CIBSE

The Chartered Institution of Building Services Engineers

Presidential Address 2003

Adapt or Die:

The major challenges ahead for the building services industry

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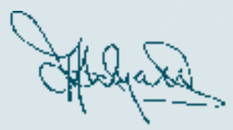
From the ‘Portsmouth Building School’, Terry entered the construction industry choosing Engineering rather than Architecture and, apart from a period of time in The RAF, has pursued a continuous career, working worldwide, in Building Systems and Environmental Engineering.

Initial training was through an apprenticeship with Brightside Engineering in Portsmouth. This was sandwiched with the Diploma Studies at ‘The National College’ (now Southbank University). A move to London followed and, beginning with consulting engineers J. Roger Preston, has led to experience on projects across the world, from Singapore to the U.S.A. via Africa, the Middle East and Holland.

In 1981 Terry joined Hoare Lea Consulting Engineers. He became a Partner in 1982. Since 1987 Terry has been Head of Research and Development. This position has provided the means to investigate and initiate implementation of, often innovative, solutions such as the development, introduction and naming of ‘Chilled Ceilings and Beams’ and of their combination with ‘Displacement Ventilation’.

Current research interests include: Climate Change mitigation, Renewable Energy, Earth Coupling systems, Carbon Capture, Emissions Trading and the ‘Future World of Work’, for more effective workplace buildings.

Terry has lectured at Bath, Nottingham, Oxford Brookes, Delft, Utrecht, and South Bank Universities, also in many parts of the U.S.A. and Europe, as well as in Brazil, Hong Kong and more recently, China.



Introduction

The growth and development of what we now call ‘Building Services Engineering’, since its beginnings in early part of last century, has been exponential. In the UK, the industry now exceeds £18 billion and employs 414,000 people. We are recognised by the Government as a profession in our own right and the numbers of graduates is growing steadily, with most coming over from other courses, to exceed 1000 this year out of around 9000 for the construction industry as a whole, although most do not come via building services courses. We have overtaken industries such as farming, once regarded as a significant mainstay of our economy. By any criteria that is a big success story.

Though we don’t attract the publicity or have the glamour of the architects, we are the critical industry in making a building work, which is of over-riding interest to the building occupants. We make sure that, using least fuel and energy, a building’s temperature over a wide range of climatic conditions is acceptable, that it is adequately and attractively lit, that essential services are provided, that air quality is good, that wastes are dealt with and that the building is adaptable and can accommodate newer technologies and changes of use over the building’s life.

And yet as events over the past few years have shown, we live in a rapidly changing world and cannot take the current state of affairs for granted. We live in a world where the unexpected is almost becoming the norm. Apart from 9/11 and war in Iraq; take the growing evidence of unprecedented climate change; the huge growth and equally rapid collapse of the ‘dot.com’ bubble; the financial crises sweeping the globe, with once mighty corporations imploding; the lack of ethical standards in the accounting industry leading to widespread distrust in big business; the way in which uncertainty over the pensions market means that our assumptions about our retirement are no longer valid. And of course the onward march of globalisation, a seemingly relentless process supported enthusiastically by our own government. Despite the success over the past few decades, our industry is not immune to change. As a service industry we are highly dependent on many of these wider external trends and on other factors only just beginning to emerge.

Some would argue that we are now the indispensable industry in the construction process. I don't. As I shall argue shortly, even though we have been a very successful industry, and have taken on a great many extra functions bringing added value, warning signals are mounting. Change, very rapid change, is underway within construction and unless we respond quickly, creatively and with focus, we may find that a substantial part of our future earnings and work has disappeared.

Failure to recognise this and to move into areas and activities where we are needed will leave us in a worse state than farming, fishing, shipbuilding, textiles and mining. Our rapid rise will merely have preceded an even faster plummet into obscurity.

As your President and someone whose job with Hoare Lea is to look ahead beyond the immediate horizon, I would not be doing my job at CIBSE this year if I did not spell out what I see as trouble ahead. I will argue that unless we respond positively to our changing world and some key trends now emerging, and step-up the speed of our ability to use knowledge, CIBSE as an organisation may not exist as a substantial member organisation in the year 2020.

However if we are positive about change and do grasp the opportunity, we can create new roles and much greater value-added than today. That's why the theme of my Presidential Address to you and a major theme for me throughout this year is: 'Adapt or Die'.

Adapt or Die

Let me briefly outline my thesis.
Imagine the construction process and the life of a building as a sandwich. One slice of bread is the briefing, footprint design, concepts and budgets for the building. The filling in the middle consists of the calculations, sizing, positioning and coordination, specification, costing, manufacturing, and the construction and fitting out of the building. The final slice of bread is the operation and maintenance work needed to keep the building working well and make future change of use possible.

Right now our industry is doing very well in making a decent living with the sandwich filling, while it is much less involved, indeed is often accused of woeful disregard, with the bread surrounding it. My over-riding conviction, backed up by emerging trends within the construction process, is that the filling in the sandwich is going to reduce significantly as computational and modelling design, standardisation and factory construction techniques cut a swathe through the work currently carried out by designers and contractors in our industry.

The Government frequently quotes the figure of 30 per cent waste, in the construction industry, which they want to see reduced. Much of that exists in the sandwich filling – our current business. Why use a consultant then a contractor to calculate the heating, cooling and lighting needs of a building and then to make installation drawings, and specify the equipment needed? New software can already do most of this, as well as price the job and transfer requirements in detail to manufacturers into the bargain. Believe me, this is already happening.

Let's take a closer look at some of the major trends affecting our industry.

The trends
I want to highlight just four of the major trends affecting us. They are:

- **globalisation** – which means that competition, and new approaches and methods already becoming common in other markets such as the USA and Japan, will affect us soon. These new methods will lead to further efficiencies and cost-cutting within the construction process; linked to this is the trend that
- **standardisation** and the integration of systems will become increasingly common. New methods, such as computer-made design and using off-site factory construction for quick assembly on-site will become mainstream;
- **climate change and the emergence of a carbon management market** will have profound changes to the economics of energy and materials use on buildings; and
- **rising concerns about health and well-being within buildings** as well as productivity, new ICT and security will affect design, briefing and the standards that we have to work to.

Globalisation and the importance of research and development (R & D)

In response to competition from overseas, many manufacturers in our industry have given up and are merely importing or selling other manufacturers' products. Quite frankly, I think that over the next decade this will be a road to extinction. Now I am well aware of the arguments about the high value of sterling adversely affecting manufacturing, and complaints that UK governments don't support industry, but with cut-throat competition on price from overseas, investment in R & D and continuous product development is the only way forward. In our industry we simply don't invest enough in R & D compared to our competitors. Figures for this are hard to come by, but in 'Fairclough of Rethinking Construction', BSRIA estimates an R&D figure of £100million for construction as a whole. This represents a pathetic 0.15% of industry output. The portion attributed to the building services division was said to be so small that the figure was assumed to be in error. Meanwhile, the UK as a whole is reported to be investing 1.9% of GDP in R&D with Germany at 2.6% and USA at 2.8%. Clearly we are heading the wrong way and must urgently rethink this part of our activities.

I believe quite simply that any company that is unwilling or unable to invest in adequate R & D to develop new products and techniques is doomed, and has little chance of making a decent living within the next 5-10 years.

Some companies understand this. One company which did grasp the nettle some years ago is SAS International. Based in Reading, the company employs acknowledged world experts on specialist ceiling systems. For many larger jobs at airports they are sometimes the only company in the world that can tackle the job. This didn't happen by accident. They achieved this position by aggressive R & D, careful acquisitions and attracting high calibre people. Similarly staying ahead are; Colt in solar shading, Nuaire in efficient air systems equipment and 'Thermomax' - arguably providing the world's finest solar thermal collectors. There are some others but we need all our companies to be like these if we are to be a viable industry.

With contractors in some sectors already at barely break-even levels, simply selling on another manufacturer's equipment, re-badged or otherwise, will not allow survival.

At boardroom level, many companies within our industry ought to be looking at amalgamation with other companies able to invest in R & D, or to look at exit strategies from the industry. The lighting fittings and air-grilles markets, where we still have some manufacturing capacity, are examples of this need. It's a fact that virtually no one in these businesses is currently making money. Indeed I would argue that a number are technically insolvent. There are simply too many companies and too many component products to be supported in the market, with not enough R & D to make attractive products for the global market.

We have already seen the demise of distributed air conditioning and general lighting manufacturing in this country. It is Japanese air conditioning manufacturers with innovative split systems which now dominate the market, while innovative boilers and heating systems predominantly come from Germany. Other sub-sectors will follow in this pattern unless this R & D nettle can be grasped.

As a result of the globalisation trend, I believe that there will be a significant rationalisation and amalgamation among the companies merely importing or selling other maker's products. It's already happening and the pace will quicken over the next few years. Companies overseas who are investing heavily in R & D and have competitive products won't rely in future upon a large number of small companies to sell their wares in this country.

Contracting companies are already undergoing the sort of rationalisation unimagined a decade ago, and now consulting engineering itself is beginning to face these effects. Very few of these companies invest in R&D or in staff training and again there will need to be amalgamation, for greater efficiencies, and better products and delivery for companies to remain viable.

Standardisation and cost-cutting

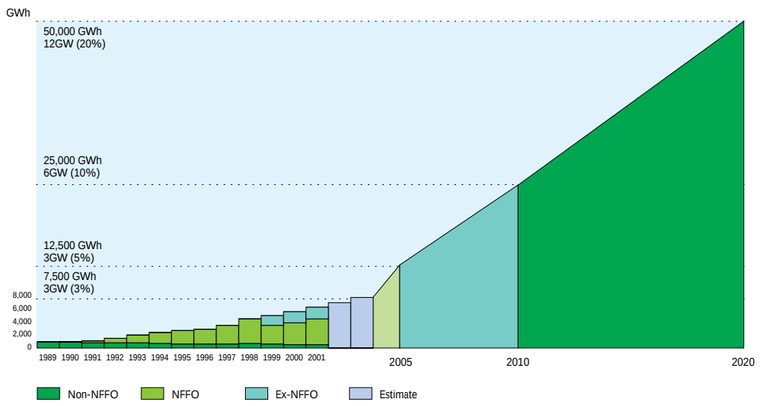
I have already touched upon this subject. Perhaps the greatest trends now emerging are:

1. the use of 'construction industry standard' software that can automatically calculate the service demands of a building as well as price the job, and the emerging Building Information Modelling (B.I.M.) that will lead to 'Attributed Objects' from which a building design will be assembled, together with

2. the emergence of factory made 'Plug and Play' assemblies of framed-up installations for rooms and plant and equipment units that reduce waste and the on-site costs dramatically whilst ensuring control over quality and performance in use.

An example of the latter will perhaps give you an insight to the future. Crown House Engineering has emerged as the leading developer of off-site factory construction of building sub-units, complete with building services equipment, piped, ducted, wired, coupled and tested as working assemblies. These units come in on de-mountable frames, and leave little work on-site to fix and connect up to the 'core' systems of the building. The process allows higher quality control and obviously significantly cuts wastes, costs and risks.

Electricity generation from renewable sources, excluding large scale hydro, 1989 to 2020



A major question arises if the impact of these first two trends is as great as I predict. What will be left for the Building Services Industry? The answer is simple – we will have to focus more on those parts of the sandwich filling which will provide a long-term living, plus crucially, the bread on either side of the sandwich. This will mean getting involved far more in the briefing and concept design of the building, as well as having a longer-term relationship in the operation and maintenance of the building, ensuring that it really does work as designed and is thereafter maintained that way throughout all adaptations. It also means re-training and taking on new functions and skills as our external environment changes. One of these new opportunities is carbon management.

Climate change and the carbon management market

Climate change is upon us. We now have a formal Government commitment to a 60 percent reduction in carbon emissions by 2050, with a set of targets for energy efficiency and renewable energy over the next 20 years. While many have complained that the recent Energy White Paper was big on vision and limited on concrete action, the fact that the Government has published such a bold view of the future is significant. Words set the tone for policies, which prepare the ground for specific actions and legally binding targets and programmes. The Government's gauntlet has been thrown down challenging us to deliver realisation of the White Paper.

In looking ahead to 2020, the Government suggests that: "The new generation of buildings could have both minimum energy requirements and produce their own electricity through new and emerging technologies such as micro-CHP, small scale wind turbines, photovoltaics and fuel cells". That's a challenge for us but can we also make it an opportunity?

The Government has given energy efficiency and renewable energy a big role in meeting the new carbon reduction targets set for 2020. It also gave a big thumbs up to emissions trading in carbon as a key policy response to climate change. That's definitely an opportunity for this industry.

How big an opportunity?

Around half of the total carbon reductions needed by the UK over the next 20 years are supposed to come from energy efficiency. The White Paper contains a set of policy measures for energy efficiency which affect everyone here today. They include proposals to accelerate the next review of Building Regulations, (just when we are getting used to the current ones); extending the Energy Efficiency Commitments (EEC) scheme to business and possibly doubling the expenditure, as well as accelerating appliance and boiler efficiency levels. Achieving a 4-6 MtC reduction from business and public buildings won't be easy. It will require a doubling of energy efficiency improvement levels at a time when energy is still very cheap, and include among other measures the need for insulating 4.5 million cavity walls and getting 160 million energy efficient lamps into the market by 2010.

The Energy White Paper further concludes that:

"Achieving these bigger and faster changes (in buildings) will require concerted effort of all parts of the industry – customers, architects and designers, the construction industry, manufacturers and other suppliers, the professional bodies, energy companies and the government itself". It also adds that: "The shift to far greater energy efficiency is also an ideal opportunity to intensify the efforts already being made to improve the productivity of the construction industry".

How well is our industry geared up to respond to this new challenge?

Well, I think we made a good start last year with, for example, the CIBSE Carbon Task Group, where we engaged with DEFRA and set ourselves specific actions and some targets.

We concluded in our Task Force that:

"Acutely aware that climate change is mankind's greatest peril and recognising that a majority of 'climate changing carbon emissions' arise from buildings, CIBSE is committed, through its Members and Patrons, to initiate and adopt processes that will redirect society to a low carbon future in pursuit of the mitigation and eventual reversal of manmade climate change. To facilitate this throughout the Property and Construction industries, CIBSE will take a leading role over the pursuit of 'Building Sustainability'."

I think we need to build on this commitment. We should lead with much more direct action across the construction and running of all buildings now that radical carbon reduction targets and implementation measures are formal Government policy.

The building services industry has a major opportunity to be at the forefront of carbon management within buildings which account for a full 50 percent of UK carbon emissions. To put that in perspective, the UK currently emits around 150 million tonnes of carbon. Assuming even the modest damage value of carbon assumed in the Energy White Paper of £70/tonne, that means being in charge of managing a tradeble commodity worth more than £5 billion a year. If we achieve the 2 percent per annum efficiency improvement the Government now wants, that's around £100 million a year in value for someone to manage. Given that the Government admits that this £70/tC figure is probably too low and misses out many climate damage impacts, the true figure by 2010 may be nearer £250 million a year. Think about that extra business for a moment.

Making buildings more energy efficient, or using more green energy, some of it embedded in the fabric of the building, suddenly has a big financial benefit. Taking over the management of that has massive potential value and it is the one our skills base is best equipped to respond to. That's why we need to be engaged in an on-going way with how buildings actually work, both now and in the future.

The danger is that we won't grasp the opportunity and will allow others to do it instead. We are already behind the curve. The rules for carbon measurement and emissions trading have been written and largely agreed by others such as the big global management consultancies, working closely with Governments. Once those consultants develop expertise in this area, it is only a short step for them to take that aspect of the value of current and future buildings. Our industry previously lost out, and is now struggling to claw-back, the business of Facilities Management (FM) and the profitable front-end parts of ICT planning. We cannot afford to miss out on the carbon management market.

We need to be a bit ahead of the game, like progressive local councils such as Merton Borough Council, which has adopted a 'positive planning' stance on self-generation within commercial buildings. Merton makes it a condition of planning acceptance that office space above 1100m^2 must generate 10 percent of its energy requirements on site. This is specifically aimed at stimulating solar thermal and photo voltaics in buildings, micro combined heat and power and fuel cells. Other councils will follow this lead.

We need to take note of adventurous local authorities such as Woking Borough Council or Nottinghamshire County Council. Woking seeks every opportunity to build in self-generation to everything from offices to car parks. It recently won a big grant under the Solar PV Major Demonstration programme to put a solar PV system on the roof of a car park, feeding the electricity into its own local grid network which can pay higher prices as well as offer a net metering deal. Notts County Council meanwhile has set up a private sector vehicle called RENU to bring modern biomass heating into its large buildings stock, as well as help stimulate local forestry and the rural economy to provide fuel.

We have work to do. Where is the expertise in our industry in this type of embedded or distributed generation? Who in this audience today could specify fuel cell, carbon capture, modern biomass or PV systems?

Our industry should be specifying these types of technologies instead of just the status quo. Assessing and then capturing the carbon values of these type of initiatives could and should be part of our future business.

Health concerns

The final trend I want to note today is that of the increased sensitivity about health in our society. Food scares such as BSE, worries about minute levels of pollution from incineration plant, and the genetic modification debate have sensitised the general public about air quality and healthy living. People are far more demanding than before about the quality of the work place. Yet despite a great deal of research and some improvements, many of our buildings are unhealthy. Sick building syndrome may be off the newspaper headlines but it has not gone away. Ventilation is still poor in many buildings, and air quality worse than it could and should be.

Even more worrying is growing evidence that hospitals, schools and doctors' surgeries are breeding grounds for disease due to poor ventilation. Brackman et al have shown that up to 30 percent of the disease unwittingly caught by patients in hospital is due to airborne contamination. While the need for rigorous cleaning by hospital staff gets the attention over the MRSA or 'superbugs' problem, air contamination is exacerbated by poor design and inadequate building standards in most parts of a hospital, clinic or school. At a time when there is due to be a massive level of new hospital building under PFI contracts, it is worrying that we may be storing up problems for the future.

Ventilation is our responsibility. Recent Danish research, on a 'personal exposure' index by Henrik Brohus, has enabled me and my colleagues to postulate a linking of methods and amounts of ventilation to the likely spread of airborne infection in:-

'The Hoare Lea adapted Wells Riley' proposition. Verification of this important research by trials involving the NHS, is planned.

Again – we have an opportunity to design better systems by taking a lead, investing in R & D and working with NHS Estates and the Government to do the job much better.

I don't claim that the above is an exhaustive list of trends affecting our industry, but they are important ones, which provide both threats and opportunities for everyone here today. In case you feel that this is all way in the future, I'd like to tell you about an industry that failed to react to such trends.

A salutary lesson from the farming industry

It was not by accident that I mentioned the agricultural industry in my opening remarks, noting that we have surpassed them in value within the economy. The history of agriculture in the past twenty years provides a salutary lesson for us all, showing what happens when an industry does not embrace change, but puts its head in the sand and hopes that the good old days will return.

You might say: 'Look - you can't compare a heavily subsidised and a mainly family based industry like farming with the competitive building services industry' - but there are some critical parallels. Let me first quote from the stack of recent reports produced on the state of the farming industry for and by the Government over the past 18 months.

The Curry Report came out last year and concluded that: "Even before the current outbreak of Foot and Mouth, many of those involved with food production in this country were saying that their industry was facing a crisis. English farmers are finding it hard to compete in an increasingly globalised marketplace. Despite a very substantial public subsidy to agriculture, farming incomes are at their lowest for 30 years….many will share our belief that things can't go on as they are."

The figures don't lie. In England alone, total income from farming fell by more than 60 percent from 1994 to 2001. Farmers continue to go out of business, and many compensated under the Foot and Mouth outbreak have not re-stocked as they do not see any viable future for livestock.

While the overall agri-food sector has grown within the economy, agriculture itself now makes up less than 12 percent of the value of the sector, the bulk of the real value coming from food and drink manufacturing, wholesaling and retailing. Among a huge number of disturbing trends and indicators of decline and influence identified by Curry, one was notable.

“In a survey conducted before the Foot and Mouth Disease broke out in 2001, 17 percent of farmers said that they definitely did not expect a member of their family to succeed them, 24 percent more thought it was unlikely”. Talk about people voting with their feet! I wonder what that figure is now?

Curry’s review came up with a new vision for the industry which was that: “We look for a profitable and sustainable farming and food sector, that can and does compete internationally, that is a good steward of the environment, and provides good food and a healthy diet for people in England and around the world”.

The government has substantially supported the Curry Report recommendations and a new strategy for farming was launched in late 2002 which provides £500 million for a new agri-environment scheme, continued expansion of premium rural and environmental schemes like Countryside Stewardship, simpler farm regulation, assistance for small regional food producers, skills development and training, and improvements in combating animal health and diseases. It’s a big commitment to a diversified and more environmentally sensitive industry who are being asked to provide healthier food to its customers.

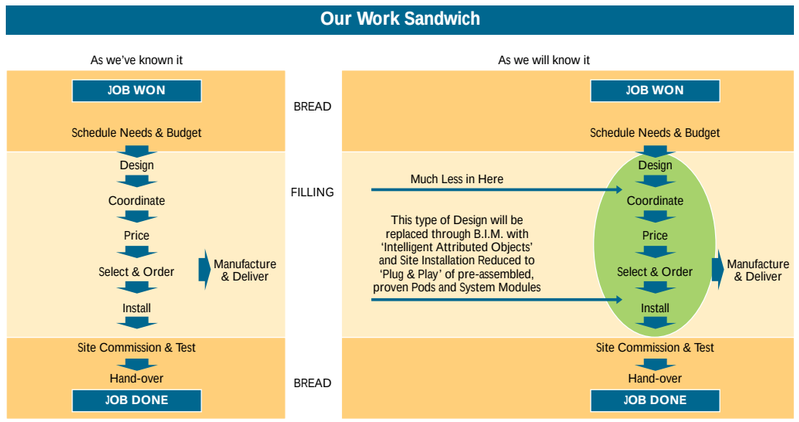
The lessons I think we need to draw from the farming crisis are that an industry that thought it was indispensable and used to a comfortable way of life was unable to respond to:

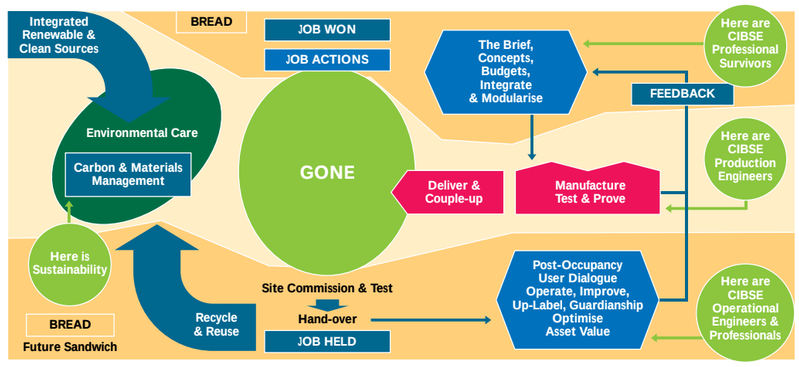
- competition from overseas;
- greater control of the market by others (e.g. supermarkets);
- value-added markets increasingly taken by others in the food chain;
- changing public tastes in food;
- greater concern over the environmental impacts of farming; and
- greater public concern over animal welfare.

The end result today is an impoverished industry struggling to cope with rationalisation, further consolidation, cost-cutting and the need to develop wider skills and new strategies. Hindsight is easy, but where were the farming industry leaders ten years ago pointing out that globalisation would inevitably lead to loss of competitiveness, the fall in common agricultural policy subsidies, and the need for new approaches? Where were the industry leaders when the signs of growing environmental and health concerns were obvious to anyone not blinkered by an addiction to the status quo of subsidies and a 40-year emphasis on production at all costs?

As your President I say that changes no less dramatic than those affecting the farming industry are already underway for our industry. We can adapt to them and take the opportunities available or we can die.

So how do we in the Building Services industry respond to these and other major trends emerging?





The way ahead

The good news is that, as well as the new worlds of work and lifestyle, global climate change, coupled to a widespread realisation of the crucial need to reform economics under the banner of ‘sustainability’ means in the context of the built environment, that CIBSE’s time has arrived. Prosperity beckons but will only be enjoyed if and when we act and change.

CIBSE must acknowledge the new realities, identify what is required and adapt itself to bring the opportunity of a continuing and enhanced future to its members and the society it serves.

So – what do we have to do to grasp this opportunity?

I would summarise this as changes to “What we do” and “How we do it”.

What we do

The best way to highlight changes in what we do is to look at a building services engineer today and one in a few years’ time. Today the engineer may be involved in a range of tasks which includes:

- assessments of ‘U’ values, condensation, heat losses and gains;
- heating/cooling emitter sizing positioning and pipe/duct sizing/routing;
- boiler, chiller, tanks, pumps and air-handling plant sizing and locating, and acoustical attenuation;
- provisions for fuel supply and storage, flues, and electrical power;
- sanitary ware layouts, drain runs, manholes and sewerage;
- lamp sizing, luminaire selection and layouts;
- cable sizing, conduit and trunking, switch and socket layouts;

- electrical switchboard and substation sizing and positioning;
- automatic controls systems scheduling and selection;
- manual 'guesstimates' of annual running costs and maintenance;
- costing advice on £/Sq.m and £/system basis;
- manual drafting, equipment scheduling and specification writing;
- materials take-offs, costing, tendering, selection and ordering;
- site craftwork; and
- site meetings and travel, correcting errors, inspections, setting to operate, and hand-over.

The successful building services engineer of tomorrow will have to embrace new working methods and retrain. He or she will be focused on some of the following tasks:

- preparing briefs and concepts for buildings;
- building information modelling;
- computer databased diagnostics for selection of optimum designs;
- attributed object orientated design;
- computational and physical modelling of building features and built environment effects;
- modularisation of serviced building units and assemblies;
- factory production of modules;
- offsite commissioning, testing and proving of modules;
- virtual operating of buildings;
- carbon management planning, implementation, monitoring and trading; and
- operating and maintaining buildings, managing investments in and operating retrofitted efficiency measures and embedded small-scale generation to up-label buildings for optimum asset value.

Are you ready for this future?

How we do it

The critical actions here are all about building relationships and identifying new roles within those relationships. To get real value from the bread in the construction sandwich I described earlier, we need to be involved in building concept design and making the building work over its lifetime. This will include:

Establishing a close relationship of understanding and respect with architects and for CIBSE a direct association with RIBA. We need to create common modules of education through 'architectural engineering' courses, and establish the general appreciation that the role and function of CIBSE and its members is to 'make buildings work'. We need to be prominent in making that case, to be visible, and to seek out lasting relationships where we make that a reality.

Following on from that we also need to develop a close working relationship with building surveyors and the Royal Institution of Chartered Surveyors. For CIBSE that means we should establish joint working parties over 'Building Labelling' and the 'Values of Building Sustainability'. Going to Government in partnership on these issue will have strong resonance.

It will mean us taking a leading role in the Construction Industry Council (CIC) over joint and collaborative working between the presently diverse facets of the construction industry. That means inputting to the 'Rethinking of Construction' so that the industry amalgamates to a single entity of purpose. We cannot be passive or reactive in this process, and go down the same road as industries like farming. For companies, that means thinking closely about what type of business they are in and what amalgamations and partnerships they need to seek out. I would urge that you do this sooner rather than later.

For CIBSE, again we need to establish a role and capability for us to be continuously involved throughout the entire useful life of buildings. Developing the Building Operations FM group in conjunction with British and International Facilities Management Organisations would be a good start. Bringing greater awareness to the media of the critical role that we have in 'making buildings work' is essential if we are to have weight in debates over the future of the construction industry.

To capture the carbon management aspects of buildings now emerging, CIBSE and its members need to extend their influence and expertise into the supply side of building energy provisions. This might initially mean incorporating distributed energy facilities into communities and buildings. It means that many of us will have to get up to speed with the use of these solar, biomass, fuel cell and other technologies, in order to work with companies and local authorities who due to national policy are seeking to implement low carbon strategies.

Solar thermal and PV is starting to creep into the equation for a small number of high profile buildings, but what about fuel cells and modern biomass heating? People think of wood heating as old-fashioned and polluting. I beg to differ. Modern biomass heating is compact, automatic, highly efficient, carbon neutral and with very low pollution levels. This photo shows a modern biomass system used by Fischer the well-known ski and aerospace company in Austria. Using wood chips from the local area the system provides highly reliable cooling, heating and power under an innovative heat contract. Local authorities across the UK are now seeking to use local forestry residues in modern biomass heating systems. With 25-50 percent capital grants, the time is right to look at these type of systems in the UK.

Other opportunities for CIBSE and its members include:

- the need to take ownership of the recognised point of reference for Government and EU over the performance of buildings in meeting user and society needs, particularly over user productivity and on climate change mitigation issues, and;
- CIBSE becoming a key source of information and useful advice on the facts of the changing climate, of its effects on existing and future buildings over time
- market transformations so that people will want what we have to offer which is, after all, in their best interests, although they may not appreciate that yet. In this respect socially responsible investing by the Institutions is beginning to bring sustainability issues to the fore.

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Conclusions

Our world is changing dramatically and the pace at which this occurs is speeding up. Assuming that lessons from the past will guide us in the future no longer runs true. Uncertainty is the norm today and the only thing that we can bank on is sustained and rapid change.

In that context it is crucial that we take a cold clear look into the future for our industry. We need to face-up to both previous shortcomings and the emerging new requirements and move swiftly to take advantage of the opportunities they represent. The world will not wait for us to latch on to its needs. Others will step in if we refuse or are unable to adapt to the new realities.

I believe that our industry has the skills, experience and imagination to be very successful in the turbulent world we are living in, and can adopt the new skills and approaches needed. But we will have to be bold and take a greater leadership role than ever before. It is a time for courage amidst great change. The pay-off for us all is not just having a viable living, but the fact that our work will be challenging and highly skilled.

Viewed from the prospective of the peril to mankind coming from manmade climate change, the challenge to us over its mitigation and the creation of a low carbon future could not be of greater magnitude. Yet we have the skills, experience and creativity to respond to that challenge.

Adapt quickly and our future is only limited to the horizons we set. But fail to adapt and we, with 150 years of heritage, will fast fade into obscurity.