for the purposes of any SSA registration scheme.

Gearing-up education & training

Some may argue that Government support for education and training is not the role of DETR but DfEE. However, at the time of implementing new policies for National Training Organisations, the DfEE did not see the necessity for an umbrella body to manage and monitor the provision of energy efficiency education and training. The DETR has therefore, taken the lead in this area, however, they could possibly benefit by exploring this policy again with DfEE colleagues as a joint initiative. The Institute of Energy would certainly be an active supporter of such action as it has already approached the DfEE to review the matter.

As a DETR partner in its past education and training activities, the Institute assisted Government in March this year by facilitating three workshops to discuss future education and training strategy. Groups including energy professionals, training managers, trade union representatives and intermediary organisations came together to debate the issues on the basis of past experience and assessment of future needs. Issues raised included the barriers to both training and energy efficiency; the role of any

how the Institute can help

future programme; audiences who should be targeted; methods and materials that would be needed; possible partners and the communication approach needed to facilitate action.

The process was very rewarding for all participants who took the opportunity to contribute. The outcomes could deliver an innovative step-change to future energy efficiency education and training support from DETR.

In addition the Institute and partners have concluded a scoping study examining the provision (or lack) of energy education in the Higher/Further Education sectors – a crucial area for attention in relation to the skills and knowledge needed in the lifetime of the Draft Programme.

The views were unanimous – more education, training and awareness for various groups are one important solution to contribute to the aims of the Government's draft programme. The DETR now has views on how innovation could be delivered to achieve success in this area.

Reminding myself of where we began, I hope readers will agree that getting these two aspects of the programme right is the solution to avoid such stories published in the national press. The energy profession has much to be proud of, and no more should be done to distort the mass market's image of energy efficiency, let alone damage the credibility of a large number of genuine professionals. So, let us get this right and ensure that a little knowledge can go a long way – from protecting the customer and the expert through SSA, to making mass markets aware, through education, of the contribution they can make to energy efficiency and a better environment for us all.

Contact Louise Evans at: levans@instenergy.org.uk

The Government's education project

by Dick Coldwell, Immediate President, Institute of Energy

Since coming to power, the current Government has set education and training as a very high priority. It is clear to all those in power, not only in the UK, but in all industrialised countries, that economies are only as good as their labour forces.

The Institute of Energy has now committed itself to playing an active role in what is often called 'The Government's Education Project'. This is a multi-faceted attack on a whole series of educational areas that required immediate attention and often radical reform.

The Government's programmes and initiatives cover the whole spectrum of life-long education. Nursery care and education, primary and secondary schooling and basic skills (numeracy, literacy and oracy) are the very highest priorities. Without a solid base of basic education we are all lost.

Of more immediate interest to the Institute are the next layer of reforms on 16-19 year old education and on adult education and training outside higher education. Here the Government is currently engaged in a major reform with the introduction of a new Learning and Skills Council and 47 Local Learning and Skills Councils to bring together the work previously separately conducted by the TECs, the Further Education Funding Council, the Training Standards Council and some parts of other services.

The new national Learning and Skills Council will have an approximate spend of £6 billion - and so will be one of the largest and most influential of all quangoes - and is intended to provide a more integrated approach to all post 16 education and training outside higher education. This is fairly radical surgery and the Institute will need to keep closely in touch with this new player as it sets to work with a new statutory remit.

The Higher Education agenda for universities and colleges adopted by this Government was initially set by the response to the Dearing Committee and in particular the Government's decision to charge students a proportion of tuition fees on a means related basis. Much has happened since, with a greater concentration of research funding on centres of excellence, a slowly increasing acceptance of diversity and a desire to turn increasingly to new technology and global alliances to deliver high quality higher education in the future.
This was all given particular focus by David Blunkett in his recent speech at Greenwich which is one of the most far reaching and significant statements on higher education over the last two or three decades.

Again the Institute will wish to play a role in these developments as they unfold. Of particular interest will be the narrowing divide between the academic, the professional and the vocational and the desire to allow people to move easily between these three pillars. For the Institute the new Eng Tech qualification is particularly relevant. While preserving standards, we must seek to be inclusive, to facilitate people's learning and then to allow them to move onwards and upwards.

As with all changing situations there are threats and opportunities. With some light footedness and a little foresight the Institute should be looking to play a major part and to benefit its members from these changes.

Dick Coldwell is involved on a wide range of agencies and working groups taking forward new policies and initiatives in Basic Skill, Schools, Further Education and Higher Education.

Automatic utilities

by Colin Boughton Smith, Energy Metering Technology

Automatic meter reading (AMR), together with 'expert' data analysis can provide automatic and continuous utilities auditing, thereby de-skilling the task of energy consumption and cost analysis. This, writes Colin Boughton Smith, will eventually displace the need for 'snapshot' conventional energy audits. The Government should, adds Smith, "wake up to the IT revolution and encourage utility consumers to install AMR technology as best practice for energy and water management".

The process of energy auditing was first expounded in Sir Oliver Lyle's famous book: *Efficient Use of Steam*, published in the early 1900s, where he called it a 'heat balance' and stated: "The making of such a balance generally brings to light so many extravagant processes and practices, that a subsequent steam saving is usually obtained forthwith". Energy auditing has been a foundation plank of successive government programmes to save energy since the formation of the Ministry of Fuel and Power in the Second World War.

As currently understood, an energy audit is based on a site survey and hence is a snapshot of the energy flows at the time. The general recommendations are that such an energy audit should be repeated every three to five years.

The process follows the classical method of managing a large problem; ie to break it down into small components each of which are more easily managed. There are three stages. The first stage, similar to a financial audit, involves finding out how energy is entering a site or process and where it is being used or lost. The second is to investigate each final user in detail, usually in order of magnitude of usage, to see if the energy is being used efficiently, what the possibilities are for improving efficiency, and estimate the financial viability (usually in the form of a simple payback period) of each measure. The third stage is the presentation of a report to communicate to management both the findings of the audit and recommendations for energy saving action where there is proven financial viability. After the audit should follow implementation of recommended measures – the extent of implementation being dependent on funding available.

I have been conducting energy audits in both the industrial and buildings sector for nearly 30 years. In my experience, the first stage is just slog surveying and collection of data, usually extremely demanding on shoe leather. The second stage is the crux of the audit and where deep technical and intellectual understanding of usage is required together with a wide knowledge of practical possibilities for efficiency improvement. The third stage depends very much on the ability of the auditor to express himself and his ideas – sometimes very difficult for us engineers! Without it, the good work of the first two stages are lost.

History of auditing

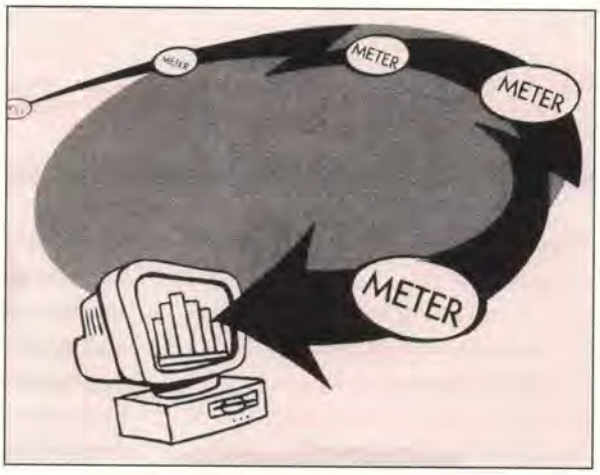
In the UK, after the 1970s oil crises and up until the mid1980s, energy audits were generally conducted by an external specialist consultant. The Government encouraged this by providing grants of up to 50% to assist with the consultants' fees (the Extended Energy Survey Scheme). The standard of an energy audit therefore depended on how much the recipient organisation was willing to pay and the professionalism, expertise and experience of the auditor.

In the late 1980s, the emphasis changed, energy prices began to fall in real terms, and the Government pulled the plug on energy audit grants, believing they had primed the pump for long enough. Even after computerisation, the cost of a sound, professional energy audit for a large multi-building site (eg a 600 bed acute hospital) was still over £25,000. After the audits were conducted the reports would often be left to gather dust on shelves since funding was not forthcoming to implement even the recommendations with the shortest payback. Apart from the public sector, where there is tremendous bureaucratic inertia, the energy auditing consultancy market as we knew it collapsed.

Computerisation showed how vulnerable energy audits were to the criticism that they were based on only a snapshot in time. As a result of the microprocessor revolution, the need for British business to compete in a new global marketplace, and market reforms in the public sector; rapid changes were taking place within the estates of major energy users which are still proceeding today. After a short period, many of the entries in the inventory would be out of date and the audit would cease to be soundly based. Specific recommendations for energy saving measures were vulnerable to the charge that the building or equipment in question may cease to exist before the measure had achieved a payback. Even if funding was available, the attention of estate managers was invariably drawn to more urgent priorities.

The same market reforms were also leading to a need for information about energy consumption for reasons other than reducing it. Competition in energy supply meant that users could choose from many complex deals on offer and needed detailed information to choose which was the best deal for them. The division of large sites into accountable cost centres, often with outside organisations occupying part of the site, led to a need for internal charging systems to reflect actual consumption.

auditing



Towards automatic utilities auditing

Meanwhile, the microprocessor revolution was creating less expensive yet more reliable and accurate metering as well as data logging and acquisition systems. Furthermore, flexible software products became available to enable data analysis not previously possible by manual means. This brought the ability to the ordinary energy user to log and monitor consumption continuously and also to analyse data to a level previously only affordable in the research environment.

Portable metering and recording instruments were also developing for the energy management market, particularly electrical demand profile recorders. These showed how the process of profiling (ie logging consumption with respect to time) could reveal inefficiencies and provide a useful tool to diagnose and stem wastage.

With the need to reduce labour costs came a requirement to de-man the meter reading data analysis task. The parallel development of flexible spreadsheet and database software enabled several small businesses to develop proprietary monitoring and targeting software to assist in this task. Monitoring and targeting was vigorously promoted by the government for several years after the energy audit grants ceased, but this has now lost its momentum.

Early in the 1980s, microprocessor based building energy management systems (BEMS) were developing. However, most of the companies involved with this came from the controls industry and hence they treated monitoring very much as an also ran compared to the need to control. This led to systems being designed with the intention that the outstations in the field should continue to function and perform control when the data communication network is down, rather than trying to keep the comms on line 100% of the time. This resulted in a high percentage of the meter reading being lost when a BEMS is used to automatically read meters.

As a consequence of the frailty of communications, poor reputation and high cost of BEMS, and also the need to keep the management monitoring function separate from the control function, organisations such as EMT, saw a void in the market and designed and developed low cost, automatic meter reading where data integrity was paramount.

Using the meter as an asset

The cost of installing submetering is relatively high, but reducing due to advances in technology. The value of submetering is in its ability to yield information. If management systems are not put in place to read the meters and analyse the readings then the meter becomes an 'idle asset' and investment is wasted.

The MoD, for example, has a mandatory requirement to fit meters on all new buildings and major refurbishments, yet without also stipulating that AMR should be installed. The consequence of this is that many meters are not used after money had been spent to buy and install them. I was once asked to survey an RAF base to provide recommendations for installing additional meters – it was immediately apparent that many meters were already present but not used because the staff did not have time to walk round and read them all. Indeed, the locations of many of the meters had been forgotten, and the consultants had to leave site and come back after the RAF had sent out a search party to locate them!

Similarly, in 1998, The Home Office spent just under £2 million on installing sub-meters in prisons without any investment in automatic meter reading systems. The Estates staff at the prisons were already struggling to read and analyse the existing meters and were not in a position to cope with manually reading and analysing any more.

Towards expert analysis

There is little point in collecting data if it is not going to be analysed and the only practical way of analysing, say, half hour data from an automatic meter reading system is automatically. With the sophistication of the software available today virtually any analysis algorithm can be applied automatically to data - in fact this is the only practical way mass iterative analysis can be conducted.

Simple analyses most commonly deployed include profiling, regression, standard, mean, benchmarking, normalised performance indicators etc. More complex analysis that starts to both de-skill and reduce manual interpretation includes reconciliation, monitoring and targeting, exception reporting, CUSUM etc.

However, the next level of analysis that starts to introduce a different depth of artificial intelligence is 'expert analysis'. Development of such systems is in its infancy, and is more easily applied in specific circumstances. Approximately five years ago Sainsbury plc made a bold attempt to achieve expert system analysis of the their store consumptions and almost de-skilled the whole of the analysis and interpretation by putting in place a system which would automatically notify individual store managers of a problem and suggest possible reasons and remedies.

I contend that by installing comprehensive automatic metering with associated expert data analysis, we could evolve towards fully automatic auditing. This would enable the whole process to be de-skilled and de-manned, taking us beyond where we where with computerised auditing some years ago, and with the major advantage of allowing this to be conducted every 30 minutes rather than every five years.

Contact Colin Boughton Smith on tel: 01628 664056, e-mail: colin@eccl.co.uk

Providing power to low budget consumers

by Dr Nigel Smith, managing director of Sustainable Control Systems

The problems of supplying secure and affordable electricity to the 2 billion people world-wide who lack this basic service have been significantly reduced, thanks to the launch of an innovative new product called PowerProvider. This award winning product, which meets the needs of low budget consumers and electricity supply companies alike, is described by its developer, Dr Nigel Smith.

PowerProvider is a replacement for the electricity meter that enables the consumer to draw current up to an agreed limit. If they exceed this limit they are temporarily disconnected, with power automatically restored after a short time delay. Consumers pay a fixed monthly fee for their PowerProvider electricity service, often through local electricity or post offices. In short - the consumer subscribes to a low budget supply and the electricity supply company achieves a significant reduction in revenue collection and administrative costs.

The process that led to the creation of PowerProvider began when, with UK government funding, I carried out a study to explore the reasons why so many people are without electricity world-wide. The study identified the fact that many companies are reluctant to provide electricity to low income households because the costs of meter reading, billing, revenue collection and administration are often greater than the payments to be collected. The need for a reliable low cost alternative was clear.

The concept of a fixed or limited current connection is well established, although until now it has suffered from a lack of suitable technology. In Zimbabwe, standard miniature circuit breakers are used as current limiters, replacing metered supplies to more than 100,000 households. However, these circuit breakers have a serious drawback – as they have to be readily accessible for resetting, they can be bypassed easily by fraudulent consumers.

PowerProvider is a much more secure alternative to the circuit breaker as the unit is auto-resetting and designed for outdoor installation on an electricity supply pole. Any attempts to tamper with, or bypass, the device will be both difficult and clearly visible to the electricity supply company – a major breakthrough in theft reduction.

PowerProvider is also effective in reducing overloading of the electricity supply network, by limiting the maximum power that the consumer draws from the supply. Widespread use of the product instead of – or in addition to – conventional meters can result in substantial savings on transmission, distribution and generating equipment. It also offers immediate financial advantages – it costs less than a standard electricity meter, is cheaper to install and is supplied pre-calibrated.

PowerProvider is fully solid-state, using a ceramic substrate printed and fired with thick-film resistors and surface mounted with electronic components. The trip current threshold is accurately set by active laser trimming. An aluminium chassis forms a robust housing and incorporates slots for strapping the unit to a pole. The module and connecting leads are fully sealed in a high grade, UV stable encapsulant, colour coded according to the current rating.

The device has been subjected to rigorous testing, including 6 kV, 3 kA lightning simulation transient tests and repeated short-circuits. It is now in manufacture in the UK, with pilot projects being carried out both in Asia and South America.

The potential market demand for PowerProvider is clear and the list of countries able to benefit from this piece of world-class innovation considerable. The simple practicality of SCS's groundbreaking approach to a significant international problem is one of the reasons why PowerProvider has recently been granted 'Millennium Product' status in a prestigious award scheme endorsed by Prime Minister Tony Blair.

For further information:
e-mail info@scs-www.com or
visit www.scs-www.com

Facing the levy

Steve Hodgson sat in as representatives from ESTA and PowerGen addressed north western energy managers on the impending climate change levy.

Blackburn's building-site-of-a railway station (currently being refurbished), on a wet Tuesday in May, does not give visitors much of a first impression. But the still shiny Jack Walker stand at Blackburn Rovers' Ewood Park provides a welcome contrast, even if the pictures on the wall inside still celebrate the league winning team of some years ago. Looking out of the window of the seminar room, we have a perfect view not of an immaculate green playing surface, but a tractor pulling a roller over bare earth – Rovers' pitch is being relaid as the club prepares for another season in the First Division.

We – energy managers and financial people from private and public sector organisations in the north west of England – are in Blackburn for the first in a series of seminars organised by the Energy Systems Trade Association (ESTA) on facing up to the climate change levy.

The events are sponsored by PowerGen, so PowerGen's Danny Finlay is first up to remind us of the details of the proposed levy. To be introduced next April, the levy is designed to prevent the release of at least 2 million tonnes of carbon in the first year and generate around £1 billion in revenue, all of which will be recycled back to business in the form of:

- a 0.3% cut in employers' national insurance,
- £100 million in enhanced capital allowances for investment in energy efficiency (see below), and
- a £50 million energy efficiency fund.

The levy will thus be 'revenue neutral', although very few individual businesses will see it that way. Businesses will be taxed for their use of utility (piped) gas, electricity, coal (and its derivatives), and LPG and CNG where these are not used as road fuel. Companies will not be taxed for using hydrocarbon (mineral) oils, any road fuels or waste containing otherwise taxable commodities. Also excluded is energy supplied for domestic use and energy used for non-business use by charities.

Tax rates are: electricity 0.43 p/kWh, gas 0.15 p/kWh, liquid gases 0.96 p/kg. Price rises will vary according to consumption levels and thus unit price paid, but will be up to 15% for electricity and 25% for gas. There are, however, a series of both discounts and exemptions.

Energy intensive users (currently defined rather inexactly as those regulated under IPPC) will qualify for an 80% discount if they are covered by one of a series of climate change agreements currently being negotiated by trade associations with the Government. There is also a 50% discount for the horticulture industry.


Blackburn's Ewood Park

Complicated enough – but the exemptions picture is even more so. Exempted supplies include energy: not used in the UK, used in transport, used by electricity producers, supplied from 'good quality' CHP stations and nominated renewable sources, including large-scale hydro electric schemes, and any other still to be specified by the Treasury.

The big picture is that the levy will produce both winners: *labour intensive* commerce and industry (eg a chain of high street travel agents), and losers: *energy intensive* commerce and industry (particularly manufacturers).

Mr Finlay then showed two examples – both losers.

The first – a labour intensive company with 720 employees, annual energy consumption of 11 GWh of electricity and 60 GWh of gas and not party to a climate change agreement – would lose £102,000 a year. Company two – an energy intensive employer of 750 people, using 110 GWh of electricity and party to a climate change agreement – would also lose, around £48,000 a year.

PowerGen could help, said Mr Finlay, by providing access to both enhanced capital allowances and the energy efficiency fund.

ESTA's Alan Aldridge added some more flesh on the climate change agreements – these only apply to companies working with IPPC regulation who are prepared to agree and then achieve carbon dioxide reductions in stages up to 2010. Ten industrial trade associations are currently negotiating agreements on behalf of their members.

He also described how the enhanced capital allowances scheme will work. Energy users will be allowed a 100% first year capital allowance (as opposed to spreading this over several years) on a prescribed list of energy efficiency technologies (variable speed drives, lighting systems, thermal screens, boiler systems, high efficiency motors, refrigeration, CHP and pipework insulation) from April.

The effect will be equivalent to a slight reduction (perhaps 5%) in the capital cost of these items, enough, perhaps to persuade buyers to opt for a more energy efficient version.

Mr Aldridge went on to describe all the other government moves on climate change, summarising that energy prices would begin to rise again from next April, largely due to the levy. Efficiency savings can more than offset the expected rises – so it's time for energy managers to look ahead, calculate their liability and plan to offset it.

Contact ESTA on tel: 07041 492049, or www.esta.org.uk

The management of waste

by Geoff Loram

Geoff Loram attended the 7th annual conference on waste incineration organised by IBC Global Conferences, a subject that has been well explored. Delegates fairly fresh to the energy-from-waste business would be looking for as much factual information as possible, whilst the old hands would want to hear what was new; the former were better served than the latter in this case, he reports.

Papers presented fell under three general categories: planning, legislation and technology. There were no less than five papers on planning, which was excessive - two good ones could have put across the simple message that emerged, ie that you have to prepare your planning application very carefully with a full environmental impact assessment; that you need to consult with the local population at the earliest possible moment and get them involved; and that you need to build a six month delay for a public inquiry into your timescale. This is rather old hat and, indeed, Professor Judith Petts of the Centre for Environmental Research at the University – who gave a good paper – said that it was virtually one that she gave nine years ago, which I can confirm.

Legislation

Planning, although an important part of any project is not of prime interest to members of the Institute; legislation, on the other hand, is fundamental and impinges on both plant design and economics. Dr Martin Whitworth, Strategic Policy Manager, Process Industries Regulation at the Environment Agency, gave the first of two important papers on this subject. He gave a run down of the current regulatory position for all waste burning applications, with particular emphasis on what is somewhat inaccurately called co-incineration. The latter is the use of various waste materials as supplementary fuels in cement and lime kilns, a subject that has been exercising the Agency's mind for a while now, but the imposition of an incinerator standard of flue gas cleaning would be immensely expensive and is something that, realistically, could only be done on an EU wide basis; so that issue is awaiting the proposed Directive on incineration.

What was evident from Dr Whitworth's presentation is that the upper echelons at the EA are not prepared to stand up and take responsibility for defending any particular standards as being wholly adequate and sensible and providing a high level of environmental protection. Instead he reiterated two or three times that the Agency had the power to demand higher standards than required by regulation if they came within the BATNEEC criteria.

The most important contribution under the legislation topic came from Michael Theben from the DG Environment of the EC, who is responsible for drafting the proposed new waste incineration Directive and taking it through the process of becoming EU law. He said that the main purpose of this Directive was to tidy up, consolidate and clarify the existing legislation under which Directive 94/67 controlled the burning of hazardous waste whilst 89/369 and 89/429 covered municipal waste. These two waste categories were defined in Directive 75/442 but the burning of waste oils and solvents, although defined as hazardous waste, was not controlled by 94/67, nor was the burning of tyres, sewage sludge and clinical waste controlled under 89/369 or 89/429. The burning of these wastes will be controlled under the new Directive.

The other major thing that the new Directive will do is to tighten the emission limit values, which will then apply to all waste burning, reducing them from those applicable under 89/69 to those required by 94/67. The proposed timetable for implementation of the new Directive is 1:12:2002 for plants built after that date and 1:12:2005 for existing plants. That there have not been loud howls of anguish from the energy-from-waste industry at these very tight limits – which have been mooted for some time – clearly indicates that it is quite confident that they can be met with the technology currently employed.

Dr Stuart McLanaghan, Director, The Energy from Waste (EfW) Association in his paper exploring the role of EfW in sustainable waste management – which he expected to be a major one – emphasised that it could meet "the highest environmental standards", reinforcing the point about meeting tight emission limits. He introduced other ways in which legislation influences the EfW business; the EC Landfill Directive and the undertakings made under the Kyoto protocol are both drivers towards greater capacity and the EU and UK targets for the percentage of electricity to be generated from renewable sources, although not statutory, have given rise to the UK Government intending to replace the NFFO scheme with a Renewables Obligation under which all electricity suppliers will be obligated to generate or purchase a set percentage of the electricity that they supply from renewable sources.

That percentage has yet to be fixed, as has the penalty price at which suppliers will have to buy out their obligation if they cannot meet it; these will be enshrined in regulations to be made under the Utilities Bill after it reaches the Statute book later this year. The level at which they are set will be crucial to the success of the scheme. The EFWA has calculated that meeting the Government's target of 10% renewables by 2010 would require the building of 92 EfW plants of 120 kt capacity; even if half the capacity was provided by larger plants of 200 kt capacity, it would still need over 70 plants. It seems highly improbable, to say the least, that so many plants will be built, but it does indicate that there will be a very large market for plant suppliers and operators to exploit over the next decade or so.

by incineration

Technology

The second day's crop of eight papers dealing with technology matters included four on ash and its disposal. The first, from Mr Steven Sawell, MD of Compass Environmental Inc, Canada and Chairman of the International Ash Working Group gave a resumé of the results of the research done by the Group. Various graphs and tables illustrated: the percentages of different heavy metals in the bottom ash, boiler ash, fly ash and APC (air pollution control) residues; the elemental composition of the bottom ash; bulk density; particle size distribution and leachability; all useful technical data. The Group favoured ash utilisation and suggested criteria by which it could be assayed and engineering parameters for its use; it was significant that they did not seem to consider that the fly ash, which is the destination of most of the heavy metals except mercury, needed special disposal.

David York, MD of Ballast Phoenix Ltd, followed up with a very positive account of his company's progress in developing the utilisation of incinerator bottom ash (IBA) in the UK, where they now process half the ash produced annually in the UK at four processing sites. The ash is used as an aggregate in either cement or bitumen bound mixes and also as an aggregate in cement bound masonry blocks. IBA has been used for road building and other civil engineering applications in continental Europe for two or three decades now and it is encouraging that the UK is now adopting the same sensible practice.

The third presentation was a short introduction to a long and complicated written paper about APC residue treatment as practised in France; the system appears to be quite expensive and only justified when restrictions on fly ash or APC residue disposal cause that disposal to be expensive as well. The fourth paper, again by Steven Sawell, recounted developments in recycling the metals and other substances in these materials, presumably by his company, but again predicated on their disposal being expensive, and the lack of economic data was revealing in itself.

The two core papers in the technology section, one on gasification and pyrolysis by Joe Schwager of Jupiter Consultancy Services Ltd and the other by Prof Jim Swithinbank, of the Sheffield University Waste Incineration Centre – a Past President of the Institute - were both rather disappointing in that they did not live up to their titles and give as much information as they might have done.

Gasification and pyrolysis

Mr Schwager entitled his paper "Gasification & Pyrolysis Processes: Are they an alternative to incineration?" but got off to a bad start by saying that he was not going to answer that interesting question! He stated that his object was to review the arguments for and against 'novel thermal treatment processes' as alternatives to incineration for handling wastes. What he gave us was a wide ranging litany of all the materials that can be processed, lists of manufacturers and so on that had all the hallmarks of a desktop study; one slide listed the leading processes by market segment and named ten processes dealing with MSW but failed to mention that none had yet built a plant that could demonstrate the processes efficiency, reliability or economics. As if to prove the point he showed one photograph of a large plant in Germany which had been built in 1999 but had still not been handed over and another of a large plant built there by Siemens which was being dismantled because it didn't work! Three slides setting out advantages and market drivers – some of which were pretty spurious – were only balanced, later on, by one asking the question as to whether the processes were bankable – to which the answer appeared to be `no'. Technological data was there none.

Combustion technology

Prof Swithinbank's paper was entitled "The Changing Face of Incinerator Technology" though he did not make it clear in what way he thought it was changing; to the contrary he examined fluidised bed technology – and again one gets the impression of a desk-top study – but dismissed it, despite the advantages that he acknowledged, because the waste needed pre-treatment in the form of shredding. He also dismissed gasification as being high in capital cost and low in efficiency. Currently that is true, but an efficient fluidised bed gasifier coupled with a CCGT generating plant, such as that currently commissioning at the ARBRE plant in Yorkshire – it burns short rotation coppice – could be as efficient, if not more so, than a mass-burn incinerator.

The Professor's unit at Sheffield University is currently doing some highly technical research into the combustion processes on a mass-burn grate with a view to improving their rather low boiler efficiency; so it is it not surprising that he is more interested in that technology than in fluidised beds. However, as was pointed out from the floor of the conference, the Baldovie plant at Dundee – which has two bubbling bed boilers – won the contract in direct competition with mass-burn designs on straightforward commercial criteria, ie capital and operating cost and how much electricity is extracted from a tonne of waste. It has now been operating successfully for six months as, indeed, you would expect it to in view of the many successful plants in Sweden and the USA from which it is descended.

So the face of waste combustion technology has been changing for some time; we are just a bit slow to catch up with it in the UK. The flue gas emission figures from Baldovie are so good that they would meet the proposed limits under the new Directive, apart from NOx and the manufacturers say they could do that if they were allowed to have less than 6% oxygen in the gas stream. If Dr Whitworth of the EA really intends to apply BATNEEC he might consider dictating that all future EfW plants employed fluidised bed technology!

Letters

Incentives to save energy

Sir

Louise Evans, our Secretary and Chief Executive, commendably refers in her article (*Energy World* May 2000), to the need to eliminate enormous energy waste which takes place. She suggested that the "Government estate should be one of the first to act as exemplar to us all".

In 1970, I joined the Ministry of Defence as Chief Adviser on Fuel and Energy for the armed forces, home and abroad. At that time, oil prices had escalated. The MoD, being the major user of fuel and energy, resulted in the Minister being asked political questions like – what action was being taken to save energy. He sought my assistance. "Save it" became the slogan.

It became necessary to produce a plan, covering the short, medium and long term as a policy for action, covering technical and better management. I estimated savings in the order of 30% of total consumption. The Minister highly commended the plan, with instructions to implement it.

In visiting Germany, with outside temperatures below zero, I observed a barrack block with all windows open. The main boiler was on, supplying the heating to the barracks, which was escaping through the open windows. It appeared that it was standing orders to open the windows and air the rooms, common practice. I was able to change that, with considerable energy savings.

In my travels, both home and abroad, I observed that private and public office blocks had opened windows when occupants were too warm. The radiator valve was never turned off to reduce heating. In the summer, the lighting was on when not needed.

It became clear that these people did not likewise waste energy in their own homes, because they were footing the bill. The question arose – how could I harness this element of human nature used in home economy, for it to be used in their places of work, where others were footing the bills.

I produced what appeared to be a simple answer. From records, I selected a number of military establishments and all fuel/energy consumption data over three years, producing an average consumption for one year.

I visited each of the military establishments, inviting Commanding Officers to participated in an experiment to eliminate energy waste, involving all staff to use any means to make savings. If the savings reduced the levels of consumption below the average, then these savings would be converted into cash, with half to be given for comforts for the troops and the balance retained by the Treasury, to benefit tax payers.

At each base, my proposals were enthusiastically received with comments that no capital expenditure was being incurred and if it did not work, it would be no worse than hitherto. To implement the scheme, I needed Treasury approval. It was not approved on the grounds that the armed services should not be wasting energy! One observes energy waste still taking place in public and private buildings. In meeting Louise Evans' objectives, may I suggest offering incentives on the principle above, towards eliminating waste, benefiting us all.

Walter J Ablett CEng MInstE

No need for nuclear reprocessing?

Sir

I am surprised that a Viewpoint Article in our prestigious journal (Time to end reprocessing of nuclear fuel? - *Energy World* May 2000), in discussing the future of nuclear-fuel reprocessing, made no mention of fast breeder reactors.

I wonder if Malcolm Grimston, as a (presumed) expert in this field, could comment on my understanding that the inevitable use of fast breeders - as proceeding in Japan, France and Russia - will eliminate any need for uranium reprocessing, or for transport of spent nuclear fuel. Moreover, by increasing the efficiency in use of the natural uranium by a factor of 50, such technology converts uranium into virtually a renewable source of energy for the future.

It is my personal opinion that it won't be long before the advocates of global warming in most countries come to realise that such nuclear power is their only practical alternative to conventional thermal power generation. They will no doubt envy New Zealand, with its reliance on renewable resources for some 75% of its power, whose only problem, however, is the opposition from environmentalists that is preventing any further development of the plenteous, undeveloped hydro potential!

Peter A Toynbee CEng FInstE

Malcolm Grimston replies.....

First, it is not inevitable that fast reactors will take over even if there is an enormous increase in the use of nuclear power. If it were feasible to extract uranium from sea water, for example, world uranium reserves would increase by some orders of magnitude. In this case it might be possible to provide nuclear electricity from a once-through uranium cycle for a very long time.

Secondly, if fast reactors do become necessary then some method of extracting the plutonium from spent fuel will be needed. It may be possible to organise a nuclear industry including fast reactors into 'nuclear islands'. Reprocessing will occur on these islands, alongside fast reactors. Transportation will indeed be reduced, but not reprocessing. Fast reactor fuel is usually a mixture of plutonium and depleted uranium oxides. Even if the spent fuel from the reactor is left unreprocessed, it will be necessary to reprocess the depleted uranium/plutonium mixture in the breeder blanket.

The editor welcomes letters for publication, particularly short contributions, on anything that has appeared in Energy World, and on wider energy issues.

Events

July 2000

Energy research – helping the UK compete
IMechE seminar and exhibition,
4 July, London
Details from Fiona Fulton,
tel: 020 7304 6815,
e-mail:
f_fulton@imeche.org.uk

The Utilities Bill 2000
Conference, 6-7 July,
London, £899 + VAT
Details from Euroforum,
tel: 020 7878 6886,
fax: 020 7878 6885

CHPQA – passport to climate change levy benefits
IMechE seminar, 7 July,
London
Details from Amelia Brunt,
tel: 0207 973 1301, e-mail:
a_brunt@imeche.org.uk

UK electricity outlook
Course, 10-12 July,
Brighton, £1195 + VAT
Details from PowerInk Ltd,
tel: 01273 202920, website:
www.power-ink.com

Fuel cell 2000
Conference and exhibition, 10-14 July, Lucerne,
Switzerland
Details from the European Fuel Cell Forum,
tel: +41 56 496 7292,
e-mail: *uboss@dial.eunet.ch*

Fourth European SOFC forum
Conference and exhibition,
10-14 July, Lucerne,
Switzerland
Details from the European Fuel Cell Forum,
tel: +41 56 496 7292, e-mail:
uboss@dial.eunet.ch

Utilities bill 2000
Conference, 11-12 July,
London, £999 + VAT
Details from IIR Ltd,
tel: 020 7915 5055,
e-mail: *registration@iir-conferences.com*

Energy efficient heating systems
CIBSE workshop, 12 July,
London
Details from Maggie Procopi,
tel: 01442 866378, e-mail:
maggie@cibsecpd.com

Introduction to NETA
Course, 12 July, London,
£699 + VAT
Details from IIR Ltd,
tel: 020 7915 5055, e-mail:
registration@iir-conferences.com

Shared services for energy and utility companies
Conference, 12-13 July,
Amsterdam
Details from IQPC Ltd,
tel: 020 7430 7300, e-mail:
enquiries@sharedservicesnetwork.co.uk

Internet marketing strategy in the utilities
Course, 19-20 July,
London, £899 + VAT
Details from IIR Ltd,
tel: 020 7915 5055, e-mail:
registration@iir-conferences.com

Fuel cells infrastructure
Conference, 25-26 July,
London
Details from IQPC Ltd,
tel: 020 7430 7300, e-mail:
fcellsinfra@iqpc.co.uk

August 2000

Greenhouse gas control technologies
Conference,
13-16 August, Cairns,
Australia
Details from CSIRO Energy Technology,
tel: +61 2 9490 8790,
e-mail: *c.paulson@det.csiro.au*

Internet marketing strategy in the utilities
Course, 16-17 August,
London, £899 + VAT
Details from IIR Ltd,
tel: 020 7915 5055,
e-mail: *registration@iir-conferences.com*

Uranium Institute annual symposium
30 August – 1 September,
London, £995
Details from the Institute,
tel: 020 7225 0303, e-mail:
enquiries@uisymposium.com

September 2000

Renewable energy and energy efficiency Asia Pacific
Conference, 4-7 September,
Kuala Lumpur, Malaysia
Details from Eco Energy Sdn Bhd, tel: +60 3 635 8187, e-mail:
reee2000@eco-energy.com.my

Energy management
Institute of Energy Course,
5 September, Glasgow,
£99 + VAT
Details from Sophie Milligan,
tel: 020 7580 7124, e-mail:
smilligan@instenergy.org.uk

Energy 2000
Festival of renewable energy,
8-10 September,
Leicester
Details from Environ,
tel: 0116 222 0254, e-mail:
rstockdale@environ.org.uk

Hybrid vehicles 2000
Conference, 11-13 September,
Ontario, Canada
Details from Intertech,
tel: +1 207 781 9800, e-mail:
info@intertechusa.com

Power station maintenance
IMechE conference,
18-20 September, Oxford
Details from Ed Maycock,
tel: 020 7973 1316, e-mail:
e_maycock@imeche.org.uk

Energy saver
Course, 19-21 September,
Buxton, Derbyshire,
£875 + VAT
Details from NIFES,
tel: 0115 984 4944,
e-mail: *training@nifes.co.uk*

PowerEXPO 2000
Exhibition, 20-22 September,
Zaragoza, Spain
Details from PowerEXPO,
tel: +34 976 76 47 00,
e-mail: *communicacion@feriazaragoza.com*

Incineration of municipal waste
University of Leeds course,
25-26 September, Leeds
Details from the CPD Unit,
tel: 0113 233 2494, e-mail:
cpd.speme@leeds.ac.uk

Future Developments in InstE training provision

The Institute has a variety of training and education resources that it makes available to those working or studying for a career in the energy profession. In addition, the Institute approves and accredits a wide range of provision from other institutions in academe and the private sector to ensure diverse learning opportunities to suit most needs are available. Due to the growth of the Institute's work in this area, Rob Wall has taken over responsibility for all Education Services that the Institute offers and if you wish to find out more about these services please contact him on .tel: 020 7580 0077, fax: 020 7580 4420 or e-mail: membership@instenergy.org.uk

TEMOL

As many of you will know TEMOL is the Institute's open learning training pack for those entering and developing within the energy management field. With 14 elements TEMOL covers the technical and managerial aspects of the topic in some depth. TEMOL students receive one to one tutor support and the assistance of a support network. TEMOL is mapped to the National Standards for Managing Energy and available to deliver the underpinning knowledge required to achieve the VQ in Managing Energy which is part of the criteria for professional recognition via Associate Membership (AMInstE).

Plans are afoot for developing new elements of TEMOL in lighting, built environment, transport and a host of other topics. In addition, options for on-line learning and CD Rom provision are being reviewed. Our immediate priority is to edit and update the current materials as part of our commitment to ensure high standards in the Institute's training provision.

Vocational Qualifications

Readers will be aware that the Institute of Energy was a fundamental partner in bringing about a S/NVQ 4 in Managing Energy - the first professional level VQ dedicated to recognising the current competence of energy management professionals. The Institute also promotes the VQ Bitesize qualifications - individual unit certificates that can be achieved in isolation from, or as part of, working towards the achievement of the full VQ award.

Over the years, VQs have been subject to a degree of bad publicity generally. This has made employers and employees nervous of investing in this particular form of award. However, as candidates qualify from the Institute, the quality reputation of this particular VQ is growing. In addition, this is a crucial qualification in the current debate about recognising current competence.

Rob Wall will be working with Tracey Fisher to ensure the future for the VQ is bright - but essentially, it is the quality and standing of the candidates and their achievements that make the award what it is. Any Energy Manager working today should be seriously considering this option to gain professional recognition 'on the job' without taking time out to study in what is already a hectic life for so many of us. The full VQ also forms part of the criteria to be recognised by the Institute in a professional grade of membership - AMInstE, so make your personal learning choice the right one and choose the VQ.

Bespoke Training

Bespoke training services have developed as a result of market needs and innovative new work with major trade unions including the AEEU and IPMS. The Institute has trained a core team within its membership to develop and deliver bespoke training and awareness programmes for its Group Members. This service has already begun to bear fruits for the Royal Borough of Kensington and Chelsea and CGU Insurance and Prudential are soon to follow. Future plans include the development of the training materials and the expansion of the pool of expertise available to service Group Members' needs. By comparison with commercial training companies, this service brings a wealth of added value through the !ong-term support Group Membership provides.

Companies who have undertaken the Energy Efficiency Accreditation Scheme can also be key beneficiaries in terms of using 'people power' to sustain the initial energy efficiency improvements demonstrated to achieve accreditation in the first instance - a useful tip for those wishing to succeed through re-accreditation! For further information, Maria Adams, *madams@instenergy.org.uk*, negotiates the content of each customer's programme and Rob Wall manages the customer's requirements to a successful conclusion.

Energy Diplomas

The Institute also awards two Diploma-level energy-based qualifications: a Diploma in Energy Management and a Diploma in Energy Technology. Both of these qualifications have been designed to be delivered through part-time study at regional colleges of higher and further education, although full-time and intensive short course options are also possible. The Institute is keen to see the development of the provision of both of these qualifications and welcomes input from its members.

The Diploma in Energy Management is aimed at the pragmatic application of basic scientific principles, knowledge of fuels and combustion plant and common sense in order to reduce the consumption of fuel and energy within an organisation. Candidates are assessed through a combination of project work and written examination. The Diploma in Energy Technology was originally developed to provide an energy engineering educational route to Incorporated Engineer registration. With the new Engineering Council SARTOR regulations now in force, the Diploma requires further enhancement to meet the increased educational standards for IEng registration, which is currently being investigated.

2000 Ellis Memorial Lecture - 18th May 2000

The 12th Ellis Memorial Lecture was presented by Mr. David Varney Chief Executive, BG Group plc, to an audience of approximately 100 members and guests of the Midland Branch on 18th May 2000 at the Birmingham Botanical Gardens.

Mr. Varney was introduced by Danny Brennan, Chairman of the Midland Branch.

In his presentation, Mr. Varney emphasised the unique contribution that natural gas is making, and will continue to make in the fight to contain global warming during the transition period from dependence on fossil fuels and the emergence of sustainable alternatives. He claimed that BG is at the forefront of the international gas industry in developing the technology to contribute to ever-increasing efficiency in the supply and use of gas in its many applications.

Mr. Varney has been employed in the energy business for 30 years, mainly with the Shell group of companies until 1996, when he joined BG, and is a suitable figure to add to the eminence and prestige of the Ellis Memorial series of lectures.

The Lecture was followed by a stimulating question and answer session, after which Mr. Varney was presented with a commemorative medal by Harry Freeman, Midland Branch Honorary Secretary.

The Branch was pleased to welcome Dick Coldwell, President of The Institute of Energy and Louise Evans, Secretary and Chief Executive. Among the other guests, some of whom represented kindred societies in the Midlands area, were Mr. Peter Rost, a Companion of The Institute of Energy and a former presenter of the Ellis Lecture, and representatives of BG Group and Transco whose financial support made the event possible.

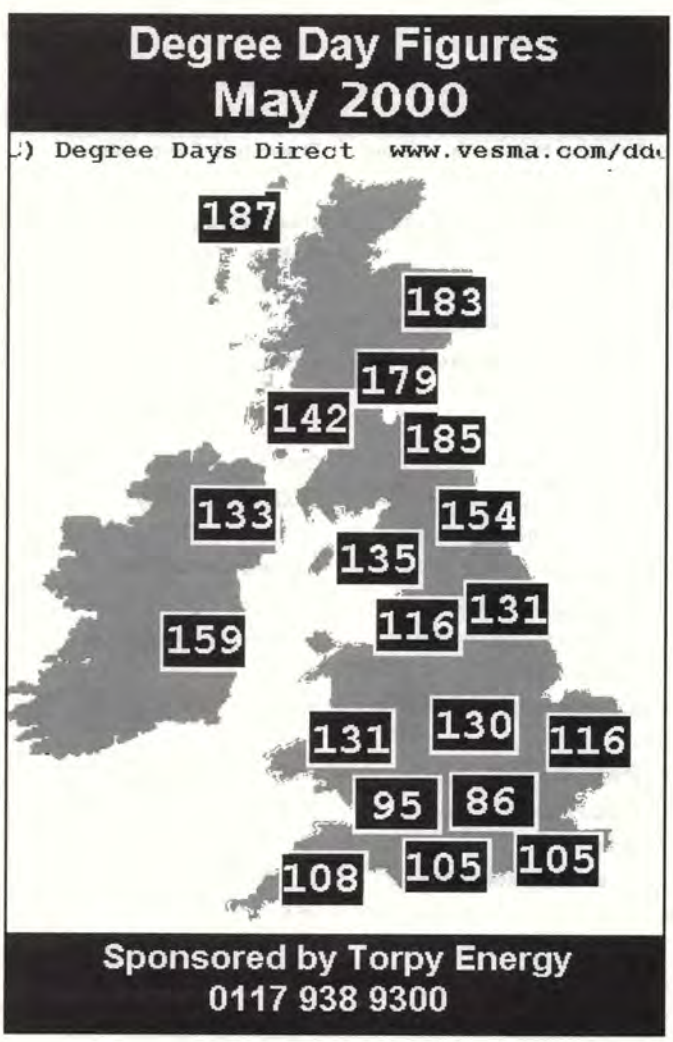
The proceedings concluded with lunch and closing remarks by Dick Coldwell.

The Lecture will be printed in full in a future issue of *Energy World*.

The Institute's Project & Marketing Manager, Maria Adams looked absolutely radiant, and thoroughly enjoyed her wedding day on 10 June 2000. She married Tristan at St. Mary's Church in South Woodford and was then joined afterwards by family and friends at the Roebuck Hotel in Buckhurst Hill. More than 100 guests joined the wedding party on this warm and sunny day to celebrate the occasion. We thought this important piece of Institute news should not pass you by, and as so many members very generously contributed to a number of gifts from Maria and Tristan's Wedding list we felt a captured moment of their very special day was in order!

As *Energy World* goes to press Maria is returning to the Institute after two weeks honeymoon in Thailand.

Finally, thank you once again to all those members who contributed to wedding gifts for the happy couple. Maria was quite overwhelmed.



New Members

NORTH WESTERN

Dr J Francis MInstE
University of Central Lancashire
Mr D Williams MInstE
McKinnon & Clarke

LONDON & HOME COUNTIES

Mr A I Barnes AMInstE
Invicta Community Care
NHS Trust
Mr T Beach MInstE
Rolls Royce Power Ventures Ltd
Mr J N Reynolds FInstE
Credit Suisse First Boston
TM Resources Ltd
Group Member
Alliance Gas Ltd
Group Member

SCOTTISH

Mr J M Grangeret MInstE
(Transf)
Consultant

MIDLANDS

Mr J Blackhall FInstE
PowerGen Plc.
Mr D M Crompton MInstE
George S Hall Ltd.
BS Burner Services Ltd
Group Member

NORTHERN IRELAND

Ms L Clydesdale MInstE
IRTU

SOUTH COAST

Mr R N Olding MInstE (transf)
Bournemouth Borough Council
Mitsui Babcock Energy Ltd
Group Member
Mr B. Lockyer Graduate
IEI Building Services Engineers

OVERSEAS

SPAIN

Mr P Amunarriz Sagarzazu
Graduate.
Orloga S. A. Engineering

CPD Events

JULY 2000

BRIGHTON

2 - 4 July
Renewable Energy Exhibition 2000 at the Metropole, running alongside the 6th World Renewable Energy Congress. Contact Prof Ali Sayigh, tel: 01189 611365, fax: 01189 611365, e-mail: *asayigh@netcomuk.co.uk*

CRANFIELD

3 - 7 July
Gas Turbine Combustion. Contact Mrs Mary Howard, School of Mechanical Engineering, Cranfield University, tel: 01234 754644, fax: 01234 750728 email: *m.howard@cranfield.ac.uk*

OPEN LEARNING

Gas Distribution Self-Study Course.
Contact Susan Robertson at the Institute of Gas Technology, tel: +1 847 768 0783, fax: +1 847 768 0842, e-mail: *robertsr@igt.org*

Branch Events

SEPTEMBER 2000

GLASGOW

Tuesday 5 September
One day short course in Energy Management. Anniesland College. Contact Ms S Milligan, Institute of Energy
tel: 020 7580 7124
Email: *smilligan@instenergy.org.uk*

BALLYMENA

Date to be confirmed
ECOS centre, Ballymena
Contact Dr D McIlveen-Wright, Northern Ireland branch, tel: 01265 324477 Email: *dr.mcilveen-wright@ulst.ac.uk*

OCTOBER 2000

LONDON

Thursday 5 October,
One day short course in Energy Management. Institute of Energy. Contact Ms S Milligan, Institute of Energy
tel: 020 7580 7124
Email: *smilligan@instenergy.org.uk*

New Honorary Officers

PRESIDENT

Mr B A Chamberlain CEng FInstE

PRESIDENT ELECT

Mr J E Ingham CEng FInstE

HONORARY SECRETARY

Eur Ing R I Wilkie CEng MInstE

HONORARY TREASURER

Eur Ing D Barber CEng FInstE

CHAIRMAN OF BRANCHES COMMITTEE

Mr N F Peacock CEng FInstE

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North Eastern
Chair:
Mr B A Pacey CEng MInstE
Northern Ireland
Chair:
Mr W McIlhatton CEng MInstE
North Western
Chair: Mr E J Gibson MInstE
Scottish
Chair:
Mr J Watson CEng MInstE
South Coast
Chair:
Dr C W Wilson CEng FInstE
South Wales & West of England
Chair:
Dr J Whitehead CEng FInstE
Yorkshire
Chair:
Prof. G E Andrews CEng FInstE
Hong Kong
Secretary:
Mr D M T Lai CEng MInstE

Deceased Members

It is with regret that we report the deaths of the following members of the InstE:

MAKOWAR, Arthur Denis, FInstE, LHC
RICE, Alexander Pershing, FInstE, SWW
BREECE, Robert, FInstE, Australia
LUCAS, Aubrey John, MInstE, SWW
FOLLETT, Bertie John, MInstE, YOR
FISCHER, William Harry, FInstE, LHC
SUTHERLAND, Laurence Anderson, MInstE, SCO

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Please contact Mr. A Malik at
aadil_malik@yahoo.com

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PhD student (UMIST/EA Technology)
seeks work in renewable energy. BSc Chemistry/German, PhD Chemical Engineering. Postgraduate Training Partnership has provided business and management training, plus three years industrial experience.
Contact: Sandra Eager
Tel: 01244 314259 or
e-mail: *seg@eatl.co.uk*

FHP Management Services Professional Managment of Facilities and Environment.
Engineering Graduate to work from our Birmingham Office. Becoming involved with all aspects of engineering services for commercial properties.
Contact: David Forster
Tel No. 0121 212 2263
e-mail: *fhpmidlands@btconnect.com*

ENVIROS require experienced consultants to meet demands from UK and international clients for work on Climate Change issues (strategy, audits, specialised studies, benchmarking, etc.)
CVs to *celine.soars@enviros.com*

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Please contact M. Haque on
020 8907 2191

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For more details contact Maria Adams or Beatriz Cano on tel: 020 7580 7124, fax: 020 7580 4420 or e-mail: eworld@instenergy.org.uk

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We seek people from a wide range of engineering or scientific backgrounds, with practical experience gained through training in industry or academia, ideally with skills or experience in gas turbines or combustion technology. While you don't need to be an IT expert, familiarity with CFD techniques would prove useful. In return, we offer the opportunity to take concepts from inception through computer modelling and simulation to testing on actual hardware. You will also find an environment in which pure technical expertise is both recognised and rewarded.

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This innovative and challenging research will focus on the chemistry and aero-thermodynamics of gas turbine combustion and emissions, leading to technology demonstration for next generation power plants. You will ideally have an MSc in a related subject and a PhD in Combustion, or be a graduate with relevant experience gained within industry. IT skills - especially CFD - would be an advantage, although training is available. The higher salaries are available to those with four or more years' relevant experience in combustion processes or emissions technology, capable of quickly becoming a recognised source of advice and consultancy to national and international customers.

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