The demand side is our starting point...

Ross McCracken summarizes the keynote speeches of the June IAEE conference and puts questions to a panel comprising **Olivier Appert**, President of the Institut Français du Pétrole, **Jean-Philippe Cueille**, President of the IAEE, **Georg Erdmann**, IAEE conference chairman and former UK energy minister **Lord Howell of Guilford**.

The central importance of demand management, the need for diversity and the alignment of market signals with policy goals were the key messages of the 29th conference of the International Association for Energy Economics, held June 7-10, in Potsdam, Germany. There was no promotion of 'silver bullet' technologies, rather recognition that a diverse range of energy sources is needed to meet the challenges presented by climate change, security of supply concerns and energy poverty.

However, some contradictions were evident between the role of policy and markets, with empirical evidence that market signals and outcomes were not synchronized with changing policy goals. While free market philosophy retains its primacy through belief in the efficiency of markets, questions remained over how markets can internalize the costs of climate change and the role policy should play in this process.

Lord Howell of Guilford: The most important need is for diversity and flexibility in our energy supplies. Within the EU there are three serious dependencies, the EU's reliance on piped Russian gas, France's dependence on nuclear, and the world dependency on oil. These have brought less energy security not more. We should look to Japan as an example, a country with precious few natural resources, but one that has persisted with energy efficiency since the 1970s and '80s oil shocks.

Europe's dependence on piped Russian gas was foreseen, but many felt that the supplier would need the customer just as much as the customer needs the supplier. However, even if we forget the unsettled political scene in Moscow, Gazprom will inevitably behave as monopolies do and find the best customer, which might prove to be Asia rather than Europe.

The Russia-Ukraine gas crisis at the beginning of the year unnerved the EU, but the European Commission's response has been to meet a monopoly with a monopsony – a single buyer. This will not work in practice as EU member states treat gas supply on a national basis and Russia has other buyers.

I put forward two propositions: first, there is no such thing as full energy security, because no such pattern can ever last. It will always be disrupted by events. Second, the best security is achieved through diversity and the ability to switch between sources of primary and secondary energy. This applies at all levels of the economy. Japan again provides a good example in its development of LNG and its moves towards spot market purchasing rather than long-term contracts.

China's strategy of establishing wider contacts abroad and securing foreign assets is not a guarantee of security of supply. It works in a buyers market, but when there is a shortage of oil they are as vulnerable as everyone else and diversity again comes to the fore. We all have to face reality in that security lies in diversity, market driven efficiency and the development of domestic resources.

The cost ruler must be applied to nuclear power and the question asked, is it worth it, given the risks and the level of investment required? Energy efficiency, driven by economics, offers much more hope. Coal can be gasified and liquefied for a carbon-free burn. Plant derived hydrocarbons can be developed with experience, although we must avoid the risk of a new subsidy regime.

Former executive director UNEP, Klaus Toepfer: Oil reserves depend on price, technology and demand. If we can achieve carbon storage and sequestration, then this will allow further increases in hydrocarbon production. But what is the overall economic and social end of the decisions that we take? How do we bring energy security of supply and ending poverty together? We need reliable and economically affordable energy sources, alongside policies that are socially responsible and environmentally sound. Energy is fundamental to achieving other goals of reducing poverty and promoting development.

The demand side should be the starting point. In the short-term most energy costs are fixed. Only over the longer term does the demand side demonstrate a more flexible response. Consumers react to price, but need signals.

Settlement structures reflect the relative price of gasoline. The global average for car ownership is 120 private cars per 1,000 people. In the US, the figure is 850, in the EU 750 and in China less than 50. There is the prospect of adding 13 million more cars, owing to increases in income and people's need for mobility. As a result, there is an urgent need to change the demand side. This is also true for buildings, where there is now the possibility of building zero emission houses. These technologies become more competitive as energy prices rise.

We need to cancel all subsides for all forms of energy supply. If subsidies persist, then there are no clear economic answers and no clear economic signals. Currently all forms of energy are subsidized. Fossil fuels are subsidized because the costs of climate change are not included. We have incomplete knowledge about carbon dioxide, but all decisions are taken with incomplete knowledge and the case looks persuasive. If

the costs of climate change can be integrated into the production of fossil fuels, then we would have no need to subsidize other forms of energy supply. We would have the same structure of subsidy for all sources of power.

Energy Economist: Saudi OPEC governor Majid Al-Moneef expressed concerns about over investment. Do you see tensions between producer countries and the climate change agenda?

Olivier Appert: Producing countries were deeply hurt by the drop in demand after the first and second oil shocks and again in 1999. They are again under pressure to increase production, but do not want to invest for nothing. US President George Bush's recent statement on reducing US dependence on Middle East oil was naturally a cause for concern.

Now, however, oil is more related to the transport sector. If there is a global crisis, economic growth could slow and with it the demand for oil, but with no crisis, there is every expectation that the transport sector will continue to grow and so will demand for oil. As a result, producers perhaps overestimate their concerns. The real problem with a potential lack of investment is not in the next couple of years, but in the next ten to twelve. Producers were opposed to climate change mitigation, but now they see the level of prices and realize that these measures have had no impact on price.

Jean-Philippe Cueille: Oil producers also see carbon storage and sequestration as a technology that allows a greater future for oil, even if it is hard to apply to the transport sector, it represents a future for burning hydrocarbons. There are even some far off ideas of CCS in cars. But you can see the importance of the oil price to producers. Oil exporters' budgets are often highly dependent on the oil price and enormous economic and political pain can result from a sharp fall in prices.

Lord Howell: There is so much anxiety about oil supply and the situation in Iraq, but it is important to realize how much oil has been kept back from the market by supply disruptions. The London-based Center for Global Energy Studies, in which I have an interest, has estimated that some 2.2-8.8 million b/d has been missing from the market as a result of various disruptions, mainly in Venezuela, Nigeria and Iraq. This has reduced spare capacity to below 2 million b/d, but it also indicates that there is much more potential spare capacity than people realize.

EE: There are many signs that the physical market is over-supplied with oil. Are futures setting the price?

Olivier Appert: Looking at the market today, there is no question that the current price is not related to the fundamentals of supply and demand.

Lord Howell: As a general measure, I see $20/barrel of the price of oil as speculative, $10/ barrel of which relates to pure trading activities and another $10/barrel to more widespread concerns with the market situation. All it takes are some positive noises from Iran about talks over their nuclear program and the price of oil drops by $4/barrel.

Georg Erdmann: You have to get current price in perspective. It was only a few years ago that OPEC had a price band of $22-$28/barrel and even that sparked debate over whether the ceiling was too high. We are now at $60-$70/barrel.

EE: Despite predictions, why has the oil price rise had so little impact on inflation?

Olivier Appert: Non-OECD demand has not been so badly affected, but the burden has become heavier because of subsidy systems. These have protected consumers, but in many cases have taken up a significant share of state budgets. As a result there has been a delayed effect on demand, but it is happening.

Lord Howell: This time around, there are a lot of new factors. For example, deliberate oil reduction policies operating over the medium term, resulting in real demand destruction. This time, there would not be a corresponding impact on demand if oil prices fell.

Olivier Appert: There has been a small short-term demand effect, just like during the 1990 Gulf War. In the US, there was then a significant drop in demand. Three months after the price spike, demand fell by 1 million b/d. That is not the case today. There has been less impact on inflation in part because there are more tools to cope with inflation. Demand has been less affected because of the tax cushion – taxes in many countries make up 75% of the price consumers pay, so the actual rise in product prices is much smaller. In the non-OECD, there are three types of country, those like China and India, where their cost advantage is so large they have been able to cope with the rise in prices. Oil producers, which have accounted for a large share in oil demand growth. Some, like Venezuela and Iran, have large subsidies which for political reasons are impossible to get rid of, so there has again been little impact on demand. In other non-OECD countries, the rise in costs has been absorbed by governments concerned about the political costs of passing on the whole rise in prices.

Georg Erdmann: There are also other effects such as where demand falls on the marginal driver. With little elasticity of demand in the US, because of their social dependence on car transport, there is no marginal driver. In China, where demand for transport is growing rapidly, again there is no marginal driver effect because the Chinese government has been subsidizing the price of refined products. Europe has become the only area where there is a significant marginal driver effect.

Olivier Appert: More broadly, the world economy is in much better shape now than is was during the other oil shocks.

EE: Should the price of gas be de-linked from oil and are we seeing greater possibilities for substituting other commodities for oil?

Jean-Philippe Cueille: The US has had open gas markets, without this link to oil, for sometime, but even then there is a strong correlation because of the ability to substitute between oil and gas. It has been estimated that the capacity to switch is as much as one million barrels of oil equivalent a day.

Lord Howell: Over the last 30 years there has been a huge switch in the UK from oil to gas and there is likely to be more flexibility as spot market supplies of LNG increase. But the contractual link represents a form of insurance for both sides.

Olivier Appert: Oil is used 98% for transport and there are increasing levels of car ownership. It will take a long time and we are starting from nothing. Even if biofuels took 5% of the market by 2010, when the increase in car ownership is taken into consideration, there will also still have been an increase in demand for oil. So there will be little impact on oil over the short term. The first priority must be energy efficiency encouraged through policy. The average weight of cars is actually increasing by about 25 kilograms a year.

Jean-Philippe Cueille: Cost is everything. Ethanol in Europe is competitive with oil only when oil reaches a price of between $90-$150/barrel. The technological development of cars offers a way through, but so far we cannot say at what price the different technologies will meet.

EE: There seems to be some tension between policy and markets. Do markets always give good signals?

Jean-Philippe Cueille: It is necessary to have a clear regulatory framework and policy context, but it is wrong to rush into subsidies, which can stifle innovation. We have to ask what is the true cost of a barrel of oil, including the cost of carbon dioxide emissions, plus other hidden subsidies. The policy environment must reflect the true costs, which means that prices must become more transparent.

Olivier Appert: The experience of the UK gas market is interesting. The market appears to have been blind to two facts. The drop in North Sea production was not hard to predict. The second was seasonality, taking into account production on the UK continental shelf, there was no signal to invest in storage. Why didn't the market see these facts?

Lord Howell: The market is not always able to give good signals. It is unreal to think that markets offer all the solution, but in order to avoid a boom-and-bust cycle markets need long-term players for crucial investment. Therefore government must be more involved.

Georg Erdmann: Governments have a role. No market in the world is totally competitive. Power plants' marginal costs are very steep and this makes market entry very difficult. They operate in markets that have natural oligopolistic tendencies. These markets do not necessarily attract rational investors because oligopolies want to keep capacity as low as possible. Governments should facilitate open market entry and create incentives.

Lord Howell: There is also an important question, which is whether government is equipped to make these decisions. But if capital markets will not invest and investors themselves refuse to step up, then how do we get long-term investment?

Olivier Appert: Energy by its nature is a long-term sector. A power plant's life is somewhere between 40-50 years. Governments have short-term horizons as they are driven by elections and the market is also short term. How can these actors take long-term decisions?

EE: Combined heat and power generation technologies offer much higher efficiencies. Should they be an integral part of energy policy? What other developments do you see as important?

Jean-Philippe Cueille: CHP is a good solution where there is a large heat sink. It is a good solution in the case of the Nordic countries, but is not so good in southern Italy for example, where there is less demand for heat. It represents one part of the solution. It works best in places where district heating is already installed. It is very expensive and sometimes simply not practical to install in lots of different private houses, which already have different heating systems. In addition, it takes a lot of time and money to build from scratch.

Georg Erdmann: Finding a large heat sink is problematic, one that is big and requires heat for long hours. CHP can be applied mainly in buildings, but the requirement in industry is small. As it is hard to get people to change, small-scale CHP provides more of a solution. However, this requires the production of small motors and there are no economies of scale in downsizing motors, in fact there are diseconomies of scale. Fuel cells possibly offer an alternative route as these can be downscaled and the cost reduced per unit.

Olivier Appert: If there could be one breakthrough, I would hope that it would be in batteries. If we could store electricity efficiently it would solve so many problems. But batteries have been around for so long and there has been no breakthrough.

Lord Howell: Not using energy is our biggest resource. Energy efficiency, not just politically guided, but as a question of changing public attitude is of central importance. If that happens, we could reduce the need for energy substantially.

Jean-Philippe Cueille: I agree, education is of fundamental importance and it is key to achieving energy efficiency, both for access to energy and for energy conservation.