

Energy Policy

John Mitchell considers EU policies on energy supply security

EU policies on energy security are 'work in progress'. The Green Paper of March 2006 (*A European Strategy for Sustainable, Competitive and Secure Energy*, COM(2006)105) was followed by an Energy Council discussion on 14 March 2006 which initiated a consultation process which should lead to a Strategic Review to be completed in 2006 for an Action Plan to be adopted by the Council in spring 2007. Xavier Solana, the High Representative and Secretary General of the Council has submitted a paper to the European Council (of heads of governments) on external energy risks and how these can be better managed by use of the EU's emerging Common Foreign and Security Policy (CFSP). The Green Paper is also being reviewed by the European Parliament Committee on Industry, External Trade, Research and Energy: the action plan (if it has substance) is likely to include some actions that require parliamentary approval or through the co-operation or co-decision process.

Like most EU communications, these texts reflect the tensions between the Commission, with its limited powers of initiative and direction, and the Council, composed of national governments, with the Parliament on the fringes. Like all EU communications on energy, it also reflects the lack of clear Treaty authority for Union-level actions in energy, unless these are based on more general Treaty provisions such as external trade, the internal market or competition.

Those concerned with energy supply security therefore face the double challenge of identifying what appropriate policies for Europe might be, and then how to advance those policies through the decision-making processes.

Electricity

For many consumers, energy means electricity. Of Europe's energy supplies, 40 percent go to generate and distribute electricity. Final consumers want electricity that comes on at the flick of a switch. The switches did not work in the US East Coast and Canadian blackouts of 2003, the Italian blackouts of 2003, and recent blackouts in Chicago, Honolulu, New York and New Zealand. They are remembered as exceptions. In the last two months there have also been prolonged and disruptive blackouts in 19 other countries. Such disruptions affect households, damage the economy and may cause deaths.

These blackouts were not caused by lack of fuel supplies. Either the management of the network failed or there was not enough spare capacity in the network or the generating system, or both. The liberalisation of the European electricity market should improve the ability of the existing capacity to respond to local disruptions. However, few countries have yet achieved full liberalisation at the consumer level, as required (for January 2007) by the 2003 Electricity Directive.

The Commission apparently intends to pursue the completion of the single market structure, to promote improved technical interconnectivity and to enhance the financial assistance available for Trans-European Networks (TENS).

Policies are less clear for investment in new generation plant, which requires a choice of fuel and a prediction of the likely load factor. The fuel mix is regarded by many governments (and the Commission) as a legitimate sphere for government decision. According to Andris Piebalgs, the forthcoming Strategy Review will suggest a 'benchmark objective to maintain or achieve a minimum level of overall EU energy mix from secure or indigenous and low-carbon energy sources'. How to judge reality against

so vague a target will be a puzzle. There are difficult issues: how will nuclear be treated, given the extreme differences in approach between France and Germany, with the UK somewhere between? Specifically, will nuclear be recognised as a low-carbon fuel for the purpose of emissions caps and financial incentives?

There are similar policy uncertainties for coal, which at present and likely future oil and gas prices would obviously be the fuel of choice for new base load plants if there were no penalties for CO₂ emissions. The future prices for carbon emission permits depend on the severity of the caps on emission in the second trading period (2008–2012) and on what system will exist after 2012.

Meanwhile, national mandates should increase the share of 'renewable' primary energy input from 14 percent in 2004 to 21 percent in 2010 across Europe. The higher proportion of intermittent supplies will increase the complexity of balancing loads and the need for spare 'reliable' capacity.

Storage and Shocks

EU Directives require the oil industry to hold storage equivalent to 90 days consumption for use in emergencies. At present, the electricity sector takes only about 6 percent of Europe's oil supplies. Gas is a more important question. Just under 30 percent of gas supplies go to electricity and this proportion is projected to increase slightly. The Commission is canvassing the idea of compulsory stocks for gas. It would be controversial whether such storage would be under the control of the Commission or of national governments.

The single European market for gas is far from complete. The UK experience last winter showed that despite a high premium for gas in the UK, following a fire at the Rough (storage) field, supplies to fill the interconnecting pipeline from the continent did not appear. The Commission is addressing

this issue through implementation of the 2003 Gas Directive and through investigations under competition law. Meanwhile, the UK is looking for solutions that rely less on the single market. The UK consultation paper published on 16 October envisages extending to firm industrial contracts the 'public service' obligation which now protects households. Suppliers would be free to meet this obligation as best they could – probably mainly by storage.

Imports

The Commission, and many politicians in Europe, are attracted to the catchphrase of reducing the so-called dependence on imports. From a strategic point of view it seems reasonable to count Norway as part of Europe (the EU documents never do). It is inconceivable that Norway would adopt an export policy which discriminated against the EU. For the European Economic Area (which includes Norway), imports supply 46 percent of energy consumption, 66 percent of oil consumption and 41 percent of gas consumption. Does this matter, as the EU policy makers seem to think?

Energy trade, like all trade, is driven by economic benefits. About 60 percent of world oil consumption is supplied by imports; almost every country either exports or imports oil. The benefits of this trade are very large. Policies which deny these benefits by aiming at 'energy independence' are unlikely to be adopted or, if adopted, are likely to be abandoned, like Nixon's 'Project Independence'.

The second point is that the international oil trade is almost perfectly structured to maximise security through diversity. Crude oils are close substitutes. They are transported relatively cheaply, mainly by sea. There are active commodity markets in New York (Nymex) and London (IPE) for benchmark crude oil and oil products. With small variations for quality and location, there is a world price for crude oil. Trade in crude oil is free of customs tariffs and import or export quotas (the OPEC quotas are on production). One consequence

of the open oil market is that price signals allocate oil very quickly from where it is available to where it is scarce. 'Access to oil' today is a matter of paying for it.

The other consequence is that bilateral deals don't have much security value. It is the total supply of oil to the international market that matters for consumers (and the total demand to producers). If Russian oil exporters chose to sell all their seaborne exports of oil to the USA, they could be replaced in Europe by the oil which would be displaced from the USA.

The two keys to the security of oil supply are therefore maintaining the openness of the market and maintaining investment in new supply in the countries where the resources are. Access to these profitable investment projects is interesting to oil companies, but their interests should not be confused with the interests of oil consumers.

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Gas is different: the markets in pipeline gas are regional, often bilateral. Exporters and importers who are linked by pipeline have few alternatives. Russia's gas exports are totally dependent on the pipelines. Russia supplies about 20 percent of European gas consumption, but Europe provides 100 percent of the market for Russian exports outside the former Soviet space. Russia has an interest in diversifying its markets incrementally, but developing new infrastructure for alternative markets will require large investments and will take time. Europe, with a developing pipeline grid and with more LNG import terminals, is in a more flexible position, though it needs the full liberalisation of the internal market to take advantage of this.

Energy and Political Relations

There remains the question of whether oil or gas trade can be used for political purposes. The answer is 'seldom, and only as part of a larger engagement'. In the case of oil, any bilateral diversion of trade is likely to have limited effect because of the availability of strategic stocks in the OECD countries and the ability to switch trade from one country to another. The more serious threats are to exporters: UN or US sanctions apply to Iran, the Sudan and Burma and have applied to Iraq and Libya. Pipeline gas is rather different, but in most cases the economic importance of the trade to the exporters is a long-term protection for the importers. An exception might be Canada, where gas exports to the USA are small in relation to the economy; but is Canada likely to sanction the USA as part of some wider political confrontation?

This I think is the final key to understanding the role of energy trade in national security: the context is critical. As between Russia, the Ukraine, and Turkmenistan, energy trade is very important to the smaller countries and Russia has large political agendas with all of them. One has to ask what the political conditions would have to be for Russia to use energy supplies to Europe as part of a general confrontation.

Of course, energy will be an important part of EU–Russian relationships, in which energy is not the only bargaining counter. The Energy Charter Treaty and Transit Protocol were written on the narrow basis of energy trade and investment. It was the wider consideration of Russia's accession to the WTO that brought about some concessions on the pricing of gas within Russia. There are wider considerations about the future position of the Ukraine that will inevitably colour its availability as a transit route for Russian exports to Europe. Is energy more likely to follow, rather than lead in this engagement?

Energy trade is not the only element in the EU's economic and political relationship with other neighbouring countries. The EU is negotiating a free trade area with Algeria and

has established a 'European Energy Community' to extend the electricity and gas directive to the countries in south-east Europe. According to a Communication of 15 May 2006, the Commission appears to think that the same approach will work with the Maghreb and other Mediterranean countries of the Barcelona process and eventually with Russia itself, creating an internal market of 35 countries. However, in each case there are other important issues: migration, co-operation on terrorism and illegal money flows, non-energy trade and investment, and approaches to issues of common (but divergent) political interests in the Middle East.

Summary

Energy security includes reliability of supply to consumers. In electricity, more capacity is needed and the new investments require a fuel choice influenced by uncertain future government and EU policies on fuel mix, nuclear energy, mandates on renewables and the price of carbon.

Security of fuel supply needs careful analysis. Energy trade has great economic benefits. The risk of disruptions to oil supply can be managed by flexible open markets (such as the international oil market, and strategic stocks, such as exist for oil). Similar mechanisms are not in place for gas.

Bilateral deals have no function in securing oil supplies: in the case of pipeline gas, the dependence of exporters such as Russia is probably greater than that of the EU.

Oil and gas trade and investment may be an important part of general political and commercial relationships of the EU, especially with Russia, but the conditions are such that they are unlikely to dominate the broader engagements.



Tera Allas on energy security of supply in the UK: the way forward

In July 2006, the UK government published its review of energy policy (DTI, *The Energy Challenge*), describing the energy issues facing the country and announcing a set of measures to address these. Among the most

difficult energy concerns is tackling global CO₂ emissions (see Box 1). But the next 10–20 years will also bring security of supply challenges, with increased gas import dependence and a need for major investments in our electricity infrastructure. Fortunately, many of the measures aimed at reducing CO₂ emissions – such as increased use of renewable fuels or improved energy efficiency – can also contribute to security of supply. However, these may not be enough to ensure the high energy reliability that is fundamental

Box 1: Climate change requires action both internationally and domestically

Among our toughest challenges is that of climate change: without the extensive set of policies announced in the Energy Review, we would be far from reaching our target of reducing emissions by 60% from 1990 levels by 2050. And we are not alone: the IEA projects that, on current trends, global CO₂ emissions will increase by 50% by 2030, with emissions from OECD countries increasing by 20%. So this is not a problem the UK can solve on its own. We therefore have to continue to show strong leadership in developing global climate change policy; and we have to make progress domestically to prepare for a potentially carbon-constrained future. In July, we highlighted the following key policy directions for tackling our CO₂ emissions:

Policy direction	Examples of measures
Maintain commitment to international CO ₂ reductions	<ul style="list-style-type: none"> • Establish Office of Climate Change • Amend international legal framework and boost co-operation for CCS
Strengthen the EU Emissions Trading Scheme	<ul style="list-style-type: none"> • Refine and influence policy for EU ETS post-2012 • Promote inclusion of surface transport and aviation in EU ETS • Keep option open to further strengthen EU ETS/CO₂ price signals
Enhance energy efficiency across the economy	<ul style="list-style-type: none"> • Develop and implement energy efficiency standards • Improve metering, billing and information on consumption • Extend and refine existing supplier energy efficiency commitments
Lower barriers and strengthen incentives for low-carbon supplies	<ul style="list-style-type: none"> • Lower planning barriers to distributed energy, renewables and nuclear • Consult on policy framework for new nuclear build • Review incentives and barriers to distributed generation • Enhance incentives through changes to Renewables Obligation • Increase Renewable Transport Fuel Obligation to 5% after 2010/11 • Implement proposals towards carbon-neutral Government

to the functioning of our modern economy.

Box 2 summarises the security of supply policies announced in July. We remain committed to a market-based approach – where suppliers have a sharp commercial incentive to ensure energy is available for their customers when needed – as the most cost-efficient way of delivering security of supply. It has certainly delivered high levels of security to date. However, there is uncertainty about how this model might work in the future, as the energy environment shifts. Therefore, the government is implementing facilitative measures to maximise the likelihood that markets deliver appropriate levels of security of supply in future decades.

1. A Market-based Framework Can Deliver Security of Supply

There is a widely held misconception that the UK government has somehow given up responsibility for security of supply and that it merely hopes that market forces – in the form of price signals – deliver the goods. First of all, even if it was fully reliant on market forces, there are good reasons to believe that they would indeed deliver quite a lot. They have in the past: a wave of new power plants were constructed in the 1990s; owners of 21 GW of old coal-fired plant will soon have fitted it with Flue Gas Desulphurisation that will prolong its running life; companies operating in the UK North Sea spent £5 billion on exploration and development in 2005

alone; and roughly £10 billion is being invested in new gas import pipelines, LNG terminals and storage facilities, and onshore pipelines to support these investments.

More importantly, the incentives facing and hence the actions of energy producers and suppliers are not a coincidence but a result of our regulatory framework and meticulous market design. This is where the government and Ofgem have ensured that residential gas customers are protected against physical supply interruptions, that transmission and distribution companies face financial penalties for poor reliability, that suppliers or shippers ‘short’ of gas or electricity internalise the full costs of that shortage, and so on. It is not that private sector companies provide energy security from ‘the goodness of their hearts’ – it is because they have a strong profit-motive for doing so.

As a result, the current level of security of supply enjoyed by UK energy consumers is extremely high. In 2005, Oxa estimated that the likelihood of electricity supply not meeting demand (due to lack of generation availability) was essentially zero; even at capacity margins more than 75 percent below current levels, the probability of a material shortfall was 0.002 percent (10 GWh of annual demand, or the amount of supply lost each year due to distribution network failures). For gas, Ilex’s modelling of the UK’s supply/demand balance in 2006 suggested a probability-weighted ‘gap’ between demand and supply (otherwise known as ‘expected energy unserved’) of 0.3 percent of annual demand – and this in a year that is one of the tightest in the history of our gas market. Markets can and do deliver secure energy supplies. How this worked in winter 2005/6 is shown in Box 3.

2. But Markets are not Perfect and the Environment is Changing

It is fair to say that, while our framework has delivered security in the past, this is not a guarantee that it is necessarily robust going forward. In some ways this is inevitable: no one – including the government – can ensure 100 percent certainty. Markets,

Box 2: Security of supply will be delivered by a strengthened market-based framework

Market participants – rather than the Government or Ofgem – should have the knowledge and incentives to determine what the appropriate level of security of supply is and how this can be delivered in the most cost-effective manner. However, there may be obstacles – such as anti-competitive behaviour, regulatory barriers, lack of transparency, geopolitical tensions – that stand in the way of timely investment or effective trading. Our proposals in July, summarised below, were aimed at minimising these barriers:

Policy direction	Impact on security of supply
International strategy to promote open markets and contingency arrangements	<ul style="list-style-type: none"> • More investment in producing and transit countries • More stability in production and exports • Global ability to withstand geopolitical energy shocks
Measures to slow down production decline from the UK Continental Shelf	<ul style="list-style-type: none"> • More investment in exploration, development and production • Better utilisation of existing infrastructure
Reform of planning system for large-scale energy infrastructure	<ul style="list-style-type: none"> • Reduction in regulatory uncertainty vis-à-vis gas and electricity facilities • Reduction in lead-times in permitting and building new infrastructure
Consultation on framework for gas security of supply	<ul style="list-style-type: none"> • Potential measures to further ensure appropriate market outcomes
Enhanced forward-looking analysis and information on security of supply	<ul style="list-style-type: none"> • Objective information to help companies form expectations of future • Time for markets and Government to react to mitigate any risks
Clarification of policy position on renewables and nuclear	<ul style="list-style-type: none"> • Lower uncertainty for all electricity generation investment • Lower import-dependency of low-carbon power generation technologies

Box 3: How the gas market delivered security of supply in winter 2005/6

The supply/demand balance in the UK gas market in winter of 2005/6 was one of the tightest we have ever experienced. This was exacerbated by a number of discrete events: a cold spell early on, which depleted storage stocks; cold weather and market practices on the Continent limiting flows through the gas Interconnector from Belgium; and an incident at the Rough storage facility in February, forcing it off-line for the rest of the winter.

The main effect of these factors was on prices. As fears about the sufficiency of gas stocks emerged in November, forward prices for the rest of the winter increased dramatically. It then became more profitable for owners of stored gas to hold onto it or sell it forward into the latter part of the winter. The reduced storage flows put pressure on spot prices, increasing them to a level sufficient to help supply and demand balance on the day. Companies short of gas in the UK looked for ways to import more from the Continent or elsewhere. High prices incentivised power stations to find ways to run on alternative fuels, and a number of industrial facilities switched to using distillate back-up. A handful of energy-intensive companies reduced or stopped production, as gas prices became prohibitively high.

Were prices irrationally high? From an economic point of view, the answer is no. Modelling of the UK gas market indicates that, for the vast majority of days, prices matched very closely the marginal costs of supply and the marginal willingness of customers to pay. Overall, prices had to rise to an average level high enough to curb demand – and this level happened to be at around 50-80p/therm, the average cost of running on alternative fuels such as coal.

In the event, the UK gas market did not actually experience a physical shortfall in gas supplies. Prices were uncomfortably high and volatile but the impact of this was far less detrimental than involuntary interruptions. For example, work conducted by Global Insight and Ilex suggests that the economic loss from high and volatile prices while the market is still operating is perhaps in the region of 50-200p/therm; while the costs to the economy of involuntary interruptions could be more like 200-3000p/therm, with an average of 1200p/therm.

Had the Government or Ofgem intervened somehow to ‘calm’ prices, there would not have been the incentive for companies to look for additional supplies or for customers to reduce demand. The most likely outcome would have been a gas emergency, with involuntary interruptions to large users’ gas supply. Moreover, and probably more damagingly, this would have dampened the enthusiasm of those working hard to bring gas into the UK for the following winter and beyond. Such intervention with market signals could have jeopardised the investment we need for our future security of supply.

comprising many different participants with different abilities to react quickly, are likely to provide a fair degree of diversity and flexibility to manage these risks. But the government also needs to review its framework to ensure it is fit-for-purpose in the longer run.

The issues potentially weakening our future energy security fall broadly into three (interrelated) categories: geopolitical or global energy risks, the domestic investment challenge, and possible market failures. Indeed, the impact of these, as illustrated by

modelling work by Ilex and Redpoint, could be to increase materially the possibility of involuntary interruptions (or high and volatile prices) in the period between 2010 and 2020 in both electricity and gas. While there is a lot of uncertainty around these projections, and they depend on a large number of assumptions, levels of ‘expected energy unserved’ by 2020 could increase from essentially zero to around 0.15 percent and 0.025 percent of annual demand in gas and electricity, respectively. (For a more detailed discussion of how energy security can be measured quantitatively, see

DTI, The effectiveness of current gas security of supply arrangements, on the DTI website.)

Recent events in global energy markets – ranging from the situation in the Middle East and Nigeria to Russia’s behaviour in relation to Ukraine – have highlighted the geopolitical nature of energy. Fears about terrorism or major incidents have raised questions about the resilience of energy infrastructure worldwide. And lower-than-expected gas flows through the Interconnector last winter have drawn attention to the need to look beyond our shores to understand security of supply. In some ways, this is nothing new. However, given that by 2020 the UK is projected to be a net importer of around **80 percent** of its natural gas consumption, the importance of stable and reliable supplies from abroad will be amplified. Yet, these risks need to be considered in the context of factors that help to mitigate them.

Firstly, by and large, it is very much in the producing countries’ interest to gain and maintain a reputation as a reliable supplier; anything else would likely result in a reduction in their oil and gas export revenues, on which many of these economies rely heavily. Secondly, as far as the UK is concerned, we are on a path to having one of the most diversified gas supply systems in the world. For example, Woodmac projects that Norway – the largest single import source to the UK – in 2020 will only account for around 20 percent of our supplies, with the rest coming from a large number of different countries as Liquefied Natural Gas or via pipeline. Thirdly, UK companies with large gas purchasing portfolios recognise these risks and are implementing strategies to remain robust against any shocks.

Perhaps a more material question is whether private sector companies will invest sufficiently and in time to meet the huge domestic requirement for new infrastructure in both power and gas in the next decade or two. Under normal circumstances, expectations of future market tightness and hence high and volatile prices (or price differentials between different regional markets) should feed into investment

decisions, thus balancing supply and demand. However, these may not be normal circumstances.

In electricity, our system is facing a major one-off event when 8 GW (over 10 percent of current capacity) of old coal-fired plant will have to close by the end of 2015 due to environmental restrictions and about 6 GW of nuclear plant is scheduled to close between now and 2014. This could create a 'cliff-edge' in generating capacity if there are financial, regulatory, management or supply chain constraints in building a number of new power stations in a short period of time. In gas, while the current wave of investment should provide a comfortable level of spare capacity till 2015 or so, last winter's experience illustrates the risk that new infrastructure may not always be perfectly timed. This could be due to regulatory barriers, such as planning, or imperfect foresight on behalf of companies.

"There is a widely held misconception that the UK government has somehow given up responsibility for security of supply"

Finally, it could be that there are genuine market failures, resulting in a sub-optimal level of security of supply. If companies, for whatever reason, don't fully appreciate the costs of rare but possible high-impact events (such as a very severe winter), they may not insure against such risks. If there are significant entry barriers, it may be in incumbents' interest to delay investment to enjoy high prices. If investment is very lumpy, the economics of new capacity – which when commissioned could result in lower prices across a company's whole portfolio of assets – may not be compelling. And if there are economy-wide benefits of energy security that private customers (or suppliers acting on their behalf) are not willing to pay for, a market may deliver a lower-than-optimal level.

It is impossible to prove – *ex ante* – whether such market failures will present themselves and whether the impact will be material. As demonstrated above, they certainly have not jeopardised our physical energy security to date. (Whether high and volatile prices constitute a failure in terms of security of supply is outside the scope of this article. A lot would depend on *why* prices were high and volatile; what, if any, overall welfare impacts that implied; and what, if anything, prevented market participants exposed to those prices from acting to mitigate them – e.g., through long-term contracts or investment in storage or alternative sources of supply). Given that the risks don't seem to appear to increase until well into the future (in the period between 2010 and 2020), a potentially pragmatic policy response could have been 'if it ain't broke, don't fix it'. Yet, it would not be prudent to leave it at that.

3. The New Measures Will Help the Market Framework Deliver further

Therefore, the government is taking a number of actions (such as removing planning barriers to investment) which cost relatively little and should help the market function more effectively (see Box 2). We are consulting on the current gas security of supply framework, to test its robustness for the future. And we will build on the Joint Energy Security of Supply (JESS) working group to provide enhanced analysis of future energy supply and demand scenarios and risks facing the UK market, supplemented by an informed, evidence-based debate around these issues. This way, all market participants will have time to identify emerging threats and opportunities and to respond to them in the most appropriate way.



Peter Odell assesses public/private partnerships on the UKCS

The DTI's Energy Review Consultation Document, *The Energy Challenge*, claimed that recent government policies had helped the UK to make the most of its indigenous resources of oil and gas. This assertion is not, however, confirmed by the dramatic fall in oil production since 1999 at a rate unparalleled in the global upstream industry – except for production declines caused by political and/or military actions (e.g. the Biafra war in Nigeria in 1979, the 1991 counterrevolution in the USSR and the 2003 invasion of Iraq). UK oil production is now only just over 50 percent of its 1999 level, not because reserves are running out, but as the result of unsatisfactory conditions for their exploitation and the inadequacy of government policies to stimulate production. For the same reasons, natural gas output has also fallen sharply – by over 30 percent since 2000.

Now, even if the government's hopes for 'a sustained development for a better future on the UKCS', as expressed in the Energy Review Report, prove to be achievable under the present set-up for the exploration and exploitation of the country's reserves and resources, then little more than 40 percent (1.65 million b/d oil equivalent) of the UK's hydrocarbons' demand in 2020 would be met from indigenous production. Imports of some 2.5 million b/d oil equivalent even at an average price of \$30 per barrel – under half the current price – would create a charge on the balance of trade of some £28,000 million (in 2006 £s).

But 'sustained investment' in the UKCS, with its much higher finding costs compared with those in the Dutch and Norwegian offshore areas and somewhat higher average development costs, is likely to be undermined by its relative unattractiveness. Moreover, recent increases

(in 2002 and 2005) in the severity of the UK taxes on most of the oil and gas producing companies have further exacerbated their disincentives to invest in UKCS upstream activities. These adverse characteristics of the attractiveness of the UKCS for major upstream oil and gas companies – whose investment decisions are generally rank-ordered internationally – have been mitigated over the past two to three years by the off-setting impact of the very high prices of oil and gas. But these companies' long-term investment decisions are generally taken in the expectation of much lower real prices (of the order of \$30/barrel oil equivalent in 2006 \$s). A return to this lower level of energy prices would make the UKCS a lowly-ranked contender for exploration and development investments.

“the present exclusively private sector upstream oil and gas industry is inadequate”

In these contexts the Energy Review Report's ability to specify only one 'advance' since 2003 in the UK's role as a globally-significant hydrocarbons producer, appears to indicate a gross misunderstanding of the prospects for indigenous oil and gas production. Moreover, this sole 'advance' which is specified in the Report, viz. 'more interest in the 2005 and 2006 licensing rounds for North Sea oil and gas exploration than in any other round since 1964,' is in reality of relatively little importance. Licence purchases are not costly and do not inevitably lead to high levels of investment in exploration activities, let alone to new field developments. It is worthy of note that only 44 percent of the 54 'promote' licences issued in 2003 had, by the end of 2005, 'secured financing to press on with actual exploration' (*Offshore*, December 2005, p.22).

These adverse conditions and prospects for the UK's hydrocarbons prospects could, however, be reversed by a fundamental reshaping of the

structure of the country's offshore oil and gas industry, thereby achieving the Report's declared objective 'of maximising the UK's oil and gas resources'. This necessitates, *first*, strong incentives to enhance production from the 20 or more million barrels of oil equivalent which the DTI estimates remain to be produced over the medium term from already discovered oil and gas fields, and from the prospect in other already mapped areas of the UKCS; and, *second*, a concurrent much expanded exploitation effort all across the UKCS so as to access additional large volumes of oil and gas, whereby production in the second decade of the century could be maintained upwards of 2.5 to 3.0 million b/d of oil equivalent.

In order to achieve the objectives set out above, the present exclusively private sector upstream oil and gas industry is inadequate. The UK necessarily has to compete with much of the rest of the world in order to secure an adequate continuing flow of capital for offshore exploration and exploitation by all the companies which operate internationally. In taking decisions on where to invest, such companies seek a minimum pre-tax rate of return of 20 percent. In this context, high finding and development costs as well as corporate taxation at 50 percent of the profits earned is hardly likely to provide much by way of incentive for new exploration ventures. Thus, even in the booming prospective investment climate to 2010 for the international oil and gas upstream offshore industry, there can only be low expectations of the UKCS' ability to attract great interest in the opportunities it offers for new oil and gas developments. The apparently successful take-up of new licences offered by the government in 2005 and 2006 must, instead, be interpreted as actions by a set of companies anxious to establish fall-back positions, should they not be able to secure adequate acreage for exploration elsewhere in the world; and/or in the event of oil and gas prices moving up towards \$100 per barrel oil equivalent.

Almost all oil and/or gas-rich

countries in the world (outside North America) have already recognised that their successes in the search for on-going indigenous exploration and exploitation activities necessitate public/private partnerships (PPPs). Only in this way can adequate levels of investments be jointly achieved, with the countries themselves satisfied by an acceptable 5–10 percent rate of return on their investments. Such relatively low public sector rates of return on oil and gas exploitation serve to ensure that the oil and gas fields produced by joint public/private ventures can be more intensively and extensively developed, so generating more oil and/or more gas production more quickly than would be the case with a private company-only project. At the same time, the participating companies' rates of return on such joint ventures in hydrocarbon developments can be enhanced to an acceptable level, with no royalties or tax complications which might otherwise undermine the companies' returns on their investments. The outcome is a win/win situation for both parties.

“successes in the search for on-going indigenous exploration and exploitation activities necessitate public/private partnerships”

The introduction of PPPs ought now to become the basis on which the very-much needed further exploitation of the UKCS can be achieved. This involves switching from a system which relies on intermittent allocations of concessions on which the successful companies can more or less proceed at the speed they choose – as and when investment funds become available and in competition with alternative investment opportunities open to them – to one in which there are ongoing joint venture developments. The latter are fundamentally different for both parties – viz. government and companies. On the one hand, the

government would have to establish a state entity (a Strategic Offshore Hydrocarbons' Authority – akin to Norway's PETORO) with the responsibility for creating continually available opportunities for exploration for hydrocarbons across the whole of the UKCS (except for blocks already licensed). From these opportunities, companies could at any time select areas they wished to explore, based on their knowledge of the hydrocarbons potential. The Strategic Authority, in turn, would be required at all times to consider such requests by any reputable company in order to determine, as a matter of urgency, the conditions and terms on which exploration could take place.

“the low-cost state investments will enhance the field's ultimate percentage of recoverable oil and/or gas”

Once a company's initial exploratory work confirms the existence of an oil and/or a gas field with production potential, then a PPP can be negotiated between it and the Strategic Offshore Hydrocarbons' Authority. Negotiations need not be protracted, once the two essential and intimately related elements of the PPP have been agreed:

First, determination of the maximum possible production potential of the field(s) within the knowledge that the low-cost state investments will enhance the field's ultimate percentage of recoverable oil and/or gas, and also help determine the associated optimal production curve;

Second, the establishment of the parameters which determine the shape of the rising cost-curve for increasing recovery and the anticipated rate of depletion. These data will indicate the proportions of the required investments from the private and public interests respectively. In these calculations the latter's share increases *pro rata* with the inevitably rising unit

costs associated with higher recovery and production rates. Such technico-economic considerations create a basis for both the scale and the timing of the investment requirements, with the objective of determining a best-for-both parties' division of the production of oil and/or gas over the life of the field.

In the context of these radical procedures to boost a field's volume of recoverable reserves and for determining the shape of the production curve, it is important to be aware of the following considerations:

1. That the involvement of the state will not generate any material disadvantages for the company/ companies involved in such PPPs. On the contrary, the companies involved are more likely to secure an enhanced return on their own reduced levels of investments in the enterprise. This is because it is the state's input of low-cost investments (with a 5–10 percent opportunity cost of capital) which generates both accelerated and enhanced production of the original oil and/or gas in place, compared with the results which would have arisen from decisions made exclusively by the company, given its requirements for a minimum 20 percent rate of return on its investments.
2. That the involvement of the state in the development of new fields will most likely be essentially financial only, as the operating company can be given a first-refusal opportunity to buy the state's share of the production at, say, a negotiated discount of 5–10 percent from market values as the mechanism whereby the company's initial costs of finding the field(s) can be offset. These guaranteed cash flows to the Strategic Offshore Hydrocarbons Authority will service the investments which it made on behalf of the nation.
3. That the public/private partnership for an intensified exploitation of the UKCS will eliminate the need for the special tax regimes which have hitherto been imposed on upstream oil and gas activities. Participating

companies would have no more than the obligations of the UK's general corporate tax regime.

4. That the pro-active involvement by the state in upstream oil and gas developments will be highly positive for the UK's economy in several ways; first, from the public's expectation of a return on the investments made by the state on its behalf, generated by the revenue flows from the sale by the Strategic Offshore Authority of the oil and/or gas which the PPP has determined shall flow to the state; second, by the enhanced opportunities created for British companies involved in supplying equipment, goods and services to the offshore oil and gas industry; third, to the reversal of the present decline in oil and gas' contribution to the country's balance-of-trade; and, fourth, to securing 'affordable (and secure) energy for the long term', so fulfilling an important part of the 'Energy Challenge' to which the DTI's Energy Report draws our attention.



Olivier Appert provides an overview of French energy policy

For almost one century, energy has been a key concern for French governments. Just remember the letter sent by Clemenceau, the French Prime Minister, to the US President Wilson asking for supplies of oil during the battle of Verdun in 1917: 'a drop of oil

is worth a drop of blood'. After the First World War, a bunch of political measures were taken in order to ensure government control over the energy sector. This policy has been actively pursued since the Second World War by subsequent governments.

Historical Background

France is very poor in fossil energy resources. Coal, oil and gas production has always been limited. France relies heavily on imports of fossil and nuclear fuels and the energy trade deficit represented more than 38 G€ in 2005.

“French regulation has changed profoundly in order to comply with the European directives on market reform”

For many years, French governments intervened directly in the energy sector through state-owned companies. As a result, the French energy system has been integrated vertically with national champions such as EdF, GdF or CdF for electricity, gas or coal, or AREVA for nuclear fuel. TOTAL was created by merging different oil and gas companies, either partially or totally state owned. Energy policy favoured security of supply, economic competitiveness with a strong social dimension. This system appeared efficient and robust and was flexible enough when it was necessary to engage in a profound restructuring after the oil shocks of the 1970s. In addition, it has been necessary to take into account new dimensions such as environmental concerns, both local and global, or the deregulation of the electricity and gas sectors driven among others by the EU Commission. At the same time, the government's share in most of the energy companies has been reduced by listing on the stock market EdF, GdF and TOTAL which is now totally privatised. High oil prices are currently renewing concerns over energy security.

Legal Framework

Many public debates have been launched in France on energy issues. The main trends in French energy policy have been established recently by the Energy Law of 13 July 2005. Four main objectives are pursued:

- To promote energy efficiency through different policies and measures, such as market instruments, regulations or tax credits.
- To diversify energy supplies. This will be achieved by increasing renewable energy. As France has kept the nuclear option open – which is a major supplier of electricity (78 percent in 2004) – a new nuclear plant will be built in Flamanville. This plant is of a new type (European Pressurised Reactor – EPR) and will become operational in 2012.
- To develop technological research in the energy sector in order to prepare for long-term challenges. R&D programmes have been launched on bio-energy, fuel cells, clean cars, efficient buildings, solar energy, CO₂ capture and storage, generation 4 nuclear plants. Implementation of this policy will be facilitated through the new public agencies which have been created: National Research Agency (ANR) for R&D and Industrial Innovation Agency (AII) for industrial development.
- To increase transport and storage facilities in order to ensure the reliability of the electricity and gas supplies and to improve French energy security.

Ambitious targets have been set up:

- To reduce, by a factor of 4, CO₂ emissions in 2050;
- To improve final energy intensity by at least 2 percent per annum up to 2015, and 2.5 percent between 2015 and 2030;
- To produce 10 percent of energy needs from renewable energy in 2010;
- To increase the biofuel market share up to 5.75 percent in 2010.

French energy policy has to be implemented within the global framework

of the European Union. In January 2006 France issued a Memorandum on ‘European Energy Policy in the Perspective of Sustainable Development’. Most of the French proposals have been included in the green paper of the EU Commission released on 8 March 2006.

Some Key Issues

Within this framework, some key topical issues may be emphasised: market reform, public ownership of utilities, power generation investments, energy efficiency and renewable energies, new energy technologies.

Market Reform

For the last few years, French regulation has changed profoundly in order to comply with the European directives on market reform.

An independent regulator has been set up: Commission de Régulation de l'Énergie (CRE). Special emphasis has been put on the independence of this body towards the French government and companies operating in France. It has a wide range of administrative and economic responsibilities.

“French energy policy is prioritising energy efficiency and renewable energies”

Transmission activities have been unbundled from previous electricity and gas utilities. These activities are managed by autonomous entities: Réseau de Transmission de l'Électricité (RTE) for electricity, and for gas both Réseau de Transmission de Gaz (RTG) and Total Infrastructures Gaz France (TIGF). These entities are subsidiaries of previous utilities, but their independence is ensured by the energy regulator. The same applies for distribution.

Public Ownership of Utilities

A dramatic change has happened in

the last few years within the French energy sector. Former monopolies for electricity and gas, EDF and GdF have been listed on the stock market. Another step forward will take place with the merger of GdF and SUEZ which may be finalised by the end of the year.

Even if these companies are only partly privatised, this creates a completely new framework for the French energy sector with new types of relationships between government, utilities and final consumers.

“Deregulated markets by themselves do not ensure that adequate long-term investments will be made”

Power Generation Investments

Deregulated markets by themselves do not ensure that adequate long-term investments will be made: this is specifically the case for electricity. For this reason French regulation has set up a process in order to identify investments that are needed to ensure electricity security. This process, called PPI, demonstrates how the French authorities view the future of power generation. It takes into account security issues as well as environmental and economic concerns. In addition, it considers issues related to the geographical imbalance between production and consumption.

The latest report was presented to the French Parliament in mid 2006. It states the major objectives of the development of power generation up to 2015, focusing particularly on renewable energy and nuclear as well as the future role of coal and gas.

Energy Efficiency and Renewable Energies.

In the context of the climate change challenge, French energy policy is prioritising energy efficiency and renewable energies.

Many policies and measures have been

put in place, such as tax credit or reduced VAT rates for energy efficiency or the introduction of renewables in buildings and co-generation, and for alternative cars; as well as new energy regulations for new buildings. A new market instrument known as a ‘white certificate’ has been put in place in order to promote energy savings to the final consumers.

In order to increase the market share of renewable energy, calls for tenders have been launched for new wind farms, biofuels and bio-electricity facilities. As far as biofuels are concerned, the French government is strongly committed to reach the targets set up in the European directive: its objective is also to ensure that by 2010 cars consuming transport fuel with a high biofuel content would be made available to everyone.

New Energy Technologies

In addition to R&D activities on nuclear energy (generation IV, waste disposal and so on) a comprehensive R&D strategy has been set up in the

field of non nuclear energy. There is a special focus on energy efficiency in buildings, solar energy, biofuels, hydrogen, CO₂ capture and storage, as well as clean transport. Different R&D programmes have been launched in order to promote cooperative projects with industry, research centres and academia.

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Energy issues are returning to the forefront of the political concerns of the governments of consuming countries. Because of high oil prices, and more generally energy prices, a new emphasis has been put on energy security. The policies and measures decided on by the French government, as well as those of most consuming countries, are also taking into account the challenge of climate change. Today, there is a clear synergy between energy and environment policy. Hopefully these integrated energy and environment policies will help to solve both challenges. This could be the case if the policies are implemented with continuity over the long term.

Recent OIES Publications

The New Security Environment for European Gas: Worsening Geopolitics and Increasing Global Competition for LNG (NG 15)

by Jonathan Stern, 2006.

A Question of Rigs, of Rules, or of Rigging the Rules: Upstream Profits and Taxes in US Gulf Offshore Oil and Gas (OIES 31)

by Juan Carlos Boué, 2006, UK & Overseas £50.00

The Dynamics of Power: Power Generation Investment In Liberalised Electricity Markets (EL 06)

by Malcolm Keay, 2006. £30.00, \$58.00

Oil in Egypt, Oman, and Syria: Some Macroeconomic Implications (WPM 30)

by Randa Alami, 2006

IATAL – an outline proposal for an International Air Travel Adaptation Levy (EV 36)

by Benito Müller and Cameron Hepburn, 2006

Unless otherwise stated they are free to download from [www. Oxfordenergy.org](http://www.Oxfordenergy.org)