

## REPORT

### 42<sup>nd</sup> INTERNATIONAL UNIVERSITIES POWER ENGINEERING CONFERENCE (UPEC 2007)<sup>#</sup>

4-6 September 2007, University of Brighton, Brighton, UK

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University of Glasgow, UK

The 42<sup>nd</sup> International Universities Power Engineering Conference (UPEC 2007) was held 4-6 September 2007 at University of Brighton, Brighton, United Kingdom. This conference, held annually, continued its tradition in providing opportunities for professional engineers, particularly young engineers, from both industry and academia to share ideas, explore recent developments, current practices and future trends in all aspects of power engineering and related fields. UPEC 2007 was of similar standing to previous conferences by the high quality of the presentations, the technical content of the papers, and the delegates attending. As in the past, it had a broad theme, covering all aspects of electrical power engineering, and was attended by academics, researchers, consultants and members of the manufacturing and electrical supply industries. During the sessions, 217 papers selected from approximately 300 uploads from more than 30 countries were included in the Proceedings and debated. Professor Julian Crampton, Honorary UPEC Chair, Vice Chancellor, University of Brighton opened the conference. There was a Keynote speaker, 34 technical sessions, an opening Session and a closing session. There was also an exhibition in the foyer of Westlain House on the campus for the duration of the conference. All papers in the technical paper sessions were presented orally in five groups of parallel sessions with 15 minutes allowed for each presentation. The high standard of the papers, presentations, and technical discussions was particularly gratifying.

The first full conference was held at the University of Glasgow, UK, in 1967, following an inaugural meeting in Newcastle upon Tyne in 1965. Last year the conference was held at Northumbria University, Newcastle-upon-Tyne, UK and the previous year at University College Cork, Cork, Ireland. The 43<sup>rd</sup> (2008) conference will be hosted by the Università degli Studi di Padova (University of Padova), Padova, Italy, 1-4 September 2008. Future venues under consideration by the International Steering Committee include Strathclyde University, Scotland (2009); Cardiff University, Wales (2010 tentative); South Westphalia University of Applied Science, Germany (2011 tentative); and Brunel University, London, UK (2012 tentative), The working language at all meetings is English.

This year, the technical co-sponsors included IET; IEEE/PES/PELS, Institute of Physics, and CIGRE, Industrial co-sponsors included ERA Technology, Tyco Electronics, Hubbell, Brighton and Hove City Council, and the University of Brighton. The conference was hosted at the Falmer campus of the University of Brighton. It was residential lasting 3 full days with en-suite accommodation provided in the University Halls of Residence on the campus.

#### 1. OPENING SESSION

Dr Peter Howson, Chair of the Organizing Committee, and Dr Nigel Bish, Co-Chair UPEC 2007 welcomed delegates and accompanying persons to the conference, Brighton and the UK.

Peter Howson said that the conference has run for over 40 years with considerable success at numerous venues. It was extremely gratifying to see the high level of interest this year's conference has achieved. UPEC 2007 has attracted papers of consistently high quality and originality; the proceedings thus representing a prestigious research archive of more than 600 authors. He said that having read a number of the papers, he would like UPEC 2007 to be remembered for a number of desirable qualities: its innovative

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<sup>#</sup> This conference review article was prepared by T. J. Hammons, Permanent Secretary UPEC, Chair, International Practices for Energy Development and Power Generation IEEE/PES, University of Glasgow, UK.

new topics for sessions; the demonstration and evaluation of original ideas; a spirit of eagerness for the exchange of ideas, synergy, and collaboration.

There is currently much discussion about the contribution electrical power makes to national and international prosperity. New technologies involving intelligent and knowledge based systems, asset management and power security are fundamentally important to the development and expansion of growing economies around the world. The UPEC series of conferences is absolutely essential to this theme, and will make an important contribution in the coming years. At the same time there is a respect for our environment. It must also respond to the growing needs of industry and commerce, ultimately customers and users of technology. The UPEC conferences must adapt to follow '*current*' and future trends and needs; stagnation at all cost must be avoided.

He said thanks are due to the many people who have given their time and goodwill freely with the aim of making the conference a success. He expressed his appreciation in particular to Dr. Nigel Bish in organizing this year's conference, also to Dr. Simon Walters who assisted considerably in the preparation of the conference publications. In addition, he thanked the keynote speaker, session chairs, residential and catering staff, the local and international steering committee members, the authors, and the presenters of papers.

Nigel Bish then outlined the aims of the conference, summarized the detailed organization of the meeting, and reviewed the program. He said that over 300 abstracts were received from all five continents. After a review carried out by the International Review Committee, papers reflecting the effort and knowledge of engineers and allied scientists from more than 30 countries have been published in the Proceedings. All these papers, after being judged for their affinity to the subject of the conference in abstract form, were then reviewed in full form by a committee of competent scientists and feedback was provided to improve the quality of the papers whenever necessary. 217 papers from more than 30 countries had been included in the Conference Proceedings. He said that papers were to be presented orally in five parallel groups of sessions. The full conference papers have been published hard copy in two volumes (1234 pages) and on a CD-ROM, and are distributed to delegates at the Conference. The papers would be presented by their authors and discussed in the sessions

Professor Julian Crampton, Vice-Chancellor of the University of Brighton, then formally welcomed delegates and accompanying people to the host university and the City of Brighton and Hove. He highlighted the fact that this was the second time that Brighton had played host to this very important international conference, the previous occasion being 16 years ago. Professor Crampton emphasised the role that the University of Brighton had played over the years in training people in the area of power generation and what an important impact this had had, both within the UK and internationally. Indeed, Brighton alumni in this field now played very important roles in leading the power generation strategy in a number of countries, especially in Malaysia and South East Asia. Professor Crampton then thanked the organising committee and local organisers for creating such an exciting programme and wished delegates a fruitful and enjoyable conference.

## **2. PLENARY LECTURE**

This followed the Opening Remarks and was given by Professor Cliff Walton, Technical Director, Cre8energy, UK.

His presentation was entitled: Planning energy for a sustainable world

He began by saying that the theme of "Planning energy for a sustainable world" seems particularly appropriate in the year that UPEC comes to Brighton as the City has a very strong claim to be the home of sustainable public electricity supply. It was in late 1881 that the world's first public electricity supply was provided in the Surrey town of Godalming just 40 miles from Brighton, although this closed after just a few years operation. However, just a few months later in December 1881, Robert Hammond demonstrated the new electric light in Brighton and following its success the Hammond Electricity Supply Co. was launched and by

1887 the supply was available 24 hours per day as it has been ever since. Brighton has had a long track record as a home for free thinkers and it is important that as UPEC meets to consider development in the power sector we understand and actively engage in sustainable solutions for our world and the careers of our brightest engineers too.

In considering these matters we will look briefly at some of the challenges and opportunities in:

- Sustainability & Climate Change
- Pathways to a Low Carbon Economy
- Urban Energy Systems
- Smart Networks
- Energy Management Systems
- Changing the World.

And along the way perhaps pose some provocative questions for you to consider.

## **2.1 Sustainability and Climate Change**

### **The tipping point**

Sustainable development is now new and usually considered to be *“development that meets the needs of the present - without compromising the ability of future generations to meet their own needs”* as set out by the UN Brundtland Commission as far back as 1983, but.....

Suddenly everyone is talking about climate change, green house gases, carbon emissions and sustainability – governments, politicians, businesses, international agencies and the person in the street. Every day brings a new proposal and headline. The whole issue has moved from being one pushed by lobbyists who were either regarded as extremists or cranks to a mainstream political and business issue -and this has happened very quickly.

Examples of headline grabbing events can be found in the media almost everyday not only from the UK and Europe but from USA and China too.

The US is often stated to be the main impediment to the implementation of climate change policies – and yet.....

- Former Vice-President Al Gore wins an Oscar for his environmental documentary “An Inconvenient Truth”
- In the 2007 State of the Union Address President Bush announces the goal of reducing U.S. gasoline usage by 20% in the next ten years
- A private investor group’s \$32 billion bid to buy TXU includes cancelling its plans to build eight coal-fired power units and making major concessions on pollution
- California, Arizona, New Mexico, Oregon and Washington state will draft a carbon trading scheme similar to one set to get underway in eight north-eastern US states in 2009.

The UK Government proposes legally binding carbon emission targets:

- David Cameron proposes taxing air journeys
- The Stern Report is published and
- ..... a White Paper
- Much stricter targets are being put forward for the second phase of the EU Emission Trading Scheme.

In March 2007 Chinese Premier Wen detailed plans to shut down "backward" steel and iron foundries and inefficient, polluting power plants. He said development projects would have to meet national environmental standards and vowed that China must "bring pollution under control."

And there are many more with new quotes being added almost every day. How many more have you seen?

## **The Climate Challenge**

The Stern Review on the Economics of Climate Change, commissioned by the UK government was published in October 2006. In this wide ranging report Sir Nicholas Stern reported that:

- the costs of action to reduce greenhouse gas emissions to avoid the worst impacts of climate change can be limited to around 1% of global GDP each year
- each tonne of CO<sub>2</sub> that we emit now is causing damage worth at least \$85 – but these costs are not included when investors and consumers make decisions about how to spend their money.

Schemes that allow people to trade reductions in CO<sub>2</sub> have demonstrated that there are many opportunities to cut emissions for less than \$25 a tonne.

The shift to a low-carbon economy will also bring huge opportunities with markets for low-carbon technologies

Stern concludes that tackling climate change is the pro-growth strategy; ignoring it will ultimately undermine economic growth. In the second half of the Review Stern examines the national and international policy challenges of moving to a low-carbon global economy. Three elements of policy are required for an effective response:

- Carbon pricing, through taxation, emissions trading or regulation, so that people are faced with the full social costs of their actions building a common global carbon price across countries and sectors.
- Technology policy, to drive the development and deployment at scale of a range of low-carbon and high-efficiency products.
- Removing barriers to energy efficiency, and to inform, educate and persuade individuals about what they can do to respond to climate change.

The conclusion of the Stern Review is essentially optimistic, there is still time to avoid the worst impacts of climate change if we act now and act internationally. Governments, businesses and individuals all need to work together to respond to the challenge. Strong, deliberate policy choices by governments are essential to motivate change, but the task is urgent. Delaying action, even by a decade or two, will take us into dangerous territory. We must not let this window of opportunity close.

## **2.2 Pathways to a Low Carbon Economy**

The world has large amounts of renewable resource including, wind, wave, solar and geothermal, etc., for us to harness. Conferences such as UPEC have many papers looking at the technologies to deliver renewable and low carbon electrical energy, and we can expect these will include many ideas that now are only at the concept or prototype stage and have yet to find their full potential. Looking briefly at the example of wind generation we can see that we have come a long way from individual 50kW machines with rotors of just 15m diameters to the funding of massive offshore arrays of 5MW machines of 125m+ diameter, and in just 20 years. If today's new ideas are to have real impact, then the lesson here must be that not only do we have to have the bright ideas, but we also have to use all our ingenuity, innovation

and engineering skills to not only develop the best ideas but also to work hard and fast to scale them up, improve their reliability whilst driving costs and resource requirements down. Not forgetting the need to create the incentives and business cases for widespread effective deployment, connection and control.

In thinking about generation and connections don't forget the losses. Electrical losses on distribution power systems can range from 4% (Japan) to over 50% in developing countries. The reasons for such wide variation are many and complex but include economics, investment, technologies, resources, skills, processes, theft, corruption, politics, incentives, punishments and priorities. The impacts of high losses upon the economic viability of utilities can be severe. The long term impact upon the growth and economy of countries and the impact on the environment, carbon emissions and climate change are of equal concern. As these issues are often hidden and poorly understood, what can *we* do about this?

Think also about the impact that politics, planning and incentives can have too, as these can be at least as great as those of the latest technology idea. Consider the potential impact on distributed generation that may occur as a result of alterations to the London Plan published in February 2007 which specifically require new developments to have energy supplied by CCHP wherever feasible and to reduce their CO<sub>2</sub> emissions by a further 20 per cent through the production of onsite renewable energy generation.

## **A Financial Perspective**

Changes such as those discussed will have significant impact on the level of investment that is required and this presents once in a lifetime opportunities. Consider some figures for the UK (Ofgem):

- Value of GB electricity networks: Transmission £6.2bn, Distribution £13bn
  - Distribution accounts for 21% and transmission 3% of average domestic bill
- The RPI-X price controls were very successful for customers:
  - Electricity distribution charges down 50% real since 1990
  - Electricity transmission charges down 40% real since 1990.

But agreed new investment (Distribution to 2010 & Transmission to 2012) has to rise sharply to total £10bn to deal with the changes in generation and asset renewal.

In the same way, it is estimated that EU Member States will need to invest over £0.5 trillion in power infrastructure over the next 30 years according to the IEA – World Energy Investment Outlook 2003.

Do we understand smart investment and well as smart networks?

## **Organisational and Market Structures**

Privatisation, unbundling and restructuring of markets have been progressively with us in the UK since 1990 and variants of these ideas for reducing costs and improving service can now be found all around the globe. Do we now need to ask ourselves what kinds of business structures, and incentive regimes, will produce sustainable low carbon economies as well as low cost:

- In developed countries?
- In developing countries?
- Amongst the third of the worlds population still without access to electricity?

### **2.3 Urban Energy Systems**

In 2008, the world will reach an invisible but momentous milestone, for the first time in history, more than half its human population, 3.3 billion people, live in urban areas.

By 2030, this is expected to swell to almost 5 billion. The impact of Urban Energy systems is immense and accounts for more than 75% of our energy and CO<sub>2</sub> emissions. London's Ecological Footprint is estimated at more than twice the size of Great Britain.

### **London's Energy Usage**

- 35.7% resource use (goods and services)
- 23.6% food consumption (including its transport)
- 19.5% direct energy consumption
- 13.9% personal transport
- 7.2% other consumption.

If cities are now home to more than half of the world's population and account for more than 75 percent of world energy use, what are you going to do about it?

### **2.4 Smart Networks**

Recognising the need, some radical changes to the way electricity networks are designed and operated in the future are needed. The EC have created the Smart Grids programme that will over coming years explore the way that such new sources of energy can effectively be integrated and controlled. Some of the developments that seem likely to find their way into networks of the future include:

- Active" Distribution Networks
- Wide area measurement-based control (as opposed to model-based control)
- Integrated power electronics
- Real-time security assessment
- Sustainable/controlled islanding
- Multi-vector micro-grids.

The EC have published "SmartGrids: ensuring tomorrow's electricity networks will be fit for purpose, across Europe", a Vision document, and a Strategic Research Agenda. The EC Framework-7 provides for some €2.3bn over 7 years for energy research.

How does your research work and ideas fit with these broad concepts? How can you engage with this opportunity to make a difference?

### **Smart Asset Management**

In considering all the changes that are/will be necessary to connect and operate networks of the future, we must not forget that the many of the existing infrastructure is coming to, or has already exceeded, its originally planned lifetime. The costs and environmental impacts of their renewal will dwarf those of creating smart networks. Creating the tools to understand and predict the life of assets and techniques to extend life and to actively manage risk, will be ever more important from economic, resource and sustainability perspectives. A selection of such opportunities, many but not necessarily all of which are the subject of conference papers, include:

- Switchgear & Terminations: Condition Monitoring, Life Extension, Alternatives to SF<sub>6</sub>, Maintenance free

- Transformers: Summer Rating enhancement, Condition Monitoring, Alternatives to Oil, Maintenance free tapping, Solid state Tap-changers
- Cables: Condition, Ageing, Alternative materials, Distributed compensation
- Lines & Insulators: Enhancing Ratings, EMF management, Reducing Visual impact, Condition Monitoring, Incipient Fault Detection & Location
- Lightning & Earthing: Improving storm performance, Enhanced line design, Remote on-line condition monitoring
- Surge arrestors, Earthing, Transformer protection, Dynamic earthing systems
- Poles & Trees: Assessing condition and risk, Detecting & locating incipient failure, Vegetation management
- Distributed Energy Resource: 1kW – 1GW + Storage, Connecting, Protecting, Fault level management, Voltage Control, Control & Risk Management, Active Control.

Are Smart Grids without smart asset management systems sustainable?

## **2.5 Energy Management Systems**

Energy Management Systems (EMS) has the potential to enable energy consumers to intelligently manage their energy consumption and to optimise their cost and carbon impact. The same EMS can enable energy suppliers, generators and distributors to make efficient and environmentally friendly use of energy resources, reduce carbon emissions, and manage their business efficiently. They also offer higher levels of customer service, develop and deliver innovative energy solutions to their customers, increase the efficiency of distribution networks, whilst encouraging the use of distributed generation capabilities.

Smart metering is a key part of, but in practice only a subset of a comprehensive EMS. Energy management also requires 2-way information flows, but the real key to EMS is understanding and managing information and making it available across the whole electricity value chain.

If most elements of EMS technologies already exist, at least in demonstration form, how can regulation, incentives and business cases be developed to create and deliver all these sustainability benefits?

## **2.6 Changing the world**

### **Innovation**

Innovation is often defined as “the successful exploitation of new ideas”. Yesterday’s solutions are unlikely to solve tomorrow’s problems, so can fresh thinking deliver more efficient capital investment, or new energy sources and ways to connect? Can we operate intelligently to cut costs and minimise outage risks, how can we develop low carbon sustainable systems?

Two years of experience with OGEM’s: Innovation Funding Incentive (IFI) and Registered Power Zones (RPZ) for DNOs in the UK have brought about a substantial increase in the level of investment in research and a renewed level of interest in the impact of innovation on business performance. Some 187 IFI projects have been reported so far to the Ofgem web site. Along the way six specific actions to assist the process of innovation have been identified:

- Quantify the benefits of innovation in financial terms – however problematic that is to do
- Work through a stakeholder forum: technical, regulatory, commercial and environmental
- ‘Cut a little slack’ in investment appraisal processes to facilitate innovation
- Seek out and encourage the engineers with vision (they are a rare and valuable resource)
- Engage the insights and support of senior management

- Ideas are easy (!)--put your focus on the barriers to deployment and commercial rollout.

## **Collaboration**

Don't try to do it all yourself, some of the best projects we have seen include researchers from very different backgrounds and from different institutions collaborating together.

*“One of the greatest things we have learned is that whilst two businesses operating alone may be successful, a positive working cooperation between them can be a powerful combination, increasing their success exponentially.”* Vincent Tchenguiz CEO, Consensus Business Group).

## **The Key Ingredient –You**

Walton concluded by saying that the issues we have discussed in “Planning energy for a sustainable world” require professional engineers who can think globally and act locally, and who are visionaries who ask, “how can we do the job better”. Remember, the technology alone is not enough. Be willing to go back to first principles, and use professional institutions as your launch pad.

We see that energy systems are facing the most significant challenges and opportunities that have occurred for a lifetime. There is an increased focus on energy by governments, agencies, businesses and everybody you meet.

There is significant scope for new thinking and the world requires excellent engineers, excellent engineering, vision and a commitment to delivery.

In short, your country and indeed the world needs professional electrical engineers - just like you.

## **3 TECHNICAL PAPER SESSIONS**

Topics debated in the five parallel groups of technical paper sessions on the first day included: Power Generation, Power Utilization, Future Power Networks, Electrical Machines & Drives, System Integrity & Protection, System Operation & Control, High Voltage Engineering & Dielectrics, Expert Systems, Power Quality, Power Electronics & Devices, Renewable Energy Systems, Electromagnet/Electrostatic Effects, Distributed Generation, Power HV Education/Lightning Protection, and Power Conversion.

On the second day, there were further parallel groups of sessions on Power Generation, Power Utilization, Future Power Networks, Electrical Machines & Drives, System Integrity & Protection, System Operation & Control, High Voltage Engineering & Dielectrics, Expert Systems, Power Quality, and Power Electronics & Devices.

Topics debated in parallel groups of technical paper sessions on the third day included topics debated on the first two days

## **4. OTHER CONFERENCE HIGHLIGHTS**

These included:

- Welcome Buffet Refreshments at the Main University Campus on the Monday before the Conference.
- The Civic Reception on the Tuesday evening at the University's Grand Parade Campus, Brighton. The worshipful Mayor of Brighton and Hove presided over the evening. It included drinks and a buffet reception. The Grand Parade Campus (adjacent to the Royal Pavilion) is famed for its arts and architecture courses.



- Five Cultural Excursions on the Tuesday afternoon that included (i) Royal Pavilion, the home of The Prince Regent (later King George IV); (ii) Royal Observatory situated in Herstmonceux near Hailsham, East Sussex. The telescope was originally located in Greenwich London but was moved shortly after World War II due to light pollution in the City; (iii) The Dark Star Brewery, a small single Barrel brewery set up originally as Skinners Arms in 1994. It later became the Dark Star Brewery Company in 1995; (iv) Shoreham Airport; and (v) Bluebell Railway that was the UK's first preserved standard gauge passenger railway, re-opening part of the Lewes to East Grinstead line of the old London Brighton & South Coast Railway in 1960.
- Conference Banquet on the Wednesday evening at the Regency Suite of the prestigious Metropole Hotel located on the Brighton seafront. Here, the Guest Speaker was John Walker of EA Technology. Local musicians provided musical accompaniment during the evening.

## 5. CIVIC RECEPTION

This was on the Tuesday evening at the University's Grand Parade Campus, Brighton. The Right Worshipful Mayor of Brighton and Hove, Councilor Carol Ann Theobald presided over the evening. It included drinks and a buffet.

The Mayor first thanked UPEC for inviting her to the Reception that evening. She said that she had been asked to say a few words about the engineering history of Brighton. Her talk is summarised below:

*'Magnus Volk was a famous local inventor – one of the greatest of all Brightonians.*

*In 1879 he established the first telephone link in Brighton and in 1880 fitted electric lights in his own home. The following year, in his workshop in Ditchling Rise, he demonstrated a fire alarm connected to the Police Fire Station at the Town Hall.*

*In 1883 he installed in the Royal Pavilion electric lights – illumination of Dome, Corn Exchange, Museum, Art Gallery, Library and Pavilion Grounds*

*Built an electric car*

*On 4<sup>th</sup> August 1883 he demonstrated Volks Railway – the first public electric railway in Great Britain –, which still runs today.*

*Oil lamps originally lighted the streets of Brighton. In 1881 Charles Siemens placed temporary electric arc lamps along Marine Parade. Permanent lamps were installed in 1893*

*In 1818, the Brighton Gas, Light & Coke Company provided the first gas supply in the town. The company built a coal gas production works at Black Rock.*

*Pavilion Gardens were the first to be lit, and gas lighting was installed in the principal rooms of the Royal Pavilion.*

*A water supply was first piped into Brighton in 1834. Brighton, Hove and Preston Water Works supplied it. It provided water for ten privileged houses for two hours a day. The water came from a well and pumping station in Lewes Road (Saunders Park).*

*The Brighton, Hove & Preston Constant Water Service Company was founded in 1853. It absorbed the older Company the following year, extending the supply of water to 7,000 homes. In 1866 – the Company opened a large new waterworks that was extended in 1876. In July 1872, under the terms of the Brighton Corporation Waterworks Act, the Corporation purchased the Constant Water Service Company for £321,000, supplying some 18,000 homes with 2.6 million gallons per day.*

*Some ninety years after Brighton was established as a fashionable resort, the railway between London and Brighton was built in 1841, and this brought great changes to the town. I must add that the town of Brighthelmstone, as Brighton was then known, probably became fashionable because of the flamboyant Prince Regent, George IV, and his Royal Pavilion – and also Dr. Russell with his sea water cures, which were extremely popular. Sea bathing, and drinking seawater with cream of tartar and milk was supposed to be good for your health!*

*The town's population rose by 41% between 1841 and 1851.*

*The British Railway Locomotive Works was established in the 1850's and closed in 1957 when it was converted over to producing Isetta. At its peak it employed 3,000 men and was producing one steam railway locomotive each week. Two examples of these are still running on the Bluebell Railway. The numbers significantly increased in the 1930s with the advent of the main line electric train. The train could run at a record time of 48 minutes 41 seconds – even in those days. The most famous luxury train was the 'Southern Belle', in November 1908. Passengers had to pay a one-shilling supplement. It was sheer luxury, and friends of ours have purchased some wonderful leather armchair seating from that train which they use in their dining room. This train was formally re-named the 'Brighton Belle' in 1934 by the then Mayor, Councillor Margaret Hardy. The train provided good refreshments, and in 1970, Lord Olivier led a successful protest against the withdrawal of kipper breakfasts! One of the main features of the line is the viaduct between Brighton and London stations, which is listed for its special architecture.*

*At one time we had three piers in Brighton – now there is only one intact. The first pier was the Royal Suspension Chain Pier in 1823, which was for the growth of cross-channel traffic from Brighton and Dieppe. The pier cost £30,000 and was 1,154 feet long and 13 feet wide. It was extremely popular but sustained battering from several storms, and when lightening struck it in 1833 it caught fire and was badly damaged. It was repaired – but in 1896 was completely destroyed by yet another bad storm.*

*The City does have an Engineerium – a museum of industrial history with many exhibits, including the Easton and Anderson beam engine of 1876. This is situated at the former Goldstone Works in Nevill Road, Hove. This was the only remaining Victorian and Edwardian pumping station to remain, despite the efforts of Brighton Corporation to demolish it in 1972 when pumping ceased. The building was listed to prevent its destruction, and restored as the British Engineerium. The Engineerium was due for closure quite recently but, fortunately, was rescued by a local businessman.*

*| would like to end by saying that I am driven around by my chauffeur in a Toyota Hybrid, which is an environmentally friendly green car running on electricity and fuel – which is much cleaner for the environment.*

She wished UPEC a very successful conference and hoped that all would enjoy their stay in the City of Brighton & Hove.

## **6. CONFERENCE BANQUET**

This took place on the Wednesday evening at the Regency Suite of the Metropole Hotel on the Brighton seafront.

Besides the English food, there was an after dinner speech by Professor John Walker, EA Technology Ltd. UK. This was the first time that Professor Walker had addressed the conference and he used the opportunity to reflect on his lifetime in the electricity supply industry and the future challenges that it faces.

He began with a with a few humorous anecdotes of his past life in the sector from apprentice electrical fitter, to engineering manager, to Chief Executive. In doing so he drew comparison between the centralised controlled state industry of yesteryear with the dynamic, liberated and competitive market sector of today. Commenting on the march of science and technology he said that they have been extremely effective in delivering cost reduction and supply reliability goals. As a result the power industry has, in his opinion, been the most important enabler of progress in modern history.

Professor Walker reflected on the acute need for trained power engineers. He said that the need to train more engineers raised an interesting point on how people today view working in the utility world. One is the way propounded by the late Henry Ford. *'Work is a necessary evil, but modern technology will reduce it to a minimum, your life is your leisure lived in your free time'*. The other is *'make your work interesting and rewarding and enjoy both your work and your leisure'*. Which way is to be? Professor Walker uncompromisingly suggested the second way, stating in essence the resource challenge we face going forward is that our work should be interesting and rewarding. Only a job done well, as well as we can do it, and as

well as it can be done, is acceptable. We must strive for quality in what we do and never be satisfied with second rate.

Professor Walker moved on to talk about the new paradigms and said that in his vision the electricity industry is in a period of immense technological and institutional change. The choices made in such periods of change can have profound consequences on whether future opportunities are opened or foreclosed, and whether threats are eliminated or realised.

In conclusion he congratulated UPEC for its foresight and excellent programme and said it had been an honour to have the opportunity for a few remarks.

Towards the end of the Banquet, Professor Roberto Turri (UPEC 2008 Conference Chair, Padova, Italy) highlighted the main events and proposed program for the 2008 Conference that will be organized by the Department of Engineering, University of Padova and the Department of Industrial Engineering, University of Cassino, Italy, September 2008.

## 7. AWARDS

Prizes were awarded by *UPEC2007* for the Best Paper, for the Best Oral Presentation by a Researcher under the age of 30, and for the Best Paper by a Researcher under 30. Dr Tong of Tyco Electronics, Ltd., and Mr. Richard Simmons of ERA Technology, Ltd donated them.

## 8. CONFERENCE PROCEEDINGS

All technical papers were incorporated in the UPEC 2007 Proceedings hard copy (1234 pages) and on CD-ROM. The hard copy Proceedings and CD ROM were distributed to delegates at the conference.

UPEC 2007 Proceedings may be purchased (hard copy (in two volumes) and CD-ROM) for £100 Pounds Sterling, plus postage, until supplies are exhausted, from Dr. Peter Howson, UPEC 2007 Conference Organizer, and Dr Nigel Bish, Conference Administrator. Their contact details are: C/o School of Engineering, Faculty of Science and Engineering, University of Brighton, Brighton BN2; UK; E-mail: [p.a.Howson@brighton.ac.uk](mailto:p.a.Howson@brighton.ac.uk) ; [doctornigelbish@hotmail.com](mailto:doctornigelbish@hotmail.com)

## 9. UPEC 2008

In closing the conference, Peter Howson stated that the 43rd International Universities Power Engineering Conference (UPEC 2008) is to be organized by the Department of Engineering, University of Padova, and the Department of Industrial Engineering, University of Cassino, Italy and will be hosted by the University of Padova, September 1-4 2008.

It will be organized by Professor Roberto Turri (E-mail [Roberto.turri@unipd.it](mailto:Roberto.turri@unipd.it)) and Professor Paola Verde (E-mail: [verde@unicas.it](mailto:verde@unicas.it)). It will be located at the University of Padova that is situated in the northeast of Italy, 30 km from Venice and Venice airport, with frequent train and bus connections. Padova can also be conveniently reached by train from the international airports of Milano, Bologna, Verona and Treviso, which are served by numerous airlines from the UK and continental Europe. He said its aim will be to provide a professional forum for engineers and research scientists from the universities, consultants, and in the manufacturing and supply industries, to present their work and explore potential trends and recent developments, current practices in Power Engineering, and related fields. The conference will be residential for three nights. It is expected that there will be a technical exhibition by invited sponsors, and that a number of keynote addresses will be scheduled. A number of technical and cultural visits are also planned.

For more information on UPEC 2008, contact UPEC 2008 Secretariat, Department of Electrical Engineering, University of Padova, Via Gradenigo 6/A, 35131, Padova, Italy, Tel: +39.049.8277565, Fax: +39.049.8277599, E-mail: [upec2008@die.unipad.it](mailto:upec2008@die.unipad.it)

## 10 CONFERENCE WRAP-UP

Papers were well thought out and benefited from the 15 minutes allowed for presentation and discussion of each paper. The general level of the discussions was extraordinarily high and stimulating. Of particular note was the high standard of the presentations by the younger members of the profession. The pleasure the participants experienced in meeting colleagues with similar interests from so many countries should be particularly noted

Gratitude is expressed to Peter Howson, UPEC 2007 Conference Chair and Nigel Bish, Conference Co-Chair, Members of UPEC International Steering Committee, and colleagues at University of Brighton for the detailed organization of the meeting. Peter Howson and colleagues at University of Brighton are congratulated for organizing the Meeting.

T. J. Hammons  
October 1, 2007

**43<sup>RD</sup> INTERNATIONAL UNIVERSITIES POWER ENGINEERING CONFERENCE (UPEC  
2008)**

**University of Padova, and the Department of Industrial Engineering, University of Cassino**

**SEPTEMBER 1-4, 2008**

*Call for Papers*

*Abstract Deadline: February 8, 2008*

The 43<sup>rd</sup> International Universities Power Engineering Conference (UPEC 2008) will be jointly organized by the Department of Engineering, University of Padova, and the Department of Industrial Engineering, University of Cassino, and will be hosted by the University of Padova, Italy, September 1-4, 2008.

2008 will be the 786<sup>th</sup> academic year of the University of Padova. The city of Padova is located in the northeast of Italy, 30 km from Venice and Venice airport, with frequent train and bus connections. Padova can also be conveniently reached by train from the international airports of Milano, Bologna, Verona and Treviso, which are served by numerous airlines from UK and continental Europe.

It will be co-sponsored by IEEE, IET, and CIGRE. Its aim is to provide a professional forum for engineers and research scientists from the universities, consultants, and in the manufacturing and supply industries to present their work and explore potential trends and recent developments, current practices in Power Engineering and related fields. Although the forum is open to all levels of participants, the Secretariat particularly encourages young academics and research students to attend. The conference will cover all aspects of power engineering. It will be residential for three nights, and a number of technical and cultural visits are planned. The working language will be English. Accepted papers will be presented in oral and in interactive sessions.

UPEC 2008 seeks papers in all aspects of power engineering, including the following topics:

- 1) Power Generation
- 2) Power Utilization
- 3) Future Power Networks
- 4) Renewable Energy Systems
- 5) Distributed Generation
- 6) Power Quality
- 7) Power System Simulation and Analysis
- 8) Power System Operation and Control
- 9) High Voltage Engineering and Dielectrics
- 10) Electromagnetic/Electrostatic Effects
- 11) Electrical Machines and Drives
- 12) Power Electronics and Devices
- 13) Power Conversion
- 14) Power Engineering Education.

Prospective Authors are invited to submit an abstract (max 2 A4 pages) in the relevant subject area to the UPEC 2008 Secretariat, either electronically by E-mail or by PO Mail, before February 8 2008. The PO address is: Department of Electrical Engineering, University of Padova, Via Gradenigo

6/A, 35131, Padova, Italy, Tel: +39.049.8277565, Fax: +39.049.8277599, E-mail: [upec2008@die.unipad.it](mailto:upec2008@die.unipad.it). The Conference organizers are Professor Roberto Turri (E-mail: [Roberto.turri@unipd.it](mailto:Roberto.turri@unipd.it)) and Professor Paola Verde (E-mail: [verde@unicas.it](mailto:verde@unicas.it)). On the front page Prospective Authors should give the full name, address, affiliation, and E-mail address of the author to communicate with, the number of the area the paper is from taken from in the above list, the preference for presentation (oral or interactive), and title of the paper. Notification of acceptance will be by 27 March 2008. Final camera-ready papers are to be received by May 18, 2008 for final review. Style of submission will be available on the conference web site [www.upec2008.org](http://www.upec2008.org) At least one of the authors for each paper will be required to register and attend the conference. Registration will be available on the conference website.