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REPORT ON ENERGY REVIEW MEETING

`FINANCING ENERGY PROJECTS'

At the **BMDF** Energy Review Meeting on *`Financing Energy Projects'* at HLHZ, 23 Pall Mall, London SW1 on Wednesday 15 October 2003 a number of pertinent points were made which illuminated key aspects of the current UK energy situation.

This meeting was held under `Chatham House Rules'. However, in this instance, participants have agreed that it would be useful for an agreed record of their contributions to be made available more widely.

Attached, therefore, is a note covering some key points made during the discussion together with copies of the slides used in the opening presentations.

BMDF ENERGY REVIEW MEETING

15 October 2003

Points made during the discussion following the presentations on *`Financing UK Renewable Energy'* included:

General Production and Transportation Concerns

- There are encouraging signs of the market responding to Britain's need for rapidly increasing imports of gas. In particular, the new Anglo-Norwegian Treaty covering co-operation in the field of offshore gas and oil development is an important breakthrough. Building up from 2008, gas from Norway's major Ormen Lange field should be supplying about 20% of the UK market.

- But Ormen Lange lies far up in the hostile northern waters of Norway, 1100km from the landfall of the linking pipeline to the Easington terminal. Developed in over a thousand metres of water, the plan envisages subsea wells and two-phase pipelines to a processing plant on the Norwegian Coast. This will require frontier technology at the limits of the industry's capability.

  Inevitably, this gas will be costly; so too the imports of gas from remote Russian fields transported through new multi-billion pound pipelines; or the imports of gas as LNG. For Western Europe and the UK, **the trend of future gas prices will be upwards.**

- This will add to the upward pressure on electricity prices from the new EU Emissions Trading Scheme. Here, initial modelling by City analysts indicates that the Scheme could *lead to* increases of up to 60% in *the wholesale price of electricity in EU countries.*

- Against this background of radical and rapid change, it will be important to keep an eye on the relationship between rising energy prices and supply security. Electricity from gas will have to take the strain from the progressive retirement of nuclear power plants, the retirement of coal power stations for environmental reasons, and the intermittency of renewables. But how keen will investors be to build new gas-fired power stations against the prospect of rising gas prices, especially when the same trend - good news environmentally - will stimulate energy efficiency and make renewables more competitive?

- More generally, is there sufficient risk-bearing equity investment capacity to fund the substantial cycle of investment now foreseen across the utility sector - gas, electricity, water and waste management? And what about potential skills constraints?

Security of Supply and Concerns on Renewables

- The Government has not been served well in terms of being supplied with reliable costs of electricity from the various reports received over the past two or so years. **The PIU report in particular was very misleading.**

- Common to calculations of energy analysts is the practice of producing benchmark costs whereby all capital, O & M and fuel costs (if appropriate) are discounted to Present Values using arbitrary discount rates. These cost figures form the basis of much important policy decisions.

- For all investment purposes, however, costs should reflect market risks. *Unless risk is factored into the calculations the comparison of Present Values is meaningless.*

- To do so more sophisticated and commonly used appraisals should be used (such as the Capital Asset Pricing Model) with different discount rates applied to the different cost streams reflecting perceptions of risk as well as costs of capital (see "Is *gas really the cheapest?",* Shimon Awerbuch, Modern Power Systems, June 2003, pp 17-19)

- Sources of uncertainty and thereby risks in new investments in power generation include long-term fuel price uncertainty for CCGT plants and also the effect of the forthcoming EU Emission Trading Scheme or for wind the **uncertainty of the climatic variability in northern Europe** where variations in wind energy of up to 30% can be expected from one decade to another.

Concerns on Renewables

- If the Government is serious about reducing carbon emissions the best way to deal with it is via a **Carbon Tax** (see **Royal Society report** on Economic Instruments, November 2003 Policy Document 26/02).

- Investment in new renewables, particularly on and offshore wind, is being held back by uncertainty about the future value of ROCS. If we meet our 10% renewable electricity target by 2010 the value could fall to zero. A way of keeping the value high would be to continually keep raising the target to keep it unattainable then the ROCs value (they are currently trading at £60/MWh) could be kept artificially high.

- Infra structure development to accommodate renewable energy in remote locations will cost £2.2bn for the national grid extension and each new gas interconnector to Europe will be £500m, we will need 5 (DTI report). Who will pay?

  To meet the 2010 and 2020 targets for electricity requires 450, 3MW machines to be installed in the North Sea each year till 2020. To do this will require an immediate quadrupling of jack-up barges and heavy lifting gear ('rejen', August 2003 p.24).

- If nuclear power is to be run down only 5% or so of supply will remain by 2020, what is to replace the 20% which will be lost, some renewables plus gas? What does this do to our carbon dioxide emissions. The target of 20% reduction by 2010 looks increasingly remote. And what about the price of imported gas?

- It is sensible to look at **experience of wind power in Denmark. For 53 days last year wind power provided less than 1% of the name plate wind power, in other words the wind did not blow. Availability was only 20%, not the 30% plus forecast for UK wind**.

- Quoted costs for wind generation do not include charges for grid connection, the cost of standby generation, decommissioning costs, if these are included the generation costs increase dramatically.

General Views on Energy and Coal

- Faced with so many more pressing problems and with little consensus amongst the energy lobbies, it is not surprising that the government opted for an electorally calming conclusion to the energy reviews: *No precipitate action on difficult decisions required now and in the meantime, heavy backing for renewables, of particular appeal to the urban middle class so important to the success of new labour.*

- The policy has been too successful that is its, and our, problem. When even the Financial Times can assert that 'a lot of new plants - and not all of them wind farms - are under discussion, so the signs are promising', the process of tranquilising has gone too far. Renewable generating capacity, particularly wind, will certainly grow but there is every sign that the **necessary margin of back up plant is likely to shrink.** Certainly, the plant now available on a sunk capital basis, will.

- The key question is when, and also how and where, this policy is likely to fall apart, and more particularly, to do so in public, requiring an alternative which will mean that the awkward decisions are no longer avoidable.

- The coincidence of the recent London blackout, the power failure in the north eastern US and then in Italy has certainly put security of supply back on the political worry list. But it is still well down the list. My guess is it will take two years or more for the deficiencies and the contradictions to become publicly obvious.

As an addendum to the previous contributions on rising prices for new natural gas development. *Internationally-traded coal prices are now at their highest for twenty years. Freight rates are at record levels.* There are three main reasons:

- During the years of falling coal prices, the rate at which new mines have been planned and developed, has fallen sharply and at present, there is little, even in the higher priced coking sector, that is due to begin production.

- There is evidence that in the times of low prices, an informal cartel came into being, and at the same time capacity was closed permanently, especially in the Eastern US, which previously had contributed important tonnages to international trade.

- The most important change has been the intense demand from **China** for all raw materials but particularly coking coal and iron ore. Whilst it is highly unlikely that the recent rate of economic growth can continue, even if Chinese demand more or less levels off, its continuance at present levels is sufficient to ensure that the period of low raw material prices which has underpinned low inflation throughout the world, has come to an end.

Energy Generation

Investment in the Electricity sector.

- Independent investors should be able to play a role in developing renewable generation. The renewable obligation provides a basis for agreeing PPAs with supply companies. Those PPAs would close off price and imbalance risks. The development of the EU Emissions Trading Scheme should increase the value of renewables projects, but was also a new element of uncertainty in valuing projects. Returns available to independents would

not be high but should still be attractive as long as PPAs were available. **The development of the RO after 2010 needed to be addressed urgently.**

- By contrast there was no long term forward price available to investors in conventional plant, whether fossil or nuclear. It was unclear how further investment in such plant (including investment to extend the life of existing plant) was to be incentivised. That issue needed to be addressed by Government in order to maintain a balanced mix of plant and to have plant available to meet the intermittency problems of many renewable sources.

Generation Concerns

- The Government should aim to reduce the political risk associated with renewable investment, if it is to achieve its objective of securing 10% of electricity from renewable sources by 2010 and its aspirational aim of a 20% contribution by 2020 adopted in the White Paper.

- Some Generators want to build 1000MW of renewable plant by 2010 and the Renewables Obligation can provide the incentive for the investment needed.

  However the investment climate is being undermined by:

  - Flattening out of the RO after 2010 reducing incentives in mid to end of the decade
  - Uncertainty about impact of the 2005/6 review of the RO promised in the White Paper and the relationship between the RO and the EU Emissions Trading Scheme
  - An unsupportive local planning regime.

- Government need to ensure that the economic incentives to build renewables remain sufficient to outweigh the political and regulatory risks. It should:

  - either bring forward review to resolve these issues or
  - amend the RO now to raise the obligation progressively after 2010 on a ten year horizon
  - accelerate introduction revised planning guidance.

- Some Generators are developing structures to finance renewables projects as referred to in the initial presentations.

- Some Generators' preference is for market based solutions and for subsidies to be made explicit. This is reflected in its support for the Renewables Obligation (RO) and the market based approach to fulfilling the RO by trading ROCs.

  Its approach to the recent RO shortfall due to demise of TXU and Maverick has been to seek means to improve the operation of the mechanism in the future.

- With regard to the views expressed that the long tern financing of renewables looks difficult, Some Generators' views are that the potential for future investment in renewables with the appropriate policies and support is very good, but that to stimulate a significant further investment in offshore wind power (which will be necessary if we are

to approach the governments targets for renewable capacity) will require further development of the policies and support (beyond the 10.4%/2010 RO).

Major Energy Users' Views

- Major energy users in the UK are feeling embattled due price movements in the UK power market
- Reported wholesale power prices have now rebounded and the oft quoted OFGEM 40% reduction has disappeared
- **Forward prices are also showing alarming increases**
- Major energy users' power bills are already subject to climate change levy and the effect of the renewable obligation
- Coming on top of all this the EU emissions trading scheme, as presently envisaged, will increase the price of electric power as the market price will be set by the increase in the cost of the marginal generator
- The allowance allocation system means a massive transfer of funds from customers to generators
- Government must consider the effect of all these measures on UK manufacturing industry **which will effectively disappear if predicted future power prices come to be**
- Government should act in line with white paper policy to **act proportionately with climate change measures**
- World CO_2 levels will not be reduced by exporting UK manufacturing to less energy efficient countries.

Nuclear Generation

- Agreed that it seems highly unlikely that the Government carbon targets will be met or indeed approached. The reservations of the Royal Academy of Engineering in this respect are fully supported.
- The recent statistics from Denmark, and quoted above, that 53 days occurred last year when the output from Danish wind farms was less than 1% of capacity are very significant.
- These indicate the need for full backup to be available for periods when the wind does not blow i.e. wind power will not help security of supply but will progressively eat into the general reserve.
- Forecasts that gas prices are going to rise very significantly needs to be fully taken into account in future planning.
- Investors are risk averse when it comes to power sector investments - particularly in the UK market where significant policy and regulatory uncertainty pervades.

- There is significant uncertainty in the long term value of market based instruments such as ROCs and EUETS. This uncertainty is likely to increase as further UK and EU efforts to tackle environmental (and other) externalities emerge. For example, the value of ROCs could collapse post 2010 as the 10.4% target is reached

- Renewable generation, largely intermittent wind, will continue to displace generation output from conventional stations **but will not displace significant amounts of capacity. Therefore sufficient controllable generation capacity needs to be available** - operating at lower load factors than previously - to cover for periods of no wind. This capacity still needs to be commercially viable and comply with environmental restrictions on its instantaneous level of generation such as IPPC requirements. A higher system margin will be required as intermittency increases.

- Only if the market reflects the value of security in terms of the 'cost' of disruptions as a market externality will the market signal alone be sufficient to incentivise conventional generation for security of supply purposes and enable low load factor plant to become commercially viable.

- Prices have indeed risen recently in response to the threat of capacity shortages this winter. However, this recent market signal alone has not been sufficient for companies to unmothball generating units for the coming winter. It has only really been following the intervention of NGT with its bilateral contracting for reserve that this has really happened. This is not acceptable or sustainable in the longer term. There needs to be a transparent market mechanism to incentivise both short term and longer term capacity.

- The latter raises additional issues of appropriate timescales, investment risk and longer term price signals required to stimulate investment in both generating capacity and critical infrastructure.

- Indeed while the market will undoubtedly give some signals of the requirement for new capacity these may need to be based on significant, prolonged or repeated disruptions before the signal is strong enough for a risk averse sector to commit to new build. The.. temptation for regulatory intervention during periods of high prices and disruptions will always be present and must be high.

- The full commercial impact of LCPD, EU ETS, IPPC and other directives need to be realised before it is clear what the new build requirements on the power sector are likely to be. These policies will add to the cost of generation from fossil fuels but also restrict the available generation from existing capacity on commercial or regulatory grounds unless investment is made in abatement technology. Such constraints on coal generation in particular will require additional gas generation to take up the slack, clearly with additional fuel price risk.

- The sustainability of price rises due to environmental policy instruments need to be treated with caution as i) they may not be sustained and, ii) they add costs to new entrant CCGT in the same way they implement existing capacity.

Investment Banking Concerns

- The wholesale market can and should adequately remunerate reserve capacity. At times of generation scarcity market prices should rise to (possibly very) high levels sufficient to remunerate the fixed and variable costs of generating capacity. (The market should equilibrate the level of capacity, ie, if prices rise to high levels more frequently more capacity will get built and vice versa in the case of overcapacity.)

  Market participants will strike option contracts against the possibility of very high spot prices. Option fees paid under these contracts effectively become "capacity fees" to infrequently used generation, ie, an upfront payment per MW will be made for the option to call off the generation at a fixed price per MWh when required.

  There is therefore no additional need for capacity payments since the market should provide for this in terms of "insurance" against times of generation scarcity.

- The growth of wind generation will displace some marginal generation (MWh). However, it *will not necessarily displace the marginal generating capacity: intermittent wind patterns will mean that capacity will still be required to generate when the wind is not blowing.*

  The market can handle this. At times when the wind is blowing marginal generation sources will be displaced and prices will be lower than otherwise. When the wind isn't blowing, prices will need to rise sufficiently high to remunerate the required reserve capacity. Again the market should equilibriate in response to the price signals at times when there is no wind.

  The expected effect of the *growth of wind should therefore be increased price volatility* (ie, low when its windy and high when its not) which in turn will provide increased option value (ie, capacity fees) to controllable generating capacity for market participants to "insure" against times when it's not windy.

- The correct functioning of the market requires:
  clear obligations on suppliers to meet the needs of their customers;
  clear obligations on NGC in procuring operating reserves;
  and the economic reflection of NGC's reserve procurement in cash-out prices to send the correct "spot" price signals to the wholesale market. (It doesn't matter how much reserve NGC provides vis-a-vis suppliers if suppliers bear the full cost of not covering their customers requirements and therefore requiring NGC to buy the reserve and balancing energy on their behalf).

- Ofgem and the industry are currently engaged in a debate on how well these criteria are satisfied in the current market.

  Our view - which has been set out in a paper[1] of July 2003 - is that the market arrangements need to evolve to ensure that these requirements are met adequately and that the wholesale markets send the correct capacity investment signals.

[1] 'Promoting Efficiency and Security in the NETA Pricing Arrangements'
Barclays Capital paper, July 2003

However, despite the deficiencies we have identified, we remain strongly of the opinion that the market can and should solve the capacity investment decisions and provide security of supply and that *additional intervention (eg, capacity quotas, obligations etc) risks undermining the many benefits that the market brings.*

In short, we should focus on making the market work correctly to solve capacity problems (including those linked to wind intermittency) rather than running to add to or distort the market arrangements.

General Comments on Consequences and Governmental Considerations

- Customers would end up paying for the costs of meeting higher environmental targets.

  It was therefore important that when Ministers came to consider how to deliver better environmental performance they chose *international instruments like broadly based carbon trading mechanisms, since the cost per tonne of carbon saved would be* ***substantially lower than*** *measures which were technology* specific (eg: renewables).