The Chartered Institution of Building Services Engineers

Presidential Address 2006
Engineering for Life
David Hughes joined the major design contractor, Matthew Hall in 1963 as an apprentice, obtaining a Higher Diploma in Environmental Engineering from the National College (London South Bank University) in 1968. During a 25 year career with Matthew Hall, David attained the position of Divisional Director having responsibility for the design, co-ordination and construction for many substantial building projects throughout the UK. In 1976 David established an expatriate multi-disciplinary office in Iran, which undertook the design and construction of projects in both Tehran and on the Caspian Sea coast.

Obtaining a Master of Science Degree in Architecture from University College London, David went on to join the Consulting Engineering Practice of Jaros Baum & Bolles in 1988 as a Director. He has subsequently been responsible for such projects as Paternoster Square Master Planning, Barclays Bank City Head Office and more recently the refurbishment of the Treasury in Whitehall. Management duties have included responsibility for health and safety; the introduction of Investors in People and the writing of a CIBSE approved IPD Graduate Training Scheme.

David joined the Institution in 1963, becoming a Fellow in 1985, and a Chartered Engineer in 1989. He has served on CIBSE committees for over 12 years, was Chair of the Membership Committee, and has chaired various Task Forces including Higher Education Initiatives: Grades, Benefits and Subscriptions and International. David has responsibility for international co-ordination and development within CIBSE a role that has taken him to Australia, Hong Kong and China to reinforce the Institution’s strong ties with these regions. Within the context of the Engineering Council David has been a CIBSE appointed EC representative and is currently serving on their Registration Standards Committee and the Working Group on Competence Statements and Technical Reports for the UK-SPEC.
As a practical man, an ordinary building services engineer, I had expected a life in engineering to be a worthy but perhaps relatively mundane one. But it hasn’t been like that. I started as a foot soldier in the 1960s in a profession that would lead me from life as an apprentice to international responsibilities.

Building services were simple. Offices were heated, had openable windows and the majority of our homes still had open fires. But it was an exciting time to join the profession. The 60s economy was booming, our homes were beginning to be refurbished with central heating, and air conditioning installations reflected the growing confidence of the commercial office market.

In the, 60s energy was not an issue with the UK’s development of the North Sea providing cheap and abundant fuel for the foreseeable future and Calder Hall proclaimed as the herald of cheap electricity from our embryo nuclear industry. Everything looked pretty rosy.

But forty years on, first world economies are using more energy than ever, and developing nations are upping their rate of consumption substantially as their economies expand to meet the aspirations of a modern society. This has resulted in three significant concerns.

1. Carbon based fuels driving national economies are diminishing and becoming more expensive.
2. Their use is resulting in the climate change that can be seen around us.
3. Security of supply is increasingly difficult to achieve in a politically unstable international environment.

The mitigation of these problems is now the most significant challenge facing all of us as building services engineers. This very real responsibility represents a challenge which I could never have envisaged, or met, when I started out!

In this address I will try to make sense of the massive changes to our engineering lives, past and future by considering the drivers, tools and barriers which affect our ability to deal with the energy challenge. I will then go on to look forward to some sustainable solutions which we can achieve by becoming ’engineers for life’.

Introduction
The threat
So how will the current challenges really affect our lives? We all know about climate change, but I am not sure that we have really recognised the effect it will have, especially when taken together with the uncertainty of our energy supply now that North Sea gas and oil is coming to an end. What will these ‘challenges’ do to us and our families?

Destroy our livelihood?
The upward trend in oil fuel prices and uncertainty of supply from politically unstable countries may lead to the oft-predicted $100 a barrel oil price. If fuel prices rise substantially then world-wide recession has to be a significant possibility.

Negate the value of our savings?
If, like me, the main product of your working life is your family home, how will you cope if its value becomes negligible because it is in an area prone to flooding? Who can sell a home that no-one will insure? Red lining of flood-prone areas could soon affect a large proportion of the homes in London as well as in other areas. A lifetime’s work with nothing to show for it?

Kill us?
If we are poor or elderly or young or just unlucky, we may not be able to deal with the heat or cold or flooding which a changing climate may inflict upon us. Fuel poverty may also become a real issue.

The effects of climate change are upon us and securing our future will not be easy. We have to change our collective behaviour so that these possible outcomes are less damaging than they could be. Levers which might help us change our ways include legislation, innovation and perhaps instilling a healthy fear of what the future might bring. Behaviour, however is hugely difficult to change, not many people will vote for a hair shirt. However, continuing as we are, is not an option.

‘The next war will be a war in which people not armies will suffer, and our boasted, hard-earned civilization will do us no good’.
Eleanor Roosevelt (1884-1962)
Redefining our boundaries

As Anne Hemming, from the Office of the Deputy Prime Minister (ODPM) pointed out at CIBSE’s November 2005 Part L Conference:

It is people that emit carbon not buildings.
We can provide energy efficient buildings, (but) we do not control lifestyles.
Nor do we control the majority of appliances.

This implies a need to tackle both energy efficiency at point of use and the transfer of energy generation to non carbon based sources. This will, to a significant extent mean micro-generation at point of use. Who can manage this apart from Building Services Engineers? It seems our boundaries are being redefined and our horizons widening as a result.

This is a time of real challenge to us as an Institution as we see the effects of a number of important drivers for change which include:

- A wider definition of the profession – we work closely now with an ever broadening range of specialists we need to be involved from inception to demolition.
- An extended involvement in the life of buildings.
- An elevation in content of the intellectual process on which we are engaged – new targets require innovative not easy solutions.
- An accelerating debate on reducing the carbon footprint of our buildings – the world is now watching us.
- Greater engagement with others in the delivery of our objectives – to make it work we have to work closely with all parts of the construction and operation teams.

To meet with these challenges we have engaged some heavy-weight support.

Both members and staff have provided leadership and knowledge in depth. You don’t need me to remind you of the great work done by recent Past Presidents of CIBSE including the inimitable Terry Wyatt, who has done so much to get our industry to recognise the need for action, and the great value that we can add to our businesses by accepting that challenge. Graham Manly and Donald Leeper have provided invaluable leadership in getting us to recognise the value of working closely with all parts of the industry. All of them have contributed to a situation in which the expertise of CIBSE members, and their essential role in addressing the greatest challenges of our age, is recognised.

The energy issue

Buildings, in the widest sense, consume 50 per cent of the energy produced. This comprises both power station generated electricity and fossil fuels consumed at the point of use. Both are sources of carbon emissions.

In April 2002 the Renewables Obligation came into effect. The aim of the obligation is to increase the contribution of electricity from renewables in the UK so that by 2010, 10 per cent of electricity sales would be from renewable sources and double that by 2020.
There are problems here though. Wind energy, although making a valuable contribution may prove to be less efficient than originally hoped with anticipated load factors not being realised. Combined Heat & Power (CHP), wave and tidal technologies are gaining ground although limited by investment and political will.

The government’s policy, for example, is to achieve 10,000 MWe of good quality CHP by 2010 and for the implementation of ‘Microgeneration’ strategies. Notwithstanding the fiscal incentives, progress towards these objectives has been difficult.

The move for part of the power generation requirement of our schemes to migrate to the point of use requires us to consider the micro-generation technologies of:

- Combined Heat & Power
- Hydrogen Energy & Fuel Cells
- Small Hydro
- Wind
- Solar Photovoltaic

Local generation has distinct advantages. Transmission losses can be reduced thereby reducing carbon emissions. Resilience of the network can be improved by generation at the point of use and with new technologies such as dynamic demand being included as part of an engineering solution.

Generation on site may also focus building users’ and operators’ thoughts on the amount of energy they are using.

**Changes at work**

Even as the army of building services engineers marches forward into new fields of battle, we find that the rules of engagement are changing around us. New regulations are set to have a major impact on our working lives. Already we recognise, even with the changes to Part L 2006, that complying with the Regulations is going to be much more intellectually demanding and require much more innovation and clear thinking. The easy, habitual solutions will no longer be viable.

Reduction of energy consumption must not result in a reduction of comfort, so innovative solutions will be required. The installation of local green generation mechanisms may also contribute to an increasing complexity in the systems installed in modern buildings.

Expansion of boundaries, increasing complexity... the engineering life has now become one in which constant self-improvement is essential, where professional learning and development and improvement of our communication and project management skills are not luxuries, they are critical to our ability to act appropriately. And as the pace of change quickens, we must promote ourselves through the ranks and become true Generals of the profession.
Olympic opportunities

To save the world by increasing our range of activities and the level of competence of our industry may appear to be quite a challenging task. However help is at hand.

Learning in all its forms
In 2004 CIBSE implemented their ‘Developing Membership’ Initiative, championed by Past President Doug Oughton, which has allowed us to pass the 17,000 member mark for the first time in our history. As well as growing membership we now have a major focus on retention and moving members through the grades as their career progresses, working in partnership with other professionals such as CITB – Construction Skills and with Summit Skills. Members and staff have been proactive in this area, by winning funding from the Engineering and Technology Board to promote the ECUK register of Engineering Technicians, Chartered and Incorporated Engineers. Our commitment is substantial, but I am confident that we, with our industry and academic colleagues will succeed in achieving the 2250 new registrants required. This initiative puts education and registration high on the agenda of our ongoing membership growth initiative.

I was part of a team that was involved with ECUK in establishing a new exemplar route to CEng registration as an accredited BEng together with a Technical Report or an appropriate Masters Degree. This has led to an increase in the number and variety of post graduate degrees available at our universities. These are proving to be popular with industry, which can influence content, and with students as they can offer an insight into cutting edge technology or as an introduction into building services for those wanting to enter the profession later in their careers.

Embracing the importance of education, and working to help the industry provide the much needed new recruits are CIBSE’s Regions and Patrons, who now, in partnership with industry, are providing bursaries to students. I am very proud of this scheme and intend to promote this initiative hard, as an effective way to attract students onto building services courses in partnership with sponsors and course providers.

May I take this opportunity to congratulate all our Patrons and their Chairman, Charles Lever, for their outstanding support for the Institution. The Patrons Group welcomed its 100th member earlier this year, and is truly a battalion of worthy companies, a force for good in promoting innovation, education and training, and standards in our industry.
Thank goodness for legislation
The desire to reduce and control energy consumption in our buildings has been occupying the minds of CIBSE members for many years, but getting our good ideas adopted has always been a struggle. Now we have some heavy ammunition and can advise our clients that they are required to adopt services strategies which are right in energy terms and that cost is only one measure of a successful outcome.

The 2006 Building Regulations have not only reinforced the carbon reduction process but by embracing some of the requirements of the Energy Performance of Buildings Directive (EPBD) have forged substantive links with building operation and facilities and energy monitoring and management. This legislation has become the foundation stone of the integrated design and construction process.

Legislation and CIBSE
We at CIBSE have played a proactive part in forming the legislative framework within which our members operate, producing a comprehensive and growing range of publications that support both members’ activities and the demands of carbon reduction. We are now part of the fabric of the Building Regulations, with our specialist literature referenced extensively in the relevant legislation.

A notice that systems have been checked in accordance with our Commissioning Code M is, for example, required to demonstrate compliance with Part L. This ensures that the systems and their controls are left in working order and can operate efficiently for the purposes of the conservation fuel and power. Building log-books are now also required with CIBSE’s TM31 toolkit being the default standard. This is to contain details of commissioning, installed plant and controls and effective operation together with data upon which the Target and Building Emission Rates were calculated.

Competent advice
So who will clients turn to for competent advice? Again we at CIBSE, with support from the Carbon Trust, have been active in broadening the opportunities for those who are competent by developing a register of people capable not only of undertaking the design and verification of performance necessary to demonstrate compliance but also of going beyond regulation in terms of carbon performance. This register will be open to non-CIBSE members and will give further opportunity for CIBSE to integrate with other professions.
We are putting in place strategies to deliver, over a five year period, 3000 trained and registered individuals competent to carry out low carbon design and operation of buildings, who will use their expertise to deliver measurable carbon savings for both new and refurbishment building projects.

In parallel, a structured marketing campaign is being targeted at the client sector of the industry in order to raise awareness of and demand for low energy and low carbon design.

Those on the register will be able to claim an expectation on the part of Building Control Officers that they have provided plans which fully meet the provisions of Part L. They will be able to sign off their own work and that of others as meeting the Regulations.

CIBSE will use these drivers to recruit people onto the register then use the register to drive up competence by requiring those on the register not only to prove their underlying competence, but also to refresh and enhance their abilities through specific CPD activities.

There is a real opportunity here to develop a fully recognised Competent Persons Scheme.

**Carbon clean-up**

New buildings and their creation tend to attract the majority of the focus of attention in terms of green design. But by far the greatest impact on reducing energy and carbon emissions will be by viable intervention into our existing building stock.

In recognition of this The Carbon Trust is co-funding CIBSE’s ‘100 days of carbon clean-up’ a major publicity campaign which will create demand among businesses for excellence in carbon management of existing buildings. The campaign promotes use of CIBSE TM22: Energy Assessment and Reporting Methodology by business and requires those who participate to provide a resumé of their carbon savings over 100 days. Participants will be awarded ‘Investors in Carbon’ certificates.

CIBSE will use this initiative to stimulate the adoption of operational ratings as a routine tool for building energy management as a means of revealing the potential to save energy and CO₂. The emphasis is rightly on refurbishment because of the large residual building stock. It is anticipated, for example, that engineers registered under The CIBSE Low Carbon Consultants register will refurbish over 10,000 buildings of over 1,000m², with an estimated carbon saving of 445,000 tonnes of carbon over just ten years.
Technologies and teams

A raft of tools is available to help us reduce energy consumption and carbon emissions. In addition to the micro-generation mentioned earlier we must consider technologies such as:

- Ground source cooling
- Solar collectors
- Ground source heating
- Biomass heating
- Air source heat pumps

Planning objectives such as those put forward by the Mayor of London compliment and reinforce Building Regulations by requiring applications that the Institution is vibrant and dynamic in responding to technology is evident in CIBSE’s Societies and Groups. Four of these, Healthcare, Intelligent Buildings, CHP and Energy Performance have been formed by popular demand in the last year. These illustrate the desire of our members to be actively involved in topical issues and indeed the Energy Performance Group is actively involved, in a consultative capacity, with the Competent Persons Register and the ‘100 Days of Carbon Clean up’ initiative.

Greater London Authority planning report PDU/0809a/01
International development
Carbon reduction is not just a national but an international issue and CIBSE can help to ensure that good ideas cross national boundaries by bringing to bear its international brigades.

As both Vice-President and President-Elect I have had Board responsibility for developing CIBSE in the international arena. CIBSE events are now truly international; they bring expertise from overseas to our door, so that we can all take advantage of important advances elsewhere in the world. And our UK events are international too. With the advent of webcasting, members who find it difficult to get to London, can now gain the benefit of all the information disseminated from CIBSE events in the comfort of their own office or home, thanks to the world wide web.

While we are thinking of matters international, our Australia and New Zealand Region has gained the award for highest new member increase. Hong Kong Region celebrated its 25th anniversary in 2004 and now forms over 20% of our membership. The international contribution made to the work of the institution is enormous and has been further enhanced by a Gold medal being awarded to Patrick Yip and the nomination to our Management Board of K O Yeung. This greater integration has given the Institution a springboard that not only enables us to support the Region but also to develop an international strategy that respects the growing economic growth of mainland China.

The Institution is, with London South Bank and Cambridge Universities, developing a proposal to deliver specialist Masters Courses through distance learning at Chongqing University in China. The course structure will involve membership of CIBSE and the Institution would deliver a professional development component of the course, which might also afford opportunities for student and academic exchanges.

The Institution is also exploring with Chongqing University Press the possibility of publishing a range of CIBSE technical publications in simple Chinese. These would be aimed at the student and academic market and if successful, give the Institution a much higher profile in this part of the world.
Hong Kong engineers working in Shanghai have collaborated to form a CIBSE Chapter in the model of those operated in our ANZ Region. This gives us the opportunity to develop our initiative in the area and to develop our membership base.

Our collaborative work with 12 other professional bodies in developing under the umbrella of PIUK (professional Institutions UK) initiative is proving successful. This originated out of the CIC China group and comprises a grouping of professional bodies, specialising in the construction and built environment, working together to collectively promote their interest in China. The British Council in Shanghai has agreed to support the initiative by providing expertise, funding and presentation space.

**An engineering life is now a global life and CIBSE members are part of it!**

**What better time?**
As Graham Watts chief executive of the Construction Industry Council reminded us in his speech to the Patrons Lunch at the House of Lords, construction has a workforce of almost three million people, employed in 350,000 companies and accounts for around 15 per cent of GDP. This broad definition includes the supply of raw materials, the manufacture of construction components and the associated professional services such as architecture, engineering and surveying.

BSRIA’s Statistics Bulletin for December 2005 gives a healthy account for our sector with consultants’ workload increasing sharply. The M&E industry, with growth of 3.1 per cent, is now valued at £20.04 billion, representing 25 per cent of construction.

The economic climate has been stable and conducive to the construction industry for the longest period of time that I can remember. The Olympic Games in 2012 and the development of the Thames Gateway offer real opportunities to focus on issues of sustainable development. Construction and engineering in general can rise to the occasion and lift their game. This affords a real showcase for the professions and CIBSE must play its part to give the leadership, integration and vision that will inspire the imagination of a new generation of engineers.

**CIBSE leading the way**
The results of climate change, changes to the Building Regulations and the implementation of the EPBD are now well known and are beginning to be understood and incorporated into the fabric of building services engineering. It is essential that we, at CIBSE, continue to raise the bar and develop our role of formulating policy through new ideas and to provide the means of delivery through research, publications, seminars and liaison with like minded partners.
CIBSE has raised its game and risen to the challenge. The responsibility for the outcome rests clearly on our members, both current and those aspiring to join; supported, of course, by our office staff, without whom nothing could be achieved.

These are exciting times and we should be encouraged by the regard in which others hold us. Graham Watts at his address to the Patrons Lunch identified that ‘integration’ was clearly at the core of CIBSE’s values and went on to say:-

I am very proud to have been elected President of CIBSE at such an active and exciting time, and to be able to help develop the work of reform and advancement so ably started by my predecessors. I look forward to the personal challenge that the coming year will bring and continuing to keep CIBSE in the forefront of innovation within our profession.

I feel, as I am sure you all do, the uplifting sensation of doing something truly worthwhile, of struggling to achieve something which, although difficult, is not impossible with the help of ambitious and dedicated colleagues.

It’s all a far cry from where I started out. An engineering life has not turned out to be a mundane life, but a hugely interesting career. With all the engineering projects now underway, I am confident that my engineering life will be a long, and learning one. I hope that you too will be inspired by the challenges and opportunities that face us to become a true CIBSE member; an engineer for life.

‘It seems to me that CIBSE has the balance about right. It is an organisation that is clearly led by its members and effectively managed by a dedicated and hard-working staff; it enhances and serves the specialist disciplines that it directly represents and adds its considerable weight to the force for integration and unity within the industry’