IAEE International Association for Energy Economics
WWW.IAEE.ORG

Newsletter

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Fourth Quarter 2006

President's Message

The year 2006 is drawing to a close. This *Newsletter* is the opportunity for us to look back on some of the activities of our Association over the past few months. The North American conference at Ann Arbor, "Energy in a World of Changing Costs and Technologies", organized by Shirley Neff and David Nissen was a great success with over 200 participants, 30% of whom were from countries other than North America. The plenary sessions covered particularly interesting topics centered on the state of North American energy but also focused on more general topics such as new technology in the automotive field or the current challenges that oil markets face. One of the main features of IAEE conferences, as is frequently commended by participants, is the opportunity they provide for networking with a wide range of energy economists from very varied backgrounds. To provide even more opportunity for this type of contact and discussion, the organizers this year introduced a new formula by arranging an evening of informal discussion on a variety of subjects over a buffet dinner. The relaxed setting, the possibility of getting into detailed discussion with specialists and the variety of the subjects discussed turned this into a truly memorable occasion. The organizers also implemented an expanded student best paper award program and during the conference, eight students received awards for their work. I think these are ideas to be retained for future conferences and I thank Shirley Neff and David Nissen once again for their innovative work, their commitment and the hours they spent putting together and orchestrating such a stimulating event.

IAEE membership is still largely concentrated in North America and Europe. In addition to the annual international conference, the association organizes a North American conference and a European conference on a regular basis. To attract new members, the IAEE Council, with the agreement of its regional affiliates in Asia/Oceania, has decided to support the organization of regional conferences in that area. The first of these events is to be held in Taipei in 2007, with Jeffrey Bor, as the Conference Executive Director. The presence of the region will also be reinforced within the Association by the creation of a new position of representative for Asia/Oceania in addition to the existing representatives for the North American and European affiliates. This decision required a change in the IAEE bylaws, which was done during the Council meeting held at Ann Arbor. We took this opportunity to introduce other slight modifications in the bylaws such as the possibility of electronic voting or conferring the responsibility for strategic planning to the President-elect in liaison with the Vice-President for Development and International Affairs. The new bylaws can be found on the IAEE website in the 'members only' section.

On the initiative of Arnie Baker, when he was President in 2005 and under his guidance this year, the Council has began a strategic planning process on the future of the Association, resulting in the drawing up of an IAEE Mission Statement (available on our web site under the heading "about us"). A second document outlines the IAEE's "Vision" (how the IAEE should ideally be perceived) and states precise ob-

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Editor's Notes

Peter Davies and Neelish Nerurkar, using data from the 2006 BP Statistical Review of World Energy, discuss the global energy "story" of 2005 and 2006. They note that despite the dominance of high prices, supply availability has been maintained; markets have worked and adjustments made and will continue to be made.

Majid Al-Moneef discusses energy security of supply from the perspective of an oil and gas supplier in the mid-

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From Restructuring to Sustainability: Energy Policies for the 21st Century

30th IAEE INTERNATIONAL CONFERENCE

18-21 February 2007
at Pipitea Campus, Victoria University, Wellington, New Zealand
Register now at www.vuw.ac.nz/iaee07

Conference Themes and Topics

1. Taking Stock: Two Decades of Deregulation and Restructuring in Energy Markets

- Country case studies on restructuring experience
- New market experiments in Africa and Latin America
- Comparative studies of reform outcomes
- Is a systemic approach to institutional design feasible?
- Obstacles to uptake of demand-side and decentralised-energy opportunities in restructured markets
- Investment coordination and infrastructure adequacy
- Electricity and gas market design issues

2. Looking Forward: Energy, Poverty, and Sustainable Development

- Energy poverty: evidence and policy issues
- Economics of decentralised and renewable energy technologies
- Electricity access for the poor in Africa, Asia, Latin America
- Making the power sector sustainable in developing economies
- Cross-border energy trade and the poor
- Consequences of rapid growth in China and India
- Energy and development in small islands in the Pacific and elsewhere

3. New Market Drivers: Emerging Global Markets for Carbon and LNG

- Cross-border energy trade and arbitrage in LNG and carbon
- Growth and structure of the global LNG market
- New transportation technologies for LNG and bulk CNG
- Price relativities between oil and LNG
- New market instruments for trading GHG abatement opportunities
- Recent developments in the global institutional backdrop for GHG abatement efforts
- Climate-change policy responses in New Zealand, Australia, and elsewhere

4. Old Habits Die Hard: The Future of Oil and Coal

- Geopolitics, oil prices, and energy security
- Is a nuclear comeback likely?
- The economics of emerging technologies for carbon capture and storage
- Alternative liquid fuels to replace oil
- New transport fuels and technologies

Keynote Plenary Session Themes

- **Energy Market Design Experience, Lessons and Issues**
- **Network Expansion, Infrastructure Adequacy, and Crisis Management in Decentralised Electricity and Gas Markets**
- **Energy, Poverty and Sustainable Development**
- **The Global Market for LNG: Technologies, Arbitrage Opportunities, and Consequences for National and Regional Energy Markets**
- **The Future of Decentralised Energy Systems**
- **New Zealand, Australia and The Pacific Energy Issues**
- **Climate change policy Beyond Kyoto 1**
- **Energy Security in Asia**

Register now

Go to www.vuw.ac.nz/iaee07/registration.html to register online or to download the registration form.

Early Bird Registration ends 30 November 2006

The Holiday Inn is the main conference hotel. For booking details visit www.vuw.ac.nz/iaee07/accomodation.html. We advise you to book flights early as the trans-Pacific routes have limited capacity for summer travel.

IAEE BEST STUDENT PAPER AWARD: US $1,000 cash prize plus waiver of conference registration fees. If interested, please contact IAEE headquarters for detailed applications/guidelines.

STUDENT PARTICIPANTS: Please inquire about scholarships for conference attendance to iaee@iaee.org

www.vuw.ac.nz/iaee07

Registration is available online on the conference website www.vuw.ac.nz/iaee07

President's Message *(continued from page 1)*

jectives for conferences, the evolution of membership, publications and operational issues. These two documents are available on the web site in the 'members only' section. The Council welcomes any comments and suggestions you may like to make – please address them to Dave Williams. As part of the strategic planning process, we are also currently finalizing a list of actions to be implemented in 2007 and 2008. To help to define those actions, the Council carried out a mini survey in 2006 on a sample of Association members asking them why they joined the IAEE and what they expected from it. Not surprisingly, amongst the answers were: the possibility to keep abreast of academic research and energy developments, building a network in the energy economics community (both academics and non academics), access to *The Energy Journal*, the *Newsletter* and the IAEE website and interest in the international and regional conferences. It is along these lines that we wish to develop the Association and offer new services to our members. At this point, I would like to acknowledge the remarkable work carried out over the years by the editors of the Energy Journal, Adonis Yatchew and Geoffrey Pearce, and I am grateful to James Smith and Lester Hunt for having agreed to join the team.

In addition to the Asia/Oceania conference mentioned above, three other IAEE conferences are planned for 2007. The International Conference will be held in Wellington, New Zealand from 18th to 21st February on "From Restructuring to Sustainability: Energy Policies for the 21st Century". The European Conference "Energy Markets and Sustainability in a Larger Europe" will take place in Florence from 10th to 12th June and the North American conference "Developing and Delivering Affordable Energy in the 21st Century" will be held in Houston from 16th to 19th September. We hope to see as many of you as possible at one or all of these events.

The Council has been in contact with the OPEC Fund for International Development, one of whose objectives is to help, low-income countries in pursuit of their social and economic advancement. The OPEC Fund has agreed to help finance students from developing countries who wish to take part in our conferences by making a donation to the IAEE. The Association should, therefore, be able to give greater help in 2007 to participants from those countries and I hope that many of them will take advantage of this new opportunity.

As a final word, I am happy to announce that the Association should soon be able to welcome a new affiliate, from Brazil, and that the Council has accepted the offer of the Turkish Affiliate to organize the 2008 International Conference in Istanbul. As a city that bridges Europe and Asia, it will be the perfect place for a major event in Energy Economics.

Energy problems are once more at the forefront of the energy scene. Energy economists are faced with ever-increasing fields of study and investigation which are becoming more and more complex and more challenging. As we approach the end of this year my wish is that our Association and its members will continue to make a valuable contribution to the advance in the understanding of the economic aspects of the different facets of the energy sector leading to a world where energy supply is reliable, affordable and accessible for all. Before leaving this exciting challenge in the hands of our next President, André Plourde, I would like to say what a great pleasure it has been for me to work for the IAEE this year and how much I have appreciated the commitment and the precious help of all the Council members.

Jean-Philippe Cueille

Editor's Notes *(continued from page 1)*

east. He argues that while oil and gas import dependency was perceived as detrimental to energy security in the past, such a perception in an era of globalization, free markets and world competition is not warranted.

In 1865 the English economist, Stanley Jevons, wrote:

> "It is wholly a confusion of ideas to suppose that the economical use of fuel is equivalent to a diminished consumption. The very contrary is the truth..Every...improvement of the engine, when effected , does but accelerate anew the consumption of coal."

Horace Herring discusses this theory in today's light and concludes that though promoting energy efficiency is a valuable tool to save money and stimulate economic productivity, it will not lead to a reduction in energy use.

Hadi Hallouche, one of the student advisers to the IAEE Council, explains the Gas Exporting Countries Forum and how it relates to the EU. Noting that the GECF was not set up as a Gas OPEC, he explains its structure and method of operation.

Paul Tempest, long-time IAEE member, comments briefly on the founding of IAEE and its road traveled since then, concluding with remarks on the 29th International Conference in Potsdam, Germany.

DLW

IAEE Mission Statement

The International Association for Energy Economics is an independent, non-profit, global organisation for business, government, academic and other professionals concerned with energy and related issues in the international community. We advance the understanding and application of economics across all aspects of energy and foster communication amongst energy concerned professionals.

We facilitate:

- Worldwide information flow and exchange of ideas on energy issues
- High quality research
- Development and education of students and energy professionals

We accomplish this through:

- Providing leading edge publications and electronic media
- Organizing international and regional conferences
- Building networks of energy concerned professionals

Hogan Receives Award for Outstanding Contributions to the Profession

Long-time IAEE member and Past President, Bill Hogan was named winner of the 2005 Outstanding Contributions to the Profession award. Given annually, the award is made for outstanding contributions to the field of energy economics and its literature. Hogan is Raymond Plank Professor of Global Energy Policy at the John F. Kennedy School of Government, Harvard University. He is research director of the Harvard Electricity Policy Group (HEPG); director of the Repsol YPF-Harvard KSG Fellows Program in Energy Policy; and chairman of the Doctoral Programs in Public Policy and in Political Economy and Government at the Kennedy School of Government.

Hogan's primary research interests have focused on energy policy. For more than a decade, he has been actively engaged in the design and improvement of competitive electricity markets in many regions of the United States and around the world. He has worked to design the market structures and market rules by which transmission system organizations coordinate bid-based markets for energy, ancillary services, and financial transmission rights.

The award was presented at the 26th Annual North American Conference in Ann Arbor.

Past President Arnie Baker congratualtes Bill Hogan on receiving the Outstanding Contriubtions to the Profession Award.

Are We Heading for the Point of No Return?

The debate on global climate challenge, as best as we can determine, is mostly focused on the relative role of human activity, whether we are contributing to the warming trend or is it mostly caused by natural causes beyond our control. Very few experts deny the rising concentration of CO_2 in the atmosphere or the gradual rising of global mean temperature in recent years.

In September, an article published in the Proceedings of the National Academy of Sciences concluded that the Earth's temperature is "approaching a level not seen in a million years," suggesting that we may be heading towards a "dangerous" level – certainly one with unknown consequences.

While much gets published these days in scientific journals, this one authored by Dr. James Hansen, the head of National Aeronautics and Space Administration's (NASA) Goddard Institute for Space Studies in New York and colleagues at Columbia University and University of California at Santa Barbara, got wide circulation. Dr. Hansen, whose testimony before Congress in 1988 made him a cause celebre, has become an endearing figure for environmentalists while aggravating his critics. He does not see eye-to-eye with the White House and there have been allegations of attempts to silence him – to no avail.

His latest findings suggest that if the recent warming trends since 1975 are extrapolated, roughly 0.2 degrees C per decade, we would reach the maximum mean temperature of the past million years. Then what?

"If further global warming reaches 2 or 3 degrees C, we will likely see changes that make Earth a very different planet from the one we know," adding, "The last time it was that warm was in the middle of Pliocene, about 3 million years ago, when sea levels were estimated to have been 25 meters (80 feet) higher than today."

Reprinted from the *EEnergy Informer,* courtesy of Feredoon Sioshansi.

Vijay Vaitheeswaran Receives IAEE Journalism Award

At the 26th Annual North American meeting in Ann Arbor, Michigan, Vijay Vaitheeswaran of The Economist, was awarded the IAEE Journalism Award, given each year to the individual making a significant contribution to the field of written journalism. Below are his remarks on accepting the award.

"Ladies and Gentlemen, thank you very much. I'm deeply honored and delighted by this award today, especially as it comes from your organization. Over the last decade, I've had the privilege to get to know many of you, indeed I've been lucky to have been educated by you, and in turn your names have popped up in *The Economist* as a result.

Now, I want to assure you that despite today's award, there is no risk of me getting too big a head. I know from hard experience that economists are a tough crowd to please. My background is in engineering, but I did study economics with the late Rudy Dornbusch and Stan Fisher back at MIT. Some might be impressed by that, but not my colleagues at the *Economist*. My old economics editor always used to say that Dornbusch was too much of a loose cannon to be trusted with undergraduates, and therefore my grasp of macroeconomics is quite suspect. And I arrived here in Michigan last night to find one of your senior IAEE colleagues pouncing on me, thanking me for the *Economist's* recent cover story on climate change: "Now I know that the oil industry is safe and all this climate nonsense will go away, given that your magazine is reliably wrong about everything."

More seriously, though, I did want to turn to the real significance of energy economics in giving proper and much-needed perspective to one of the great questions of our age. "How many planets will it take?" asked Mahatma Gandhi six decades ago, "if India pursues the same reckless path of industrialism that Britain did, consuming half the planet's resources?" Substitute the superpower and rising giant of today, and we get the question now asked by many, "How many planets will it take if China follows America's resource-intensive path of motorization, industrialization and urbanization?"

When contemplating that question, it is all too easy to despair. Indeed, one gloomy tome after another comes out pointing to scarcity of one resource or another, especially oil, thanks to China's rise. But I have learned an extraordinarily valuable lesson of history from my energy economist friends: the world's stock of resources is not fixed over time, thanks to the interplay of economics and technologies. Straight line trends rarely continue in a straight line forever. Indeed, even the very definition of a resource can change over time, thanks to advancing technology: in 1950, Vermont granite was useless tombstone material, but by 1980 it was a valuable source of uranium for the entirely new industry of nuclear power.

In short, development is a dynamic dance once markets and technologies are taken into account, with price signals as a key factor in the system debunking one scare after another. Scarcity breeds crisis breeds substitution and innovation, and magically disaster is often—though not always—avoided. With that in mind, I turn again to Gandhi's great question. Clearly we have only one planet, and we must learn to meet the developed world's needs and the needs of the world's aspiring masses within those resources. But the good news arising from your important field is that there is one resource that is more important than all of them, one resource this room is filled with and which the world has in infinite supply: human ingenuity.

Thank you very much.

Vijay Vaitheeswaran

Alfa Fellowship Program

Promoting Understanding of the New Russia

Alfa-Bank and CDS International are pleased to announce a call for applications for the Alfa Fellowship Program's 2007-08 Fellows. Now entering its fifth round, the Alfa Fellowship Program is a professional-level exchange designed to foster a new generation of American leaders and decision-makers with meaningful professional experience in the New Russia.

The Alfa Fellowship begins with language training in the U.S. followed by an intensive language course in Moscow. In October, Alfa Fellows will attend a three-week seminar program with key Russian government, public, and private sector officials to discuss current issues facing Russia. Fellows then undertake individualized professional assignments at leading Russian organizations including private companies, media outlets, think tanks, NGOs, and government institutions.

Eligible candidates must have at least intermediate Russian language proficiency, as well as a graduate degree, and professional experience in business, economics, journalism, law, government, or public policy. The Fellowship includes monthly stipends, related travel costs, housing, and insurance.

Applications must be received by CDS no later than:

December 15, 2006

Program information and application forms can be downloaded from the CDS website at:

www.cdsintl.org/fromusa/alfa.htm

For more information contact:

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Scenes from the 26th Annual North American Conference

24–27 September, 2006 – Ann Arbor, Michigan, USA


USAEE
United States Association
For Energy Economics
EXIT

Global Energy Market Trends—Insights from the 2006 BP Statistical Review of World Energy

By Peter Davies and Neelesh Nerurkar*

Global energy markets were dominated by high and rising oil prices in 2005 and through 2006 to date. However, this single observation obscures the dynamics of markets that have been operating at high levels of capacity utilisation, but which still maintained supplies to consumers despite a series of disruptions. Supply security was maintained at the cost of spikes in prices. At the same time global energy markets have begun to adjust to higher energy prices and changing relative prices. Using the data from the 2006 BP Statistical Review of World Energy, this article aims to 'tell the global energy story' in 2005 and into 2006.

World energy consumption grew by 2.7% in 2005 – down from 4.4% in 2004, but still above the 10 year trend. Energy consumption growth slowed by more than would have been expected given only a modest slowdown in economic growth, suggesting an impact from rising prices. The prices of oil, natural gas, and coal all increased on average during 2005: WTI oil by 36%, Henry Hub natural gas by 50%, and coal by 10%.[1] Coal and gas prices have since declined while oil prices have risen further during 2006. The rise in oil prices has been greater and longer than the rise in gas and coal prices; gas price increases have exceeded coal price increases. In money-of-the day terms, oil prices hit new highs in 2005 and have done so again so far this year, although inflation-adjusted prices remain below previous peaks.

In unravelling the story behind these prices we first establish the context: examining the impacts of the starting point – 2004, an exceptional year for energy markets – and then looking at a variety of factors that shaped energy markets in 2005. We then examine the adjustment of oil, gas, and coal markets around the world. Finally, the emerging issue of energy security is considered.

The Context

Developments in 2005 can only be explained after taking into account the constraints that emerged in 2004. Strong world economic growth in 2004 drove energy consumption across all fuels. Oil consumption growth was double the ten-year average. Spare capacity became limited in many parts of the energy value chain. World spare oil production capacity fell to low levels; spare refining capacity fell; and upgrading capacity to treat sour or heavy crudes operated flat out. Further, constraints in the contracting and materials sector drove up cost inflation and increased lead times for inputs. Energy prices in 2004 rose to then new highs for all fuels.

The picture was further shaped by a number of exogenous drivers in 2005. Global economic growth remained above trend, only somewhat slower in 2005: 3.6% versus 4.0% in 2004. The negative impact of rising prices on oil consuming economies was less acute than it had been in the early 1980s. Since 1980 world GDP has doubled, while oil consumption has only increased by a third – in other words, oil intensity has fallen by 38%. Similarly, in 1979 oil prices rose 125%; in contrast between 2003 and 2005 oil prices rose by 89%.The negative drag on economic growth from higher oil prices has thus so far been relatively limited.

Weather is always a key determinant of year-on-year changes in energy markets, but 2005 was particularly affected. The weather strengthened energy consumption and weakened production. In the major energy consuming areas, the winter was colder than usual and the summer was hotter than normal. The U.S. hurricane season was hugely damaging. A cumulative 116 million barrels of U.S. offshore oil production and 595 bcf of gas production was lost last year.

Energy markets have also been affected by a number of forces over and above physical supply and demand. Energy and other commodities have increasingly become financial assets. Current events, as well as changes in asset preferences and market expectations, have the power to move market prices rapidly and substantially. Periodically, such preferences and expectations may be independent of or exaggerate energy market fundamentals. Nevertheless, as energy products are ultimately physically deliverable, fundamental forces will always assert themselves in time.

Moreover, the geopolitical situation, especially in oil producing countries, is perceived to have deteriorated. Oil production has been physically disrupted, expansion plans have been delayed, and fears about future political instability have increased. This can to some extent be observed in the rise in long dated forward oil prices that have increased by at least as much as, and often more than, prices for more immediate delivery. In this way, the oil market signalled a need for higher 'precautionary inventories,' enabling OPEC to produce in excess of consumption without weakening prices. The shift to a contango market structure – where forward oil prices are above spot prices – gave market participants financial incentives to increase their stock holdings and thus accommodate excess supply.

Fuel Market Developments

Into this context we saw global energy markets begin to adjust. There was a slowing of world energy consumption growth from 4.4% in 2004 to 2.7% in 2005. This was more of a slowing than the slight weakening of economic growth would tend to imply in aggregate. The largest consumption slowdown was in oil – to 1.3%, somewhat below the 10 year trend rate. The least slowdown was in coal. So on an aggregated basis, energy consumption slowed, and the slowdowns were greatest where price rises were bigger and more sustained.

Oil

After 2004, global spare production capacity was left at low levels – about 1.5 million b/d, according to the EIA. Still, in 2004 and 2005, production remained higher than consumption. This is evidenced by the rise in inventories – more barrels were produced than consumed and storage levels rose.

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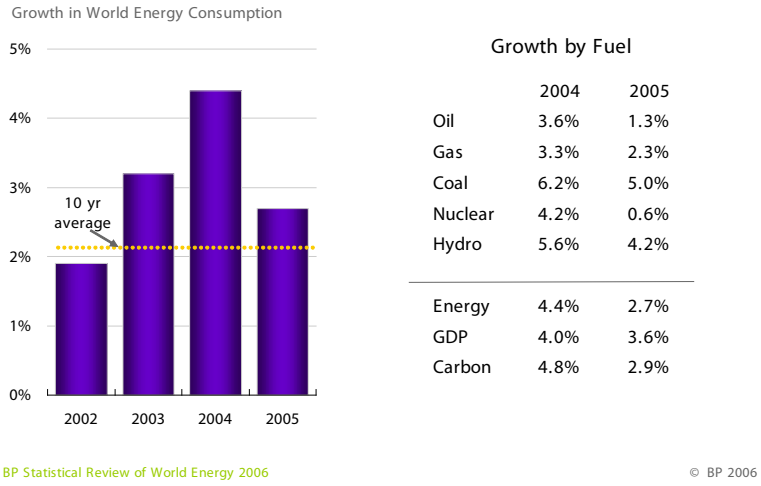
*Peter Davies is Vice President and Chief Economist of BP. Neelish Nerukar is an Economist with the firm.

[1] Central Appalachian coal price index.

2005 Energy Growth



BP Statistical Review of World Energy 2006

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However, this stock build failed to weaken prices. The market was concerned that spare capacity was low relative to potential supply disruptions. Market participants demanded greater inventories in the face of potential disruptions to global supply. In other words, the oil price rise cannot be attributed to 'fundamentals' but rather predominantly to an increase in the risk premium.

World oil consumption growth in 2005 slowed to 1 million b/d, 1.3%, which is below the 10 year trend and only 35% of the rate in 2004. Oil consumption growth thus fell by 1.8 million b/d, and over 80% of this slowdown occurred in just 2 countries – the U.S. and China, in roughly equal proportions. U.S. consumption fell due to a combination of the hurricane impacts and price effects. U.S. gasoline consumption had weakened after the hurricanes but recovered before year end. The Chinese slowdown was to a significant degree a reversal of the temporary factors that had stimulated demand in 2004, especially in the power sector where constraints on coal led to greater oil-fired generation in 2004. Oil consumption growth also weakened in the rest of developing Asia Pacific, where many countries reduced subsidies or substituted imported oil with imported gas and coal.

Total world oil production increased by 900,000 b/d – 1%. OPEC supplied 96% of the growth. A number of factors constrained supply growth. The U.S. hurricanes seriously disrupted oil production and delayed new developments. Security problems in Iraq resulted in a production decline. A number of accidents and disruptions to production occurred, for example in the Canadian oil sands or at India's Bombay High field. There was also a drag on growth due to capacity constraints in contracting and engineering sectors.

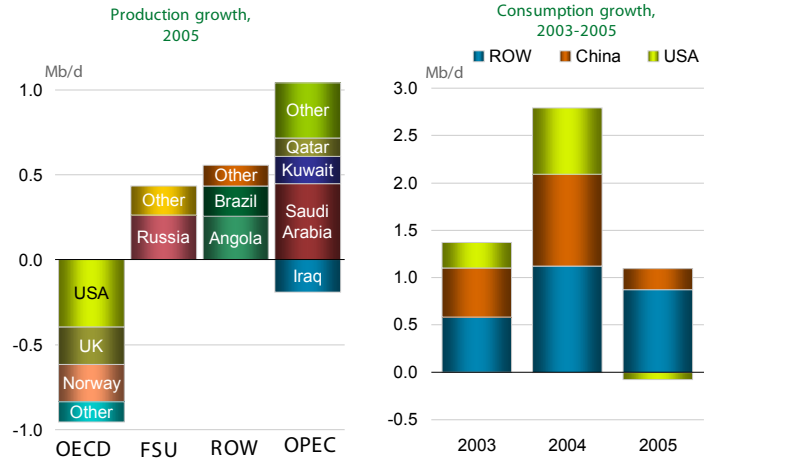
Non-OPEC production was nearly flat. OECD oil production declined by a record 1 million b/d led by a hurricane driven 400,000 b/d U.S. fall and reinforced by declines in the UK, Norway, Mexico and Canada. Offsetting growth came from several non-OECD, non-OPEC countries. Russian production grew by 260,000 b/d and Azerbaijan's output ramped up as the Baku-Ceyhan line filled. Strong growth was delivered by Angola, Brazil, and China.

OPEC's production growth of 850,000 b/d was spread across Saudi Arabia, Kuwait, the UAE and Qatar. 180,000 b/d of the growth came from NGLs, of which Qatar was the largest source as LNG output ramped up. Iraqi output fell by 190,000 b/d.

This leaves us with refining. The U.S. hurricanes seriously disrupted refining activity on the U.S. Gulf Coast. After Rita, 5 million b/d of complex U.S. refining capacity was out of action, representing about 29% of U.S. refining capacity. The initial reaction was a 'super-spike' in refining margins. This encouraged incremental crude runs at less sophisticated sites around the world. Overall product imports to the U.S. increased sharply to around 4 million b/d in 4Q. As markets rebalanced and in the absence of a cold start to winter, global average refining margins drifted down. Markets had delivered efficiently, assisted by policy support in the shape of EPA waivers and IEA stock release.

Distillation capacity utilization has continued to rise, exceeding 86%, while upgrading units operated effectively at full capacity. There was still almost 12 million b/d of unused primary distillation capacity in 2005. The main constraint in the refining system currently is limited upgrading capacity, exacerbated by the need to process incremental volumes

Supply and Demand



BP Statistical Review of World Energy 2006

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of heavy sour crude. From time to time, this has caused a substantial widening of the spread between light and heavy crudes. Refinery constraints have influenced relative crude values but not the absolute price. The experience of the hurricanes proved that much of the remaining refining capacity can be utilised when market conditions provide sufficient incentive. This has served to confirm the efficiency and flexibility of the world refining system.

Overall, these developments have left the world oil market adequately supplied despite supply disruptions. Today's oil prices are held up by low surplus capacity and fears regarding supply risks. Oil consumption has been shown to have some price sensitivity, but the extent of demand reductions has so far been insufficient to weaken prices. Meanwhile oil consumption continues to grow, driven by economic growth around the world. New upstream and refining investments are underway but lead times are long. Global spare production capacity should grow in time and get back to historic norms of around 3 million b/d, probably towards the end of this decade. At that stage the risk premium could decline and OPEC may seek to take a more active role in maintaining market balance.

Natural Gas

Natural gas developments have not mirrored oil, even though there are some common forces. Gas markets have become increasingly linked internationally, but drivers and outcomes still differ significantly around the world. As with oil, world gas consumption growth in 2005 fell back – but less so, to 2.3% from 3.3% in 2004.

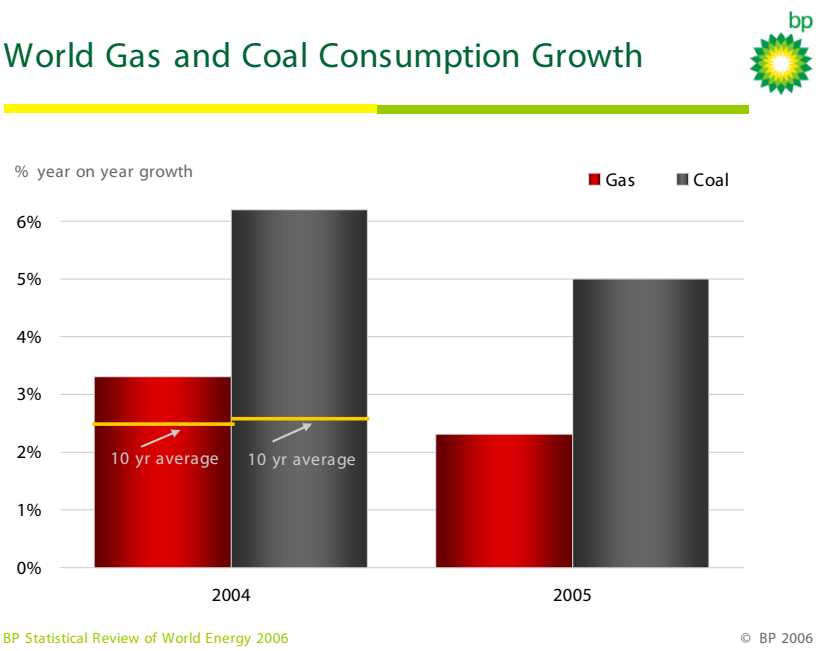
The U.S. hurricanes were especially damaging to gas facilities, cutting supply and driving up prices. Natural gas consumption fell by 1.5% in 2005. There was a direct and indirect hurricane impact on oil and gas consumption, especially around the Gulf Coast. But consumption declines occurred despite more heating and cooling degree days than in 2004. The gas consumption decline deepened a fall especially in industrial gas consumption that stretches back to 2000, largely as a result of high prices. There was a switching back into coal, which saw growth of 1.9%.

However, since January this year U.S. gas markets have shifted dramatically from a period when supply fears prevailed to one of excess supply and high levels of gas in storage. Prices have halved from above distillate parity to below residual fuel oil parity in a matter of months. High prices, both before the hurricanes and after, have weakened demand. This was reinforced by mild weather in the second half of the winter. Markets responded efficiently to both the supply disruption and high prices. LNG imports rose immediately after the hurricanes but then fell back. The cost was temporarily high prices.

A second example of gas market adjustment has been the UK. Declining UK North Sea gas production resulted in the UK becoming a net gas importer for the first time ever in 2004. Following cold weather in November 2005, fears about winter deliverability developed and prices surged to spike at 155p/therm ($23.5/mmbtu). Then, in February 2006 there was an accident that disabled the Rough storage facility that contains 80% of the UK's gas in storage. Cold weather in March created a further new spike at 187.5p/therm ($32.78/mmbtu). As in the U.S., markets worked and supply deliverability was maintained. UK gas consumption fell by 2.2% in 2005. Coal consumption increased by 2.8% as the power sector switched fuels. In March 2006 some CCGTs burned distillate on a temporary basis. UK gas prices have now returned to below 40p/therm (as of mid-August). UK futures prices for the winter are higher, implying a risk premium that reflects further concerns over winter availability.

Meanwhile, international trade in natural gas continues to grow faster than consumption as a result of continual expansions in both international pipelines and LNG shipments. 2005 saw a 6% expansion in both pipeline and LNG trade. Natural gas traded across international borders increased to 26% of global consumption. LNG has increasingly connected regional gas markets with some degree of flexibility. However, contract cargoes still dominate the trade. Spot cargoes are estimated to be less than 15% of total LNG volumes. Hence LNG market liquidity is low. Availability was limited in 2005, particularly following the U.S. hurricanes, strong Spanish demand, downtime in Nigeria, and the opening of UK facilities. Nevertheless, the trend points to continuing growth in supplies and for increasingly deep and flexible markets.

The gas story has become more complex. Gas prices have been pulled upwards by rising oil prices and prices



and third largest gas markets. Most recently, gas prices in the U.S. and UK have receded despite rising oil prices. Increasing supply availability, especially through contracted trade and in domestic markets, underpins gas consumption growth in many other markets. On a global basis, gas is no longer the fastest growing fuel.

Coal

Coal is now the world's fastest growing fuel. This was the case in 2005, in 2004, for the period since 2000 and for the last decade. However, this is only true as a result of China. China consumes 37% of the world's coal, almost all of which is domestically produced. In 2005, China alone represented 77% of the growth in world coal consumption. Chinese coal growth represented 39% of the growth in total energy consumption worldwide in 2005. Excluding China, gas has grown faster than coal. As a result it is appropriate to analyse coal in China separately from trends in the rest of the world.

Chinese coal consumption increased by 11% in 2005. In 2004, coal and coal fired power generation capacity had been in short supply. There had been brownouts, power rationing, and growing use of oil in power. These constraints eased in 2005. About 76GW of power generation capacity was added, of which 83% was coal-fired. The efficiency of coal use in power generation increased. Rail constraints were eased. Coal and power prices were raised. Meanwhile, the power and coal intensity of industrial production fell.

Coal growth outside China has been modest. It grew by 1.8% in 2005, just slightly faster than the 10–year average of 1.5%. The U.S. and India share the role of the biggest volume increases. Coal consumption is also rising throughout Asia alongside imported gas. Russian consumption continues to rise and helps release gas for export. European Union coal consumption fell, but this was concentrated in Germany where subsidies continue to fall. Elsewhere in Europe – the UK, France and Spain – consumption grew, incentivised by lower coal prices.

International coal is now relatively cheap with prices having risen less and having turned down before gas. The cost of carbon has yet to critically impact fuel choice. Fuel choice for future power generation investment is a critical issue, but the economic answer is not yet clear.

Energy Security

High prices, weather related incidents, and geopolitical tensions have contributed to energy security moving up the agenda globally, with greater attention being paid to the changing geography of oil markets. Since 1995, world oil consumption has increased by 13 million b/d, that is 19% or 1.7% p.a. China represented 27% of the world growth. OECD oil consumption also continued to rise, but relatively slowly – at 1% p.a. As a result, the OECD's share in world consumption slipped from 63% to 59%.

The changes in oil production are a contrast. OPEC's market share has hardly changed since 1995: it edged up from 41% to 42% and remains below its 1973 peak of 53.5%. OECD production fell by 970,000 b/d over the last decade. Meanwhile, oil production shifted to the Former Soviet Union and to other non-OECD, non-OPEC producers, whose aggregate shares went up from nearly 30% to 34%. OECD net oil imports rose to 59% of OECD consumption in 2005, up from 53% in 1995 and the highest share since 1979.

These broad demand trends look well established. OECD and Chinese oil imports are rising. In the immediately foreseeable future there will be increased oil supplies available from the Former Soviet Union, from other non-OECD, non-OPEC producers, and from OPEC. Rising import dependence worries some consumers. However, the growing levels of trade and the resulting interdependencies should also be grounds for some confidence.

Meanwhile, energy consumers around the world are increasingly expressing their desire to consume energy that is local and green. Renewable energy output is rising rapidly but from a very small base. For example, global ethanol output rose last year by roughly 10%, but is equivalent to 0.4% of global oil consumption. The growth of newly installed wind capacity has now exceeded that of new nuclear power worldwide for 8 years in a row. Aided by government support in many countries, renewable energy's role will rise further, but will inevitably remain small for the foreseeable future.

Conclusions

2005 has been another dramatic year in energy markets. Energy prices rose to new highs and in 2006 oil prices have risen yet further. 2005 was a year of further above trend economic growth and one when the weather was disruptive, especially the U.S. hurricanes. Global energy consumption growth was also above trend, but not as strong as economic growth alone would predict.

Market adjustments are beginning and will continue. Coal and gas prices have already moderated. There have been price effects on demand. Oil consumption growth slowed and inventories have risen. However, perceptions of rising risk have pushed oil prices up yet further. There has been interfuel competition in some markets. Coal has become the fastest growing fuel driven by Chinese consumption.

Markets have continued to work despite physical disruptions. Supply availability has continued, but at the cost of high prices. This has given rise to concerns about energy security as countries grow more interdependent.

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A Producer's Perspective of Oil and Gas Supply Security

By Majid A. Al-Moneef*

The production and trade in oil and gas, their role in the economies of the producing and consuming regions, their relative shares in the world primary energy mix and their relation to the environment have shaped global economic and energy relations in the past three decades. This dominance has put oil, and to a lesser extent gas, at center stage in the global as well as national energy security debates. Oil's share in global primary energy consumption which declined from 50 to 40 percent in the past three decades is still the single most important energy source; the share of gas, however, has increased from 18 percent in the mid seventies to 24 percent today.

Although not often recognized, efficiency improvements in the whole energy value chain in the past three decades have impacted energy security. The U.S. economy, for example, grew by 150 percent in the past thirty years while its energy consumption grew by 25 percent. The OECD and the world's energy intensity declined from 2.5 barrels of oil equivalent (boe) per $1000 GDP (in 1995 prices) in the seventies to 1.5 boe today (1.3 boe to 0.6 boe respectively for oil intensity). Conservation along with relatively lower oil prices contributed towards easing energy security concerns for most of the eighties and throughout the nineties. However, the continued dominance of hydrocarbons in global energy mix which declined marginally from 68 to 64 percent in the past three decades, have often times identified energy security with political developments in the oil and gas producing regions and/or oil price jumps.

The past three decades have also witnessed structural changes in world oil and gas demand patterns. The OECD oil demand which accounted for 70 percent of global demand in the seventies grew by an average 0.7 percent annually since then, while demand from the emerging economies in Asia and Latin America grew by an average 4 percent during 1975-2005 period which contributed to an increase in their share in global demand from 16 percent in 1974 to 36 percent today. The demand for gas, on the other hand grew by 1.7 percent annually in the OECD and 6.7 percent annually in the developing countries during the period, altering the relative shares in global gas demand, from 68 to 52 percent for the OECD and from 8 to 26 per cent for the developing countries. The period also witnessed a change in the relative shares of the different sectors in oil and gas demand, where the less demand elastic transportation sector increased its share in oil demand while the more demand elastic power sector increased its share in gas demand.

On the supply side, relatively high oil prices in the seventies as well as declining costs and improving technology in the eighties led to increases in production from different regions outside OPEC of around 18 million barrels per day in the past three decades. This contributed to the diversity of sources of supply on the one hand and a decline in the share of oil in global merchandise trade, since most of the new oil was for local consumption or interregional trade. Advancements in exploration and production technologies and improved investment climate also contributed to enlarging oil and gas resources worldwide, refuting the "limits to growth" notion of the seventies. Proven oil reserves in 1975 estimated at 630 billion barrels doubled by 2005 after an accumulated production of around 750 billion barrels in the thirty-year period. Gas reserves, estimated at 80 trillion cubic meters (TCM) in 1975 stood at 180 TCM today after an accumulated production of 60 TCM during the period. Such supply diversity and hydrocarbon resource growth over time contributed also to easing the global energy security concerns.

The relative position of the Middle East in this overall supply picture is central. Its shares in global oil and gas reserves which stood at 55 and 20 percent respectively in the mid seventies increased to 62 and 41 percent respectively in 2005. During the same thirty years period, its combined oil and gas shares increased while its oil share declined from 37 to 31 percent and its gas share increased from 2.5 percent of world total to 10 percent in 2005.

Despite the association in few OECD countries between energy security on the one hand and reliance on Middle East oil on the other, history has demonstrated that the only alternative to Middle East oil has been from the region itself. When supplies were disrupted during the Iranian revolution in 1979, the Iran-Iraq war in 1980, Iraq's invasion of Kuwait in 1990, Venezuela's strikes of 2002, the war in Iraq in 2003, the gulf of Mexico's hurricanes in 2005 to name just few, other countries from the region, especially Saudi Arabia, provided the needed oil to the market.

On the industry side major changes have occurred which altered the whole business environment. The emergence of the national oil companies of the producing (and consuming) countries introduced new dimension to oil and gas investment and supply pictures. Today, companies such as Saudi Aramco, Brazil's Petrobras, China's CNPC, Russia's Gazprom and Mexico's Pemex to name just a few, play an important role in global energy relations. The NOCs control around 2.3 billion BOE constituting 64 percent of global oil and gas reserves, with all what that may entail in terms of influence over supply. For the IOCs, the wave of mergers and acquisitions in the international oil industry towards the end of the twentieth century reduced the number of the top twenty oil and gas companies worldwide in 1997 to seven today, further consolidating the energy industry.

The Future of Energy Security

Most of the world energy outlooks of the IEA, OPEC and DOE forecast continued oil and gas demand growth at a respective 1.5 and 3 percent annually through 2025 when oil's dominant share in the world energy mix declines marginally to 37 percent. And the gas share increases to 30 percent where both are expected to account for two thirds of global energy consumption and more than 85 percent global energy trade by 2025.

The declining OECD share in global oil and gas demand

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is forecast to continue, reaching 48 percent by 2025. The developing countries of Asia, the Middle East and Latin America that have accounted over the past three decades for half of the increase in global oil demand are expected to account for 75 percent of the 38 million barrels per day projected increase in world oil demand by 2025. The transportation sector is projected to account for 60 percent of oil use due to the increase in vehicle ownership worldwide from 135 vehicles per 1000 inhabitants today to 193 vehicles in 2025 (from 38 to 95 vehicles, in the developing countries)

The projected increase in oil and gas demand and the availability of conventional and non-conventional oil as well as gas resources along with the projected production increase from different parts of the world such as Russia, the Caspian, Canada, West Africa, Latin America and the Middle East will lead to an increasing trade in energy resources, which necessitates rethinking the old energy security notions. Meeting global demand requires timely investment in the whole oil and gas chains from production to transportation to refining and processing and the related infrastructures. The OPEC Secretariat estimates total investment needed to increase production capacities in member countries to satisfy global oil demand in the reference case at $95 billion by 2010 (for a 38 MBD projected OPEC production) and $382 billion by 2025 (for a 51 MBD projected production) with the bulk of this investment coming from the Middle East. In case of a low world economic growth scenario resulting in 32 MBD production by 2010 and 42 MBD production by 2025, the estimated investment is reduced to $70 billion in 2010 and $258 billion in 2025. This uncertainty translates into an over or under-investment of $25 billion and $124 billion in the two respective years.

Since the future energy outlook points to increasing trade across regions, open and transparent energy markets are crucial to investment and to energy security. It is projected that irrespective of energy security concerns or related policy measures, OECD oil import dependency will increase from 55 percent today to 66 percent by 2025. China's oil import dependency is forecast to increase from 35 percent to 75 percent over the same period. The Middle East which has been providing the world with the incremental oil needs, due to its vast reserves, lower production costs, readily available capacity and diversified export routes is forecast to increase its production share to 40 percent of the projected world oil production of 115 million barrels per day in 2025 which will contribute to an increase in its share to half of the projected global oil trade of 70 million barrels per day in 2025.

While oil and gas import dependency was perceived as detrimental to energy security in the past, such perception in an era of globalization, free markets and a competitive world economic environment as well as an integrated global oil market is not warranted. Needless to say an increase in oil imports of this or that market, from this or that source, as the market dictates, need not jeopardize energy security. The growing dependence of the U.S. on oil imports since the seventies has not prevented it from becoming the world's single super-power, nor did oil and gas self-sufficiency (and surplus) of the former FSU prevent it from collapse. China's change from a net exporter to a net importer since the mid-nineties did not undermine its economic performance or its energy security.

Producer's Perspective of Energy Security

The projected continuation of the dominance of oil and gas in the energy and economic scenes in the producing/exporting and consuming/importing countries for decades to come necessitates redefining the term "energy security" to account for the new global economic and energy relations. Therefore, the role of oil in the energy mix and of its imports to the consuming/importing countries economies and hence to their growth and prosperity is matched by its role in the economic development and industrialization of the producing/exporting countries. While the consuming countries are concerned about the availability and continuity of oil and gas supplies at reasonable prices to sustain their economic growth, the producing countries have equal concern about access to markets and the overall stability of oil markets at reasonable prices for their economic diversification and development. From such perspective, energy security is a shared concern among energy producers and consumers. The more supplies are secured and consumers feel as such, the more demand assumes its normal growth pattern at reasonable prices, providing security to the producers to invest to increase capacity to make supplies available.

Saudi Arabia on its part realizes the importance of market stability as a cornerstone to energy security. Realizing its dominant position in world oil reserves, production and exports as well as the role of oil in its economy, it has endeavored over the years (often times through coordination with other producers and consumers) to ensure that markets are adequately supplied at all times. It has built and maintained a production capacity of 11 mbd with a stated policy of keeping excess capacity of 1.5-2.0 mbd at all times to cushion against unwarranted price fluctuations or supply shortfalls and to ensure supply reliability. It is planning to increase capacity to 12.5 mbd through capacity increments of 2.35 mbd by 2009 to augment and add a further 1.5 mbd to existing capacity.

Market related oil pricing by Saudi Arabia and other producers through price formulas linked to the benchmark crudes traded in the major markets (WTI, BWAVE, DUBAI) help ensuring transparency and enhancing security, so is the investment in refining and marketing in the main consuming markets with long term supply commitments to such markets. Saudi Arabia is now committing more than one million barrels per day of its crude exports to its joint ventures in U.S., Korea, Philippines and Japan and China and plans to double such refining capacity by 2015.

Energy security has to be placed in the context of a global economy which is not only interdependent but in which world political and economic institutions either accommodate or reinforce that interdependence. Reciprocal security along the elements outlined above should be a major part of the global dialogue between energy producers and consumers. The energy industry at large (NOCs and IOCs) have an important role to play in alleviating energy security concerns of producers and consumers by taking the appropriate and timely investment decisions and entering into partnerships along the various oil and gas supply chains.

Confronting Jevons' Paradox: Does Promoting Energy Efficiency Save Energy?

By Horace Herring*

Does promoting energy efficiency actually save energy? At first sight this seems a ridiculous question. For why would anyone invest their time and money in improving the energy efficiency of their building and equipment if it didn't save them energy and hence money. If their investment fails to save them energy they can rightly feel a victim of incompetence or fraud. But is what is true on the small, or micro, scale true on the national, or macro, scale. Does the OECD policy of promoting energy efficiency actually lead to a reduction in national energy use, and this is the subject of my speech tonight.

This is a question that has troubled economists for the last 150 years, and has greatly upset environmentalists over the last 25. We can trace the history of this controversy back to the great 19th century English economist, Stanley Jevons. In the mid 1860s there was a great national debate, that has recurred at frequent intervals since then, about whether we were running out of energy and what we should do about it. In their day the prime energy source was coal, and given the limited nature of known coal reserves it seemed inevitable that population and economic growth would soon cause their exhaustion. So what was the solution: there seemed to be no new energy sources, oil and gas were virtually unknown and unused, while electricity was just a scientific curiosity. Wind and water power were of medieval origin and insufficient to power the industrial revolution. One solution proposed was the more economical use of fuel, that is energy efficiency. If coal was better and more sparingly used in boilers and fireplaces then its lifetime could be prolonged. However Jevons argued against this position, and in a sentence frequently quoted since, wrote in his famous work, *The Coal Question,* in 1865:

> "It is wholly a confusion of ideas to suppose that the economical use of fuel is equivalent to a diminished consumption. The very contrary is the truth….Every… improvement of the engine, when effected, does but accelerate anew the consumption of coal"[1]

Thus was born Jevons' paradox, the idea that increased energy efficiency while saving energy on the micro-scale would not save energy on the macro-scale, but would instead lead to an increase in consumption. This idea, that increased productivity in the use of a commodity will lead not to a decrease but any increase in consumption, is at the heart of economics and is widely accepted for all other commodities. This is because increased productivity leads to an implicit reduction in price, and hence greater demand. We can see this effect clearly with telecommunications. Productivity improvements bought about by technical change, reduce the cost per minute of using phones. The result is not less spent on calls but more, as people find it cheaper to use phones than other means of communication, and new applications are developed, such as the internet, to take advantage of cheaper phone rates.

The greater the efficiency improvements, the greater the increase in demand. Factor 4 or factor 10 improvements in efficiency lead not to lower consumption but greater use. This can be clearly seen with electricity generation and lighting. Here technological improvements have resulted in large increases in efficiency, tremendous decreases in prices and vast increases in consumption. For instance in the USA, the fuel input need to produce a kilowatt hour decreased by a factor of ten during the last century, prices fell 30 fold and consumption rose 1300 times, an experience I am sure is found in most OECD countries.[2] Other factor 10 improvements have occurred in industry, such as in pig iron production and nitrogen fixation. There have been big improvements in energy efficiency in households due to insulation and new boilers. Since 1970, in the UK, the efficiency index or SAP rating has more than tripled, but heating energy use per household has remained constant.[2]

For lighting it is even possible to track changes in efficiency and consumption over seven centuries, as has been done in a most fascinating study by Roger Fouquet and Peter Pearson for the UK.[4] There they trace the evolution of demand for lighting as technology of lighting progresses through medieval candles, 18th century oil lamps, 19th century gas lights and finally 20th century electric lamps. Every time a new technology is introduced efficiency is improved and consumption increases dramatically. Our modern electric lights are 700 times more efficient than oil lamps, so do we use less energy for lighting?

In the last 200 years in the United Kingdom, the GDP per capita has increased 15 times, but per capita use is 6,500 times greater and total lighting consumption 25,000 times higher. Even in the era of the electric light, over the past 50 years, there has been a doubling of efficiency but a five fold increase in total consumption. And the opposite can be seen with technologies that have failed to improve efficiency, their demand decreased. For instance the domestic coal or wood fire which was much loved-- and even defended by the great English writer George Orwell as 'the birthright of free-born Englishmen' when he opposed smoke control regulations-- is now rarely used except by the very rich as decoration, or by the very poor who are unable to afford any other fuels, and who scavenge it from spoil heaps.[5] Thus low efficiency leads to low consumption, while high efficiency leads to increased consumption.

So what is the relevance of Jevons' Paradox for us today? The OECD is committed to increasing energy efficiency as a means to combat global warming. The idea is that national energy efficiency policies, such as through raising building standards and setting efficiency standards for appliances, will lead to a reduction in energy use. Whether this reduction is an absolute or a relative one is often left unclear. Polices are

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See footnotes at end of text.

claimed to save so many million tonnes of carbon by such and such a date, but are these savings only hypothetical, that is compared to what might have been used. That is, are they the difference between two computer scenarios, one with efficiency policies and one without. In most such scenarios total energy use and carbon emissions still rise, even though there are claimed to be large 'savings'. This is not to deny at all the value of energy models or scenarios as educational tools which help us to understand the structure and mechanisms of energy consumption, and to evaluate the impact of future options, but they cannot predict the future.

So while we congratulate ourselves about the success of our efficiency policies, national energy use and carbon emissions continue to increase. Over the last 25 years energy consumption in the OECD is up by about a third, and carbon dioxide emissions are up by a quarter. There is indeed an unending race between energy efficiency and economic growth. If growth is faster than the rate of efficiency increase (as it has been historically) then total energy consumption increases. For instance in the UK over the last 35 years energy efficiency (as expressed by energy intensity - a rough proxy) doubled - a Factor 2 improvement. However, GDP more than doubled, so total energy consumption rose by a about 15%. Thus at current rates of efficiency improvement, it is perfectly feasible for there to be a Factor 4 improvement in the next century. But as the RCEP comments:

> There will continue to be very large gains in energy and resource efficiency but on current trends we find no reason to believe that these improvements can counteract the tendency for energy consumption to grow. Even if energy consumed per unit of output were reduced by three-quarters or Factor Four, half a century of economic growth at 3% a year (slightly less than the global trend for the past quarter century) would more than quadruple output, leaving overall energy consumption unchanged.[6]

So will the future be any different than the past? What are we going to do that will alter the outcome of this race between energy efficiency and economic growth? Is the answer more efficiency policies, more regulations, more standards and more innovative schemes. The reason energy efficiency has failed to deliver absolute savings it is argued, is because it has not been imposed enough. Is this not similar to arguing that the Soviet Union collapsed because its economic system was ineffectively applied!

Apologists argue the merits of relative savings, if such and such a policy had not been implemented then energy use would be so much higher. But would such an excuse be tolerated in other policies areas? If a Minister pledges to reduce crime by 20% over 5 years, and total crime increases by 10%, do voters judge the Minister a success because he claims that if he had not implemented his policies crime would have risen 20%, or that crime intensity—crimes committed per GDP--has declined. Basically do we accept hypothetical excuses or a decline in some index, or do we want absolute reductions?

The European Union is committed to an absolute reduction in carbon emissions, thus saying that our energy efficiency policies are successful because they reduce the rate of energy growth or that energy intensity is falling is to my mind wholly inadequate. I believe that the answer to our quest for lower carbon emissions is not lower energy use but shifting to less carbon intensive fuels, basically in the long term renewables or nuclear power. If we want to use less energy, the simple answer is to raise its price, through such mechanisms as a carbon tax, or place restrictions on its use. Neither of these, I am sure, are popular with voters.

So following in the tradition of Stanley Jevons and many economists since, I argue that promoting energy efficiency will not lead to a reduction in national energy use.[7] In the meantime, energy efficiency is a valuable tool to save consumers' money and stimulate economic productivity. For high levels of resource efficiency, whether of energy, labour or capital, are an essential part of a dynamic productive economy with a high 'quality of life'. Low economic productivity and energy inefficiency go hand-in-hand with a low 'quality of life' as the former Soviet Union demonstrates. The aim of energy efficiency should not be to reduce energy consumption but to produce a higher 'quality of life' and enable us, if we so desire, to fund the transition to a green and sustainable future.

Footnotes

[1] See Blake Alcott (2005). Jevons' Paradox. *Ecological Economics* 44(1): 9-21.

[2] See R. U. Ayres and B. Warr (2005). Accounting for growth: The role of physical work. *Structural Change and Economic Dynamics* 16(2): 181– 209.

[3] See L. D. Shorrock & J. Utley (2003). *Domestic energy fact file 2003*. London: BRE bookshop http://projects.bre.co.uk/factfile/BR457prtnew.pdf

[4] Roger Fouquet and Peter Pearson 2006. Seven Centuries of Energy Service: The price and use of light in the United Kingdom (1300-2000). *The Energy Journal*, 27/1: 139-176.

[5] Quoted in John Robert McNeill (2000), *Something New Under the Sun: An Environmental History of the 20th Century World*. Penguin, p.66.

[6] RCEP (2000). *Energy – The Changing Climate*. Royal Commission on Environmental Pollution, 22nd. Report. London: The Stationery Office p.6.13.

[7] Horace Herring (2005). Energy Efficiency: A Critical View? *Energy: the International Journal* 32(1), 10-20.

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The Gas Exporting Countries Forum and Europe

*By Hadi Hallouche**

Gas and Security of Supply in the EU

With the Russia-Ukraine gas dispute in January 2006 and a particularly cold winter in Europe, including the UK, natural gas has hit the headlines. The geopolitical dimension of gas has become ever more important as gas supplies come from ever further away.

The depletion of reserves in the OECD, high prices and a tense international political situation have given security of supply a whole new meaning. At the European level, the Commission has passed the Security of Supply Directive and there is also discussion about an EU wide energy policy in which security of supply will be key. Gas will be at the centre of this debate.

Gas can be imported by pipeline or by LNG. The former is cheaper for short distances and links, exclusively, one supplier to one, or more, buyers. The latter is more economic for longer distances and is becoming, slowly but surely, a market with many buyers and many sellers. In the nineties and early 2000s, LNG had a high importance in South European markets such as Spain and Italy. The prices witnessed in the UK last winter have demonstrated how important LNG can be in North Europe, especially in the period of low supplies that we are witnessing today.

Because of the cost of transporting LNG, the global market is divided into two regional markets: the Atlantic and the Pacific. Liberalisation of the gas market in Europe, pioneered by the UK more than a decade ago and followed by the two EU Commission Gas Directives and a series of Competition Rules in the late nineties and early 2000s, combined with the high recent U.S. prices, has transformed the Atlantic market.

Security of Supply vs Security of Demand

In these times of security of supply concerns, particularly with the Russia-Ukraine dispute in the background, there are inbuilt fears aroused by the media and by some policymakers that gas can be used as a political weapon. Nevertheless, selling gas is as important to the producers as buying it is important to the consumers. Many producers depend heavily on exporting hydrocarbons in general, and gas in particular, for their growing populations and fast developing economies – more so if prices are as high as they are at the time of writing. The geopolitical equilibrium of inter-dependence and diversification that the market is witnessing is beneficial to both producers and consumers alike.

Having said this, however, the market will remain cyclical. In a period of tight supply that is being witnessed today, and which is likely to remain, at least in the short term, it is important for Europe to make itself an attractive buyer of gas, as attractive as the U.S., with which it is competing for supplies.

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The Gas Exporting Countries Forum (GECF)

The GECF was set up in 2001 in Tehran by some of the largest gas exporters, including Algeria, Iran, Nigeria, Qatar, Russia, Indonesia, Malaysia, Brunei and others. Norway attended as an observer. The GECF meets at the Ministerial level on a yearly basis and at the experts level 2 to 3 times a year, to share information, data, research, views; discuss projects, markets, human resources…etc.

The Ministerial Conference of the GECF met in Algiers in 2002, Doha in 2003, Cairo in 2004 and Port of Spain in 2005. It was expected to meet again in Caracas under the Venezuelan presidency in 2006 but has met instead in Doha on the 18th of September.

The GECF members discuss projects of potential mutual interest, such as a contracts database and a supply-demand model, in order to have a collective insight into potential situations of global over-supply or under-supply. It is a loosely structured organisation that has slowly but surely gained structure with the setting up of an Executive Bureau in Cairo in 2004, and a liaison office in Qatar, which was established at the Port of Spain meeting in 2005. The GECF does not have a secretariat.

The GECF has often been accused of being a Gas OPEC in the making and, indeed, its structure increasingly resembles that of OPEC, with, for instance, 7 of the 11 OPEC members being also members of the GECF. The GECF, however, was not set up to be a cartel. Gas producers do not want, nor do they need, such an organisation, as it would not serve their interests, economically, strategically or politically, and certainly not in the current market conditions:

- In the first place, when prices are high, supply is tight and the industry is still in its infancy, any collective action between suppliers would be counter-productive.
- Secondly, oil and gas are different commodities: while there is an international price and a global market for oil, gas is still a regional market dominated by long term contracts with a regional pricing structure.
- Thirdly, demand elasticities for oil and gas are different; while the scope for oil substitution is virtually non-existent, gas is highly substitutable in power generation by coal, nuclear, renewables and, as is the case in the U.S., by oil products. As the oil shock in 1973 prompted a worldwide effort of diversification of fuels away from oil, any 'political' or cartel-like use of gas would prompt an even wider effort of diversification away from gas.

It is, however, instructive to observe how the GECF has evolved. Since its first meeting in 2001, the membership grew and consolidated around all the existing LNG players except for Australia and the U.S., together with important gas players such as Russia, Iran and Venezuela. The combined GECF membership in 2004 totalled 97% of the world's LNG exports, about 90% of the world's gas reserves, 40% of the world's pipeline exports (Norway and Canada are not members) and 40% of the world's gas production. These market shares, even by OPEC standards, are significantly high. For instance, in Europe in 2004, 53% of the pipeline imports and

100% of LNG imports came from GECF members, that is 38% of total gas consumption.

Security of Demand and EU Regulations: An Important Driver for the Creation of the GECF

As mentioned above, security of demand for gas is as important for sellers as the security of supply is important to buyers. Natural gas trade has always been based on mutual trust, since its infrastructure is highly capital intensive.

One of the important reasons for the creation of the GECF, and a major subject of discussions in its meetings, are the regulatory changes within the EU, which were initiated without, or with very little, consultation with the sellers. The liberalisation of gas markets, introduced by the Transportation and Energy Directorate of the EU Commission (DG-TREN), had an important effect on the suppliers. But more significantly, the changes made to the competition rules, introduced by the Directorate for Competition (DGCOMP), have had an even greater effect, and have raised key concerns for the sellers. The most controversial of the changes in the competition rules is the phase-out of the destination clause. The destination clause is a customary clause in natural gas long-term contracts restricting the offloading of the gas/LNG to one, or a number of, destination points. The rationale behind this was to justify pricing at locally competitive levels for the buyer and a netback for the supplier.

The most contentious element is that the new competition rule implementation was retroactive, applicable not only to future contracts but also to existing contracts (some of which were negotiated more than a decade before the rules were published). DGCOMP has been criticised by many EU Member States and by the sellers, who found themselves with the obligation to renegotiate contracts. Additionally, the change in the destination clause has given the opportunity to many gas buyers to redirect cargoes to the U.S., where prices were coincidentally much higher, resulting in arbitrage profits for the buyers (later renegotiated to be shared with sellers). This had the related result of creating under-supply within some consuming markets in Europe, which formed the basis of the criticism of Member States.

The change in these rules was one of the drivers that prompted the GECF to be set up. Members of the GECF who were particularly affected by the changes, such as Algeria, Russia and Nigeria, strongly criticised the process under which the rules were introduced. The issue of the destination clause, however, has not been resolved by the GECF, even though meetings of the GECF (with some members who are not Atlantic area suppliers) have been able to develop appropriate arguments, nor has it been resolved at the political level. In practice, each specific case has been negotiated between the relevant parties, usually resulting in a mutually-beneficial profit sharing mechanism.

The important element, bearing in mind the 'security of supply versus security of demand' principles, is that the EU acted as a monopsony since it *de facto* set the rules for the most important LNG buyers in the Atlantic at that time - France, Italy, Belgium and Spain. Europe's dependence on gas imports have increased the sensitivity of its policy-makers to any sign of producer cooperation (for example recent reaction to a Gazprom-Sonatrach Memorandum of Understanding), while at the same time strongly encouraging consumer cooperation.

This is perceived as double standards by producers and impedes, rather than helps, any producer-consumer dialogue on security of supply and security of demand. It is also not consistent with making itself an attractive destination for scarce long term LNG supplies compared to the more attractive, liberalised, transparent, high priced U.S. market.

The GECF and Other Potential Producer-producer Coordinated Export Policies

It is highly unlikely that gas will ever be used as a 'political weapon' under the collective auspices of the GECF. Certainly, under existing market conditions there is no theoretical or practical case for the GECF to develop any cartelisation or coordinated export policies. It is, of course, possible that joint export policies might be discussed and developed when the industry cycle shifts from a sellers market, as is the case presently, to a buyers market, with a situation of oversupply, particularly if there were at the time other issues of confrontation with the EU Commission, related, for instance, to joint-bidding, profit sharing mechanisms, long term contracts and price indexation clauses.

ENVIRONMENTAL FELLOWS at HARVARD UNIVERSITY

The Harvard University Center for the Environment will award six two-year post-doc research fellowships to start September 2007 to outstanding scholars in any field related to the environment.

Each Environmental Fellow will work with a host faculty member in his or her department and participate in an interdisciplinary program at the Center. The fellowship will provide a generous salary and benefits.

Applications are due January 15, 2007. Details, including information about the 2006 Fellows, are posted at environment.harvard.edu.

Harvard is an equal opportunity/affirmative action employer

Harvard University Center for the Environment
24 Oxford Street, 3rd Floor
Cambridge, MA 02138

The IAEE Comes Full-Circle

By Paul Tempest*

In the fall of 1979, when the IAEE convened its first International Conference in Washington DC, the stock and financial markets were in turmoil, the oil price in the process of doubling and the Middle East ablaze and fearful after the expulsion of the Shah of Iran by radical and fundamentalist revolutionaries. One half of internationally traded oil then had to pass the narrow and vulnerable Straits of Hormuz dominated from the long coastline of Iran by the well-equipped and well-trained Iranian navy and other armed forces. Armageddon was again being preached, a mere six years after the quadrupling of the oil price and the Middle East embargoes of 1973-4 had demonstrated the power of the key oil producers to induce very rapidly global inflation, economic recession world-wide and financial mayhem. In Washington, energy security was again at the top of the political and economic energy and within one year, Iraq and Iran were locked in an 8-year war (1980-88) which claimed a million young lives and which blighted the hopes and welfare of a whole generation of Iranians and Iraqis.

In June 2006, it is much the same story as in 1979 – acute market uncertainty generated by political confrontation and unrest in the Gulf region, an investment shortfall in that region and renewed overheating of the Gulf producer economies. Again there has been a doubling of the oil price over the last two years. Again, the West has acted swiftly to intervene, and under the pretext of eliminating (non-existent) weapons of mass destruction, seems intent on prolonging its occupation of Iraq and its military presence elsewhere in the Gulf region. The near-completion of the largest embassy in the world, built by the United States in the heart of Baghdad for some 3,000 staff, has delivered an unmistakeable message to the Middle East and world-wide that the United States intends to stay on the ground in one form or another.

The Founding of the IAEE 1977-79

Into the ferment of 1979, came the new International Association of Energy Economists. Backed by strong support from the White House, some heavy funding, the presence of all the leading oil multinationals and several hundred eager and hungry independent economists, energy consultants and academics, it was off to a feverish start in its first international conference. A powerful input was the wisdom and eloquence of Chauncey Starr of EPRI and of Mory Adelman of MIT. Also the conference enjoyed the active support of the International Energy Agency opened in Paris in 1974 to represent the interests of the industrialised world as a counterpart and contingency mechanism to the OPEC countries led by Saudi Arabia and, up to that point, by Iran and Iraq.

Since then, as the IAEE rapidly acquired an international membership with national chapters in some 30 countries, it has become politically correct for successive IAEE Presidents to describe the genesis of the IAEE in terms of the simple notice placed on an American Economic Association noticeboard in 1977 suggesting a splinter organisation specialising in energy economics and providing opportunities to access the rapidly widening employment, consultancy and training demand. Yet the political imperatives were what drove the first conference forward.

The Second International in Cambridge University, UK, 1980

By the second International in Cambridge UK in 1980, the IAEE was providing, on more or less neutral ground, the very first serious venue for an extended open debate, better described as a three-day verbal joust, between the U.S. Administration represented by James Sawhill for the U.S. Department of Energy and the Arab OPEC producers represented by Ali Attiga, Secretary-General of OAPEC. Both scored many points; neither was wrong-footed. The atmosphere in the auditorium was electric. Here was history being made with the first glimmer of a consumer- producer dialogue conducted rationally and sensibly and seeking outcomes which would enhance global economic growth and minimise the risk of disruption, recession and market chaos. Hosted by the genial and unruffled Sir William Hawthorne, Master of Churchill College and previously the Chief Scientific Adviser to the British Government, acrimony, jargon and cheap political propaganda were set firmly to one side, and the common ground explored and delineated step-by-step. Here was a route-map of how energy economics could provide a neutral mechanism for resolving acute political confrontation. It very quickly became clear that oil and gas import and export dependency had an over-riding common interest in the preservation of free global markets, expanding international trade and ensuring the free flow of capital, advanced skills and new technology.

The 29th International Conference, Potsdam, Germany, June 2006

Plus ca change! It is perhaps premature to assess the impact of this year's International IAEE conference and IAEE Council meetings in Potsdam, but I would hope to do so in a later paper that places it in the context of some of the highlights and political impacts of the previous 28 Internationals. Its title was ***Securing Energy in Insecure Times.***

Let us begin with a few statistics of the 29th International

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*Paul Tempest attended the first IAEE International Conference in 1979, held in Washington, DC, on behalf of the UK Department of Energy and the Bank of England. He was Chairman of BIEE in 1980-82 and, as Conference Chairman ran the 2nd, 4th and 6th International IAEE Conferences in 1980, 1982 and 1984, all held in Churchill College, Cambridge, UK. He was a Vice-President of the IAEE in 1982-3 and President in 1984. In the BIEE he has served more or less continuously on the BIEE Council since 1980, as Chairman again in 1986-7 and as Vice-President since 1987. He was IAEE and BIEE Council Co-ordinator of the 25th annual International Conference in Aberdeen, Scotland in 2002 and has recently been presenting at IAEE Council meetings in Bergen, Denver and Potsdam an outline BIEE bid for the IAEE annual European Conference to be held in St John's College, Oxford, UK in 2008 and an outline bid for the IAEE annual International to be held in the UK in 2009, 2010 or 2011.

in Potsdam... The proceedings were supplied on arrival in CD and 492-page printed form - 250 papers out of the 300+ submitted and pre-vetted, a prestigious outlet for the 478 authors. All had been meticulously sorted into topic categories and carefully edited - a massive task for the two chairmen, Professors Ulf Hansen and Georg Erdmann. There were 53 concurrent sessions, three large plenaries, plus an opening session led by Lord (David) Howell of Guildford on global energy issues today and Ulf Boege, President of the Federal Cartel Office on German priorities within a European context.

So today the IAEE is still able to mobilise a top political input in addition to a most comprehensive technical agenda. It draws on 3000 individual members from 60 different countries. Of these 1150 are in Europe, roughly matched by 1300 in North America and a steeply rising 550 in South East Asia. In addition it now has annual North American, European and now Asia-Pacific regional conferences and many very active national chapters each with its programme of meetings, seminars and other activities. It looks well equipped to face the challenges of the future.

"Energy in a World of Changing Costs and Technologies"

26th USAEE/IAEE North American Conference, Ann Arbor, MI, September 24 - 27, 2006
Single Volume $130 - members $180 - non-members
This publication includes articles on the following topics:

- Transportation - Vehicle Technologies
- Electricity Investment, Reliability, and Environmental Effects
- Future Trends in Transportation
- Regulatory or Market Economics: Which Really Maximizes Electric Utility Consumer Benefits? Oil Market - Security and Reliability
- Crunch Time for North American Natural Gas: 2007 - 2012
- Energy, Economic Development & Energy Poverty
- Science and Technology Policy

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Careers, Energy Education and Scholarships Online Databases

IAEE is pleased to highlight our online careers database, with special focus on graduate positions. Please visit http://www.iaee.org/en/students/student_careers.asp for a listing of employment opportunities.

Employers are invited to use this database, at no cost, to advertise their graduate, senior graduate or seasoned professional positions to the IAEE membership and visitors to the IAEE website seeking employment assistance.

The IAEE is also pleased to highlight the Energy Economics Education database available at http://www.iaee.org/en/students/eee.aspx Members from academia are kindly invited to list, at no cost, graduate, postgraduate and research programs as well as their university and research centers in this online database. For students and interested individuals looking to enhance their knowledge within the field of energy and economics, this is a valuable database to reference.

Further, IAEE has also launched a Scholarship Database, open at no cost to different grants and scholarship providers in Energy Economics and related fields. This is available at http://www.iaee.org/en/students/ListScholarships.aspx

We look forward to your participation in these new initiatives.

Brazilian Association for Energy Studies (AB3E)

The Brazilian Association for Energy Studies (AB3E) was created in March 2006 having as a main objective to promote studies in multidisciplinary issues in energy, economics and engineering (the 3 Es) involving strategic aspects, such as planning, forecasting and emerging technologies. AB3E intends to support actively the scientific and technological debate on energy economics through publications and events.

AB3E is the first IAEE affiliate in South America.

AB3E current board of officers is as follows:

- President: Sergio Valdir Bajay (Unicamp)
- Vice-President: Ennio Peres da Silva (Unicamp)
- Secretary: Edmar Luiz Fagundes de Almeida (UFRJ)
- Secretary substitute: Felipe Augusto Dias (IBP)
- Treasurer: José Antonio Scaramucci (Unicamp)
- Treasurer substitute: Enrique Ortega Rodriguez (Unicamp)

All AB3E officers are IAEE members.

Ennio Peres da Silva, Sergio Valdir Bajay and José Antonio Scaramucci.

AB3E also has a financial supervising committee comprised of Carlos Alberto Mariotoni, Mario Oscar Cencig and Ademar Ribeiro Romeiro (substitute).

Ivan Marques de Toledo Camargo, Edmilson Moutinho dos Santos, Maurício Tiomno Tolmasquim and César Benjamin.

AB3E organized its first event in September. It was a debate held in Campinas on energy programs of the candidates for president of Brazil and governor of São Paulo state.

In a session mediated by AB3E member Edmilson Moutinho dos Santos, the energy programs for presidential candidates Luiz Inácio Lula da Silva (PT), Geraldo Alckmin (PSDB) and Heloísa Helena (P-Sol) were presented by Maurício Tiomno Tolmasquim, Ivan Marques de Toledo Camargo (AB3E affiliate) and César Benjamin, respectively (above).

In the opening session, Márcio Zimmermann, secretary for energy planning of the Brazilian Ministry of Mines and Energy, talked about the Brazilian energy sector and its present major challenges.

Marcxio Zimmerman talks at the opening session

Next December, AB3E will get together the principal actors in the Brazilian energy sector in a closed seminar in Rio de Janeiro, aiming at preparing a document to be forwarded to the new elected Brazilian federal government, containing suggested guidelines for an energy policy for the country. The one day event will be organized by AB3E secretaries Edmar Luiz Fagundes de Almeida and Felipe Augusto Dias in sessions on oil, gas, electricity, renewables (mainly biofuels) and long-term planning.

Edmar Luiz Fagundes de Almeida and Felipe Augusto Dias

In 2007, AB3E will hold a seminar for graduate students to present 20 previously selected papers in energy economics. Three of the authors will be selected by an AB3E referee committee to get financial support to go to Florence for the 2007 IAEE European Conference.

Upcoming events include a seminar on global climate changes and a Latin American energy-economics conference (Mexico and Brazil are currently the only IAEE affiliates in Latin America).

AB3E is also interested in hosting the annual IAEE international conference in the near future, in Rio de Janeiro or Campinas.

José Antonio Scaramucci

Energy Policy in Denmark and the Danish Affiliate

By Jesper Munksgaard and Anders Larsen*

This article addresses some features in recent Danish Energy Policy and briefly describes the activities of the Danish Affiliate of the IAEE .

Danish Energy Policy

Danish energy policy is targeting increased energy efficiency, security of supply and reduced environmental impacts. Means to fulfil these targets are the liberalisation of energy markets including the use of market based instruments such as energy taxes and tradable CO_2 permits. Danish Industry and Energy Minister, Flemming Hansen says: "It is important to the government to select those means for regulation which give highest environmental benefits and best security of supply to the Danish society considering the public budget constraint". The development of Danish industries producing new and efficient energy technologies have been upgraded in Danish energy policy. The success of the Danish wind industry on the world market is, of course, a challenging example to be copied.

Recently, Danish energy policy has been investigated by IEA – The International Energy Agency. IEA is satisfied with the overall energy efficiency of the Danish economy. Energy use per value of production is among the lowest among the IEA member states. However, IEA also has some recommendations to the Danish government: Make an inspection of the energy and environmental taxes in order to get more efficient price signals; change the taxation of cars so as to take energy efficiency more into consideration; supervise carefully the ongoing concentration in the Danish energy sector in which the former gas transmission company DONG has turned into an integrated gas and electricity company. Moreover, IEA recommends the government investigate the design of the present CO_2 regulation based on grandfathering and the exclusion of minor industries and private households. Free CO_2 permits given to power producers and big industries bear the risk of extraordinary windfall profits.

AKF has pointed to the problem of potential windfall profits given to private wind power producers using wind turbines raised before the Danish power market was liberalised. Danish electricity customers have to pay a total subsidy of around DKK 2 billion per year to private owners of old wind turbines. Contrary, new private wind turbines on shore have to face the market price of Nordpool including a low subsidy. Consequently, wind power development on shore has stopped and off shore wind farms founded on tendering procedures have taken over.

A hot issue right now is biofuels. The European Union (EU) is blaming Denmark for being reluctant to develop biofuels for the transport sector. The attitude of the Danish Government is that the development of biofuels is expensive compared to the use of biomass for combined heat and power production. In that area Denmark holds a leading position compared to other EU member countries. However, this position is founded on past political action. Actual political action is needed in order to develop new positions for the Danish energy industry. Besides the energy industry Danish agriculture could potentially benefit from a transition from food production to renewable energy supply.

Danish Affiliate

The Danish affiliate of the IAEE was founded in 1986. In 2006 we are 20 years old. This will be celebrated with a conference 16 November 2006 in Copenhagen. The theme for the Anniversary Conference is: *Liberalisation of the Danish Energy Sector – What have we learnt? Where are we now? and What should happen?*

We will address the background of the liberalisation of the sector. The Minister at that time, Svend Auken, clearly was against the liberalisation. So he will explain why he after all suggested to parliament the re-regulation and why it contained what it did. During the one-day event we will have presentations from the academic world and from policy-makers. Professor Einar Hope (member of the Council of IAEE) will give us his perspective on the experiences with the liberalized energy sector in Europe. A representative from The European Commission will give his point of view: *How far is the Liberalisation of the European Energy Sector? What Challenges Lie Ahead?*

In the wake of the liberalisation a state owned company, DONG-Energy, has taken over many other energy companies. The Director of DONG-Energy, Anders Eldrup, will-give us his view.

Thus 2006 is a special year for the Danish Affiliate. We are a small affiliate in the sense that we have only 62 members. But we are big in the sense that we have all major players in the energy sector in Denmark as members. The secretariat is taken care of by the Association of Danish Energy Companies. In a normal year we have four after hours meetings, one of them containing an excursion. We have recently visited the nuclear Swedish power-plant, Barsebäck (now closing), the off-shore windfarm outside Copenhagen and last year an

Amagerforbraedingen

*Jesper Munksgaard is Associate Professor at AKF, Institute of Local Government Studies and Anders Larsen is Chairman of the Danish Affiliate of IAEE and Assistant Executive Director at AKF.

incineration plant; all interesting installations in Danish energy policy. The power plant on the Swedish side of Øresund is now closing after Danish protests for many years. That the Swedes actually carried out the closing decision came as a surprise to many. The incineration plant (Amagerforbrændingen) is interesting because incineration in Denmark is very popular; approximately 52% of Danish municipal solid waste (MSW) is incenerated with energy recovery (power and heat). This is one of the biggest incineration percentages in Europe. Only 10 % of Danish MSW is land filled.

The other arrangements in 2006 included projecting oil prices, a discussion on the use of models in energy policy with focus on modelling imperfect competition, a discussion on the mergers in the Danish energy industry. Finally we arranged, in co-operation with other parties, a seminar on the new more commercial take on energy efficiency.

Our association is not keen on bigger conferences, the after-hours meetings turn out to be a niche for an association like ours; in the future, however, we will try to foster networks among our members.

Anders Larsen, left and Jesper Munksgaard, right, leaders of the Danish Affiliate

Newsletter Disclaimer

IAEE is a 501(c)(6) corporation and neither takes any position on any political issue nor endorses any candidates, parties, or public policy proposals. IAEE officers, staff, and members may not represent that any policy position is supported by the IAEE nor claim to represent the IAEE in advocating any political objective. However, issues involving energy policy inherently involve questions of energy economics. Economic analysis of energy topics provides critical input to energy policy decisions. IAEE encourages its members to consider and explore the policy implications of their work as a means of maximizing the value of their work. IAEE is therefore pleased to offer its members a neutral and wholly non-partisan forum in its conferences and web-sites for its members to analyze such policy implications and to engage in dialogue about them, including advocacy by members of certain policies or positions, provided that such members do so with full respect of IAEE's need to maintain its own strict political neutrality. Any policy endorsed or advocated in any IAEE conference, document, publication, or web-site posting should therefore be understood to be the position of its individual author or authors, and not that of the IAEE nor its members as a group. Authors are requested to include in an speech or writing advocating a policy position a statement that it represents the author's own views and not necessarily those of the IAEE or any other members. Any member who willfully violates the IAEE's political neutrality may be censured or removed from membership.

The Swedish IAEE Affiliate in 2006

SEEF, the Swedish Affiliate of IAEE, was founded in the early1980s. The aim was to create a meeting place for discussion of energy market and energy policy issues. The same aim applies today, and the association has remained a fairly exclusive "club" with around 130 members. The majority of the members are decision makers in the energy sector, professors and other researchers in energy economics, and energy sector regulators and analysts. In recent years efforts have been made to attract young academics, specialized in energy economics or related fields. In the coming year more will be done to inspire PhD-students to focus on energy economics, and to become members of SEEF & IAEE.

SEEF typically has two meetings in the fall and two meetings in the spring. Most meetings are held at the Stockholm School of Economics in the center of Stockholm. The format is that an invited speaker gives a 25-30 minute presentation. Two invited commentators then speak for about ten minutes each, and after that there is an open, usually very active, discussion. The discussion continues at a buffet dinner. The dinner is made possible by generous financial support by Nordea, Svenska Handelsbanken, Swedbank, Vattenfall and the National Swedish Energy Administration.

In terms of background the invited speakers and commentators in general is a mix of academia, industry and ministry/public agency. This reflects the aim of the association to serve as a meeting place for decision makers and energy specialists in different sectors of society. The theme of a meeting is almost always related to the functioning of energy markets or to current issues in Swedish or European energy or environmental policy. Needless to say Swedish energy policy makers have been very efficient in providing interesting and controversial themes to discuss at SEEF meetings!

Two examples from 2005/06 illustrate the nature of SEEF activities: One meeting focused on the international oil market and the Swedish petroleum industry. The main speaker was Mr. Michael G. Löw, CEO of PREEM, Sweden´s largest oil company. Professor Marian Radetzki was the invited commentator. Another meeting focused on the soaring electricity prices and the impact on Sweden´s energy intensive industries. The discussion was opened by Mr. Jan Johansson, CEO of Boliden, which is a major mining company. The invited commentators were professor Lennart Hjalmarsson and Kjell Jansson, Director General of Statistics Sweden and former under-secretary at the Ministry of Energy.

It is hard to measure to contribution of SEEF. However, I often meet members who praise SEEF for enhancing the understanding of energy markets and energy policy by bringing different types of energy specialists and decision makers together for open discussions.

Lars Bergman

"Energy Markets and Sustainability in a Larger Europe"

Florence, June 10-12, 2007

9th IAEE European Energy Conference

A.I.E.E - Italian Association of Energy Economists
IAEE - International Association for Energy Economics

The conference will debate a whole range of up-to-date energy issues in one of the most beautiful and artistic cities in the world, offering the participants a unique opportunity to see its cultural heritage and to visit exceptional museums and galleries.

General Conference Chair:
CARLO ANDREA BOLLINO, Professor University of Perugia, V. President of AIEE
Program Committee Chair:
UGO FARINELLI Professor University of Rome and of Lund, General Secretary of AIEE
Organization Committee Chair:
EDGARDO CURCIO, Professor University of Rome and President of AIEE

Conference Structure	**MONDAY 11 June 2007**	**TUESDAY 12 June 2007**
SUNDAY 10 June 2007 17.00-18.00 IAEE European Affiliate Leadership Meeting 18.00-20.00 Conference registration and cocktail for participants	08:00-09:00 **Registration** 09.30-10:30 **Opening session** 10:30-10:45 Coffee break **Plenary session 1** 10:45-11.45 ***Sustainability***: Implications of different scenarios for energy supply and demand; Technology outlook response 11.45-12:45 ***Security of supply:*** Availability of oil; The role of natural gas in Europe 12:45-14.00 Lunch 14:00-15:45 **Concurrent sessions** 1 15:45-16:00 Coffee break 16:00-17:45 **Concurrent sessions** 2 19:30- **Gala dinner**	**Plenary session 2** 08:30-9.30 ***A wider EU energy market***: From Eastern Europe to the Mediterranean; Evolution in market regulation 9.30-10:30 ***Implementing renewables.*** Drivers and opportunities for EU industries. 10:30-10.45 Coffee break 10:45-12:30 **Concurrent sessions 3** 12:30-14:00 Lunch 14:00-15:45 **Concurrent sessions 4** 15:45-16:00 Coffee break 16:00-17:45 **Concurrent sessions 5** 17:45-18:15 **Closing session**

The "call for papers": the topics of the papers to be presented in the concurrent sessions
Four of the concurrent sessions should be devoted to the four themes covered in the plenary sessions, both to present additional papers on these subjects and to discuss the presentations in the plenaries. The following is an indicative list of other themes that will be accommodated in the concurrent sessions:

1) Transmission and transportation infrastructures in a liberalised environment
2) Experience curves cost development vs. value
3) Policy measures to accelerate development of RES
4) Integration of intermittent RES into energy markets
5) Market instruments to improve energy efficiency
6) Improving social acceptance of energy infrastructures
7) Liberalisation and regulation of the European energy markets
8) Supply and security in oil and gas European market
9) Regulatory regimes in the larger Europe
10) Geopolitics of energy
11) Understanding energy demand
12) Energy, environment and emission trading

You can find all the information regarding the conference organisation (programme, registration fees, student scholarship funds, registration and accommodation forms and the social events) on the conference website **www.iaeeu2007.it**

Venue: The Venue is Grand Hotel Baglioni a symbol of Florentine hospitality, since 1903 preserves the charm and elegance typical of the Florentine tradition and is equipped with all the modern comforts. Located in the very centre of Florence, this venue is 5 minutes walk from the Central Station and just near the other hotels reserved for the conference.

Accommodations: Arrangements have been made for special rates with hotels of various categories near the conference venue: The Hotel Machiavelli Palace, The Hotel Corona d'Italia, Atlantic Palace Hotel with rates of € 100/150 for single/double rooms. More details about accommodations, gala dinner and sightseeing tours will be available on the AIEE website.

Social events: The gala diner will be organized at the Pitti Palace which origins go back to 1448. It was built for the banker Luca Pitti and it passed to the Medici family in 1549 and over the years became the residence of the grand-dukes of Tuscany and later of the King of Italy. Today it was transformed into a museum with various galleries and is hosting special cultural and social events.
Two guided sightseeing tours will be organised for delegates and accompanying persons: one through the city centre, through the Old Town and second a visit at the Uffizi Gallery.

For any questions please contact AIEE:
Conference Secretariat
Phone +39-06-3227367 ; +39-06-32652279 -Fax 39-06-3234921,
e-mail: assaiee@aiee.it; info@aiee.it; info@iaeeu2007.it
www.iaeeu2007.it

Welcome !! The following individuals joined IAEE from 7/1/06 – 10/31/06

Amela Ajanovic
Vienna University of Technology
Austria

Fatema Al Neaimi
ADGAS
UAE

Omokayode Hadeem Alejo
University of Dundee, UK
United Kingdom

Fareen Shazli Ali
HSP
Malaysia

Tatiana Alves
USA

Margaret Armstrong
Ecole des Mines de Paris
France

A Ashfaq
USA

Benjamin Atkinson
EP&E Branch Competition Bureau
Canada

Silvia Azucena Nebra
State University of Campinas
Brazil

Sergio Valdir Bajay
Interdisciplinary Ctr for Energy Pl
Brazil

Jan Ban
OPEC
Austria

Carlos Bellorin
Bellorin Guzman & Associados
Venezuela

Michele Benini
CESI RICERCA SPA
Italy

Harry Bloch
Curtin University
Australia

J G Blondel
Avocat
France

Constantine Blyuz
Natural Gas Authority Israel
Israel

Marcus Bokkermann
EGL AG
Switzerland

Jose Vitor Bomtempo
UFRJ
Brazil

Helena Bozic
Energy Institute Hrvoje Pozar
Croatia

Robert Brecha
University of Dayton
USA

Mark Bryfogle
Anlage Research
USA

Adam Buchhorn
Copenhagen Business School
Denmark

Wojciech Burzynski
OGP Gaz System Sp ZOO
Poland

Ivan Camargo
University of Brasilia
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Arturo Castillo
United Kingdom

Paul Centolella
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Dante Cersso Caso
OSINERG
Peru

Rogerio Cezar de Cerqueira Leite
Brazil

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USA

Lynne Chester
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Stacy Eller
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Thomas Faber
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Khalid Fathi Sobhi
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Karen Feugueur
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Victoria Fleming
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Matthias Fripp
UC Berkeley
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Stephanie Futch
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MA Dept of Telecom and Energy
USA

Yousuf Habib
USA

Booker Harrison
USA

Aaron Hawley
USA

Borge Hess
TU Dresden
Germany

Kurtis Hildebrandt
ENMAX Corp
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Thomas Inglesby
McKinsey & Co
USA

Mariana Iooty
Instituto de Economia
Brazil

Judson Jaffe
Analysis Group
USA

Alka Jain
India

Joerg Jasper
ENBW AG
Germany

Ole Jensen
Dansk Fjernvarme
Denmark

Saied Kajan
Student
Austria

Helen Katz
Ontario Ministry of Finance
Canada

Warren Katzenstein
Carnegie Mellon Univ – EPP
USA

Riyad Khan
In-Corr-Tech Ltd
Trinidad & Tobago

Richard Klotz
Hobart and William Smith Colleges
USA

Keichiro Kobayashi
Cosmo Research Institute
Japan

Steve Kyryk
Hobbs and Towne Inc
USA

Gregory Lane
University of Alberta
Canada

Huey-Lin Lee
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Announcement

9th Annual USAEE/IAEE/ASSA Meeting

Chicago, Illinois., USA January 5- 7, 2007

Session Title:

Current Issues in Energy Economics and Energy Modeling

Session Date:

Saturday, January 6 – 10:15am – 12:00n
– Hyatt Skyway, Rm 265

Presiding: **Carol Dahl**, Colorado School of Mines

Alireza Tehrani Nejad M. and **Valérie Saint-Antonin**, Institut Francais du Pétrole – *Allocation of CO_2 Emissions in Petroleum Refineries to Petroleum Joint Products: A Case Study*

Lester C. Hunt, University of Surrey, and **Frederick L. Joutz**, George Washington University – *Modeling Underlying Trends in OECD Energy Demand: Deterministic Vs. Stochastic?*

Benjamin F. Blair and **Jon P. Rezek**, Mississippi State University – *The Effects of Hurricane Katrina on Price Pass – Through in Gulf Coast Gasoline Markets*

Youngho Chang and **Qiyan Ong**, National University of Singapore – *Consumption Efficiency and Deregulated Electricity Market*

Discussants:

Donald A. Hanson – Argonne National Laboratory

Clifton T. Jones – Stephen F. Austin State University

Young Yoo – Federal Energy Regulatory Commission

Lynne Kiesling – Northwestern University

Abstracts are posted at http://www.iaee.org/en/conferences/assa2007.aspx
The meeting is part of the Allied Social Science Association meetings (ASSA)
For program information and pre-registration forms on the larger meeting go to http://www.vanderbilt.edu/AEA/anmt.htm. Also watch for the USAEE/IAEE Cocktail Party.

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Endogenous Technological Change and the Economics of Atmospheric Stabilisation

Guest Editors: Ottmar Edenhofer, Carlo Carraro, Jonathan Köhler and Michael Grubb

Few dispute that technology innovation will be central to tackling the diverse energy challenges of this Century – but the economics of innovation remain poorly understood and inadequately represented in most economic models.

Nevertheless, empirical and theoretical developments in the field of "endogenous technological change" (ETC) are increasingly being incorporated in energy-economy models, which are rapidly gaining complexity and salience in the global debate. In both 'top-down' and 'bottom up' lines of analysis, a much richer menu of technologies and innovation processes are being modeled, for example with introduction of strategic R&D investments and R&D spillovers, crowding out effects between different R&D investments, joint modeling of learning by researching and learning by doing, and endogenizing dynamics of a backstop technology.

It is time to assess the state of the art, with a comparative study traversing both 'bottom-up' and 'top-down' perspectives in relation to the most over-arching, long-term and global policy question in the field: the implications of trying to stabilize atmospheric CO_2 concentrations. This Special Issue brings together the results from the Innovation Comparison Modeling Project, representing early and extensive efforts to do just that. Edited by Ottmar Edenhofer, Carlo Carraro, Jonathan Köhler and Michael Grubb, the 284-page volume contains a Synthesis Report that examines and compares the influence and dynamics of ETC in ten different global models (ENTICE-BR, FEEM-RICE, AIM/Dynamic-Global, DEMETER-1CCS, MIND, DNE21+, GET-LFL, MESSAGE, IMACLIM-R and E3MG), applied to assess the economics of stabilising atmospheric CO_2 concentrations.

These, together with an Introductory Overview and a Technical Overview of the theoretical and empirical state of play, presents a unique collection and contribution to the wider economic debate on technology, innovation and policy towards our global energy challenges.

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• **Newsletter:** The IAEE Newsletter, published four times a year, contains articles dealing with applied energy economics throughout the world. The Newsletter also contains announcements of coming events, such as conferences and workshops; gives detail of IAEE international affiliate activities; and provides special reports and information of international interest.

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Developing & Delivering Affordable Energy in the 21st Century

September 16-19, 2007 Post Oak Hilton Houston, Texas - USA

27th USAEE/IAEE North American Conference

United States Association for Energy Economics International Association for Energy Economics

Conference Structure

This year we have chosen conference themes that we believe reflect the key policy challenges and uncertainties for developing necessary infrastructure in North America as well as the world. We would like the concurrent sessions to expand on these themes, and are actively soliciting papers that address the suggested bullet points. Papers on other topic ideas are, of course, welcome, and anyone interested in organizing a session should propose the topic and possible speakers to: Wumi Iledare, Concurrent Session Chair (p) 225-578-4552 (f) 225-578-4541 (e) wumi@lsu.edu. The conference will also feature technical tours, workshops, public outreach and student recruitment sessions.

LNG
- Upstream access and supply
- Downstream infrastructure development
- Shipping capacity and costs
- Contracts, project financing, gas market integration, risk management

Supply and Access
- Oil – conventional & unconventional resources, geopolitics
- Refining – capacity, technology
- Natural gas – access and geopolitics
- Role of National Oil Companies

Legal and Regulatory Considerations
- Siting energy facilities
- Increasing regulatory efficiency
- Managing legal uncertainties
- EPAct 2005: an initial evaluation

Alternative Energy & Efficiency
- Mass-scale solar power
- Coal gasification
- Biofuels – amount, timing
- Wind power

Science and Technology Policy
- Role of IT (upstream oil & gas, DSM, smart metering, smartgrid)
- Frontier technologies: nanotechnology, biotechnology, material sciences
- Science of climate chang

Electricity Market Design
- Importance of market design
- Market design policy evolution in the USA
- Comparison of different market structures
- Regulatory versus market (in)efficiency

Electricity Infrastructure
- Building transmission – who? how? new technologies?
- Managing grids: ISO, RTO or traditional utilities
- Building new generation including alternatives, nuclear, coal and DG

Energy Trading
- Oversight – veracity of price data
- Volatility – impact, management
- Oil, gas, coal, electricity linkages
- Impact of market structure

Human Capital
- Trends in skills needed
- Impact of demographics and societal trends on career choice
- Role of educational institutions

Energy Reporting and Education
- Role of media in public opinion
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- Energy in school curricula

**** CALL FOR PAPERS ****

Abstract Submission Deadline: April 27, 2007

(Please include a short CV when submitting your abstract)

Abstracts for papers should be between one to two paragraphs (***no longer than one page***), giving a concise overview of the topic to be covered. At least one author from an accepted paper must pay the registration fees and attend the conference to present the paper. The lead author submitting the abstract must provide complete contact details - mailing address, phone, fax, e-mail, etc. Authors will be notified by June 1, 2007, of their paper status. Authors whose abstracts are accepted will have until August 4, 2006, to return their papers for publication in the conference proceedings. While multiple submissions by individuals or groups of authors are welcome, the abstract selection process will seek to ensure as broad participation as possible: each speaker is to present only one paper in the conference. No author should submit more than one abstract as its single author. If multiple submissions are accepted, then a different co-author will be required to pay the reduced registration fee and present each paper. Otherwise, authors will be contacted and asked to drop one or more paper(s) for presentation. Abstracts should be submitted to:

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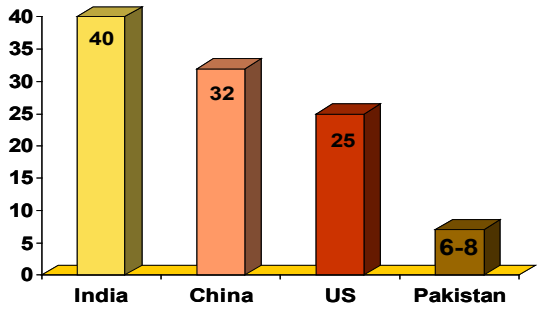
Nuclear Renaissance: If Not in the West, Then in Asia

There have been an increasing number of signals that the morbid nuclear power sector may be coming to life again. In the UK, there has been increased talk about building a second generation of nuclear plants. In the past few months a number of companies in the US have filed with the Nuclear Regulatory Commission (NRC) their intent to get back into the business. That is news. The last time NRC issued a plant license in the US was in 1973. Finland is the only European country currently building one, with France announcing that it will begin an**other soon.**

Second dawn of nuclear power?

For the ever optimist nuclear die-hards, however, the future is bright and the second dawn of nuclear power generation is imminent – if not in the US, the UK, or France, then in China, India, Pakistan and other rapidly developing countries.

Major growth markets for nuclear reactors, number of new reactors proposed



Source: Compiled from various country announcements (international) and company filings/announcements (US); does not include UK or France, both with plans to build more

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Publications

Five-Year Outlook for Geopolitical Risk in 21 Oil-Producing Countries. (2006). Price: n/a. Contact: The PRS Group, Inc., 6320 Fly Road, Suite 102, East Syracuse, NY 13057-9358 USA. Phone: 1-315-431-0511. Fax: 1-315-431-0200. Email: custserv@prsgroup.com URL: www.ICRGonline.com/products.aspx

Calendar

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6-10 November 2006, Oil and Gas Finance for non-Financial Managers at London, UK. Contact: Victoria Jolly, CWC School for Energy, 3 Tyers Gate, London, SE1 3HX, United Kingdom. Phone: +44 20 7089 4187. Fax: +44 20 7089 4201 Email: vjolly@thecwcgroup.com URL: www.thecwcgroup.com/train_home.asp

9-9 November 2006, Energy Europe: Security of Supply, Competitiveness and Environmental Sustainability at Brussels, La Bibliothèque Solvay. Contact: Giovanni Colombo, Project Manager, Friends of Europe, 137 Rue Belliard, Brussels, Belgium. Phone: 003227379158. Fax: 003227387597 Email: giovanni.colombo@friendsofeurope.org URL: http://www.friendsofeurope.org

9-10 November 2006, China Gas Summit 2006 at Beijing, China. Contact: Mabel Yu, Marketing Manager, China Decision Makers Consultancy, Ste 802-806, Oriental Plaza No.1500, Century Blvd, Shanghai, 200 122, China. Phone: 8621-6840-7631. Fax: 8621-6840-7632 Email: info@chinagassummit.com URL: www.chinagassummit.com

13-14 November 2006, Oil & Gas Exchange 2006 at Novotel West, London, UK. Contact: Romain Ollichon, Mr., IQPC Ltd., Anchor House, 15 - 19 Britten Street, London, SW3 3QL, United Kingdom. Phone: +44 (0)20 7368 9836. Fax: +44 (0)20 7368 9303 Email: romain.ollichon@iqpc.co.uk URL: http://www.iqpc.co.uk/cgi-bin/templates/genevent.html?topic=229&event=11353&

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20-21 November 2006, 11th IIES International Oil & Gas Forum: New Developments in World Oil & Gas - Challenges & Opportunities at Tehran, Iran. Contact: Conference Secretariat, IIES, 125 Dasfgerdi Zafar Ave, Tehran, 19167, Iran. Phone: 98-21-2225-8092-5. Fax: 98-21-2222-1793 Email: conference@iies.ac.ir URL: www.iies.org

21-22 November 2006, E&P Knowledge and Data Management for Asian Oil & Gas 2006 at Sheraton Imperial Hotel,Kuala Lumpur, Malaysia. Contact: Edsel Mercado Jr., Conference Director, Oil & Gas IQ - A Division of IQPC Worldwide, 61 Robinson Road, #14-01 Robinson Centre, Singapore, 068893, Singapore. Phone: +65 6722 9388. Fax: +65 6720 3804 Email: enquiry@iqpc.com.sg URL: www.oilandgasiq.com/AS-3421

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28-29 November 2006, Supply Chain Forecasting 2006 at Novotel Clarke Quay. Contact: Anna Franz, Conference Manager, Supply Chain IQ - A Division of IQPC Worldwide, 61 Robinson Road, #14-01 Robinson Centre, Singapore, 068893, Singapore. Phone: +65 6722 9388. Fax: +65 6720 3804 Email: enquiry@iqpc.com.sg URL: www.iqpc.com.sg/AS-3445

28-29 November 2006, Mergers & Acquisitions for Utilities at Grange Holborn Hotel, London, UK. Contact: Romain Ollichon, Mr., IQPC Ltd., Anchor House, 15 - 19 Britten Street, London, SW3 3QL, United Kingdom. Phone: +44 (0)20 7368 9836. Fax: +44 (0)20 7368 9303 Email: romain.ollichon@iqpc.co.uk URL: http://www.iqpc.co.uk/cgi-bin/templates/genevent.html?topic=604&event=11145&

November 29, 2006 - December 1, 2006, Achieving Fiscal Stability in Upstream Oil & Gas at The Hilton Post Oak Hotel, Houston, TX. Contact: Romain Ollichon, Mr., IQPC Ltd., Anchor House, 15 - 19 Britten Street, London, SW3 3QL, United Kingdom. Phone: +44 (0)20 7368 9836. Fax: +44 (0)20 7368 9303 Email: romain.ollichon@iqpc.co.uk URL: http://www.iqpc.co.uk/cgi-bin/templates/genevent.html?topic=229&event=11034&

29-30 November 2006, Phase II of Renewable Energy in America at Washington, DC. Contact: Courtney Tharpe, Representative, American Council on Renewable Energy, 1629 K St NW Ste 210, Washington, DC, 20006, USA. Phone: 1-202-393-0001 x7586 Email: tharpe@acore.org URL: www.acore.org

30 November 2006 - December 1, 2006, Asia 2006 Intl Symposium Water Resources and Renewable Energy Development in Asia at Bangkok, Thailand. Contact: Mrs. Maria Flintan, Asia 2006, Aqua-Media International, Westmead House, 123 Westmead Road, Sutton, Surrey, SM1 4JH, United Kingdom. Fax: 44-20-8643-8200 Email: bkk2006@hydropower-dams.com URL: www.hydropower-dams.com

1-1 December 2006, Research Conference on Gasoline and Oil Markets at Berkeley, CA. Contact: Conference Coordinator, Center for the Study of Energy Markets (CSEM), Univeristy of California Energy Institute, 2547 Channing Way, Berkeley, CA, 94720, USA. Phone: 510-643-5009 Email: gasconf@ucei.org

5-5 December 2006, Deloitte Oil & Gas Conference at Houston, Texas. Contact: Ms. Mickey Appel, Marketing Manager, Deloitte & Touche LLP, 333 Clay Street, Suite 2300, Houston, TX, 77002, USA. Phone: 713.982.3832. Fax: 713.427.4132 Email: mappel@deloitte.com URL: TBD

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5-6 December 2006, Improved Oil Recovery Asia Pacific 2006 at Shangri-la Hotel. Contact: Philip Parba, Conference Manager, IQPC Worldwide Pte Ltd, 61 Robinson Road #14-01, Robinson Centre, Singapore, Singapore, 068893, Singapore. Phone: +65 6722 6388. Fax: +65 6720 3804 Email: enquiry@iqpc.com.sg URL: www.oilandgasiq.com/AS-3390/web

5-6 December 2006, Shutdowns & Turnarounds 2006 at Shangri–La, Kuala Lumpur, Malaysia. Contact: Anna Franz, Conference Manager, IQPC Worldwide Pte Ltd, 61 Robinson Road #14-01, Robinson Centre, Singapore, Singapore, 068893, Singapore. Phone: +65 6722 6388. Fax: +65 6720 3804 Email: enquiry@iqpc.com.sg URL: www.iqpc.com.sg/as-3496/web

5-6 December 2006, HPHT Wells 2006 at Ardoe House Hotel, Aberdeen, Scotland, UK. Contact: Romain Ollichon, Mr., IQPC Ltd., Anchor House, 15 - 19 Britten Street, London, SW3 3QL, United Kingdom. Phone: +44 (0)20 7368 9836. Fax: +44 (0)20 7368 9303 Email: romain.ollichon@iqpc.co.uk URL: http://www.iqpc.co.uk/cgi-bin/templates/genevent.html?topic=229&event=11387&

5-6 December 2006, Advanced Contract Risk Management in Upstream Oil and Gas at Ardoe House Hotel, Aberdeen, Scotland, UK. Contact: Romain Ollichon, Mr., IQPC Ltd., Anchor House, 15 - 19 Britten Street, London, SW3 3QL, United Kingdom. Phone: +44 (0)20 7368 9836. Fax: +44 (0)20 7368 9303 Email: romain.ollichon@iqpc.co.uk URL: http://www.iqpc.co.uk/cgi-bin/templates/genevent.html?topic=229&event=11374&

7-8 December 2006, CGES 29th Executive Retreat Meeting: Iran and Iraq Politics and Oil at Surrey, UK. Contact: Loui, Marketing Executive, Center for Global Energy Studies, 17 Knightsbridge, London, SW1X 7LY, United Kingdom. Phone: 44-0-20-7235-4334. Fax: 44-0-20-7235-4338 Email: marketing@cges.co.uk URL: www.cges.co.uk

11-12 December 2006, Tribal Energy in the Southwest Conference at Albuquerque, New Mexico. Contact: Erika Schaefer, Marketing, Law Seminars International, 800 Fifth Ave, Suite 101, Seattle, WA, 98104, USA. Phone: (206) 567-4490. Fax: (206) 567-5058 Email: eschaefer@lawseminars.com URL: http://www.lsinews.com/LSI/06/06tribnm.htm

30-31 January 2007, Advanced Production Forecasting at Magnolia Hotel Houston, Houston, TX. Contact: Romain Ollichon, Mr., IQPC Ltd., Anchor House, 15 - 19 Britten Street, London, SW3 3QL, United Kingdom. Phone: +44 (0)20 7368 9836. Fax: +44 (0)20 7368 9303 Email: romain.ollichon@iqpc.co.uk URL: http://www.iqpc.co.uk/cgi-bin/templates/genevent.html?topic=229&event=11580&

30-31 January 2007, Security For Energy Infrastructure 2007 at The Café Royal, London, UK. Contact: Romain Ollichon, Mr., IQPC Ltd., Anchor House, 15 - 19 Britten Street, London, SW3 3QL, United Kingdom. Phone: +44 (0)20 7368 9836. Fax: +44 (0)20 7368 9303 Email: romain.ollichon@iqpc.co.uk URL: http://www.iqpc.co.uk/cgi-bin/templates/genevent.html?topic=229&event=11591&

30-31 January 2007, Wells Summit 2007 at Marcliffe HotelAberdeen, UK. Contact: Romain Ollichon, Mr., IQPC Ltd., Anchor House, 15 - 19 Britten Street, London, SW3 3QL, United Kingdom. Phone: +44 (0)20 7368 9836. Fax: +44 (0)20 7368 9303 Email: romain.ollichon@iqpc.co.uk URL: http://www.oilandgasiq.com/cgi-bin/templates/genevent.html?topic=229&event=11450&

4-7 February 2007, National Biodiesel Conference and Expo 2007 at San Antonio, TX. Contact: Conference Coordinator, National Biodiesel Conference & Expo 2007, BBI International, 228 N F St Ste 1, Salida, CO, 81201, USA. Fax: 719-539-0301 Email: registration@bbibiofuels.com URL: www.biodieselconference.org

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