BG Group

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Nick Hartley,
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Dear Nick

Subject - BG's submission to the PIU Energy Review

I enclose our formal submission to the Energy Review. There are three documents:

1. Our principal submission, containing strategic themes and key points in bullet format
2. A response to selected questions from the gas scooping notes
3. A document outlining details of our own DCHP technology and highlighting the barriers that need to be overcome for embedded generation to take off.

It was a pleasure to welcome you and some of your colleagues to our head office last month. I do hope you will be able to return soon to meet some of our senior management. I believe they could offer some further important insights, which would be helpful to your review.

Could I thank you for involving BG Group so closely in the process. I hope we can speak soon. With best wishes.

Yours sincerely,

Phil Murphy
Government Relations Manager (UK & EU)

BG Group's response to relevant questions from the Energy Review gas scoping note

Q Are there enough proven gas reserves globally to meet predicted demand? Even during peak times?

A Yes. Reserves more likely to meet global demand for @100 years rather than the 20-30 occasionally cited. UK demand can be met. Norwegian imports are likely to play a significant part but equally important is completion of single EU energy market and a joint EU political and diplomatic effort to help bring a diverse range of sources of gas supply into the European network

Q Are there any constraints (commercial, political or physical) to the UK accessing these reserves?

A There need not be but see above. The UK will not be exposed commercially, politically or physically provided liberalisation moves ahead and it is BG's view that – even given misgivings among a couple of EU member states – there is an unstoppable momentum behind the process.

The UK's physical position – as a so-called 'remote' island – is not a factor provided there are sufficient Interconnector/pipeline facilities with sufficient resilience for contingencies to meet import capacity needs within the required timescales. With that proviso, as part of a EU-wide liberalised gas network, the UK is in no way disadvantaged compared to any other member state.

To the questions, 'What if liberalisation stalls and/or a couple of member states do not fully liberalise? Will this affect the UK?' even if, say, Germany and France were to resist full liberalisation, they will not be able to halt the momentum towards an open, transparent European gas network. In fact they are more likely to disadvantage their own domestic and wholesale consumers than to halt the broader pan-European benefits of a single energy market. Indeed, there is evidence that the big French state gas and power companies are already preparing the ground for what they see as an unstoppable move towards full liberalization.

There is an issue surrounding reciprocity, though. It is not acceptable for state companies with profits heavily inflated as a result of their privileged status to make acquisitions in a liberalised market when their own position is protected

Q: If there are constraints, what is the UK Government's role in ensuring access?

A: On the broader point, as long as the UK and the EU help private companies gain access to a diverse range of gas supply and assist in the bid to construct new pipelines into the EU, the UK will have no difficulty in accessing sufficient reserves.

We would urge the Govt and the Review not to take a pessimistic view about either the quantity and availability of affordable gas imports or the ability of the industry to provide the extra infrastructure required to meet the country's import needs. There is plenty of gas within economic transportation and, with the right climate, infrastructure investment will occur. For example, BG is currently considering the possibility of virtually doubling the capacity of the CATS pipeline to facilitate imports to the UK.

Q: Are there any implications for UK security of supply from the increasing reliance on non-indigenous reserves?

A: As well as outlined above, need for extra pipeline capacity and interconnectors and a wider range of entry-points for gas into the UK. Better pipeline links with Norway in particular

Q: Should the UK have an explicit policy for increasing the storage of gas reserves?

A: Storage per se not an important issue but access to peak gas is. Peak gas comes in a number of ways – eg, via the Interconnector. Storage used increasingly to allow suppliers to balance their daily positions. A load balancing tool rather than an essential element in ensuring security of supply. Swing in producing fields, line-pack, dual-fuel customers on interruptible contracts also play a part in diminishing the need for increased storage facilities.

Q: Should the UK have an explicit demand management policy in relation to the use of gas?

A: No. It cuts across consumer freedom of choice, the move towards liberalisation and inevitably puts up the price of power and, possibly, warmth. Also, via DCHP, gas can continue to offer big cuts in CO2 emissions and significant primary energy savings.

Q: Which alternative fuels could replace gas?
A: Answering a slightly different question, DCHP can launch a new era of embedded generation – a framework which can then host power generation by photo-voltaics, fuel cells etc. NGV technologies can also act as a bridge to fuel-cell vehicles.

Q: How large is the influence of international oil markets on UK gas-prices.
Q: Should the gas-oil contractual link be broken?
A: Currently the link between international oil-prices and UK gas-prices exists because the Interconnector allows arbitrage with European gas-prices, which are largely indexed to oil products. Prior to the opening of the Interconnector, gas-prices were determined by the interaction of supply and demand for gas in the UK.

But, as we say elsewhere, this is not an argument for shutting the Interconnector. Over time, as trading hubs in Europe develop, if there is real liquidity, there will be a natural move away from oil-indexation to more spot-related prices, with those prices predominantly based on gas-to-gas competition.

Q: What are the implications of the move towards greater liberalisation in European gas markets for UK gas-prices?
A: The broader and deeper the liberalisation and the more extensive the international trade in gas becomes, the more there is downward pressure on prices. Liberalisation doesn't guarantee low prices but it does give the UK and other European states the best possible chance of low prices in the short, medium and long-term.

Q: Can liberalised gas markets produce the right incentives for long-term investment?
A: Yes, they can - as long as there are liquid markets where people can sell their gas easily, where they can buy futures contracts and options in order to manage their price-risk. The issue lies in infrastructure and the threat of regulators disincentivising investment.

Clarity over the regulatory situation is essential in order to secure investment. Investors won't take the risk if they fear that the returns on that investment might be choked off by changes in the regulatory framework at some arbitrary point down the line. The signs are that the need to incentivise infrastructure investment in the North Sea will be recognized in the Offshore Code of Practice but the more clarity there is over the situation, the more likely the necessary investment will take place.

Onshore, the regulatory system needs to provide the right incentives for sufficient, cost-effective onshore investment by Transco. Poor, or uncertain, regulation could produce bottlenecks, restricting the size of the market or imposing extra costs on industry.

Q: What is the role of the UK Government in relation to incentives for long-term investment decisions in a liberalised market?
A: What would be helpful would be a clear statement from the Government about the kind of long-term investment it is seeking to encourage and the kind of investment it is not seeking to encourage. It should then make a definitive statement about the scope of the regulator so that would-be investors have certainty about the investment context.

Q: Should there be a separate onshore and offshore regime?
A: Yes.

Q: What are the long-term implications of moving the gas balancing system into line with electricity balancing system?
A: Extremely serious, if that move means a move to hourly balancing. Before any move to an alternative daily balancing regime is made there should be a full cost-benefit analysis of the change. BG's view is that the costs would significantly exceed the benefits.

Hourly balancing will raise barriers to entry since there will be higher fixed costs involved in the role of a shipper of gas. This is likely to have an adverse effect on competition in the wholsesale gas markets.

It is also far from certain that the market solutions proposed by Ofgem to deal with hourly balancing will have sufficient liquidity to give robust price signals.

Hourly balancing will also have severe adverse implications for the offshore gas industry, since it will require substantial changes to existing contractual arrangements to enable players to adapt to the changes implicit in hourly balancing.

It would create a real danger of many players withdrawing from the market and three or four dominant players taking centre stage.

Q: How should gas supply and demand be balanced?
A: While there is a lot to be said for monthly balancing – as was the regime prior to the Network Code in 1996 and as is still employed across many US pipeline

networks – daily balancing is adequate but there is scope for adjustments and improvements to the working of the existing system in the UK.

Q: What are the long-term implications of market liberalisation on the safety of the gas network?

Q: Are long-term safety concerns adequately addressed in the regulatory regime?

A: There is no reason why market liberalisation should jeopardize safety standards. The highest safety standards should apply and be applied to the network regardless of its status.

BG Group's submission to the Energy Review - Micro-CHP

A significant contribution to Government objectives

Government seeks to encourage the development of embedded generation and has set targets for CHP and renewables for 2010. At the same time, it is encouraging and applying energy efficiency measures across all sectors. Given the extent of gas-fired central heating in the UK, Domestic CHP (DCHP) is well placed to form a significant proportion of the embedded generation mix, helping Government to meet its objectives, and producing very significant savings (28%) in primary energy used for domestic purposes.

BG Group is developing a 1.1kWe Linear Free Piston Stirling Engine-based DCHP product that it expects to launch to the mass market in 2003. BG Group believes that a market penetration of 4 million homes by 2010 of all types of DCHP is realistic if Government creates the right environment – by supporting development, removing regulatory and other barriers, and providing market support for early adopters.

This would represent:

- 4,000 – 8000 MW of installed DCHP capacity
- 8.8 electricity produced pa + exports
- 40TWh primary energy saved pa
- 6m tonnes CO_2 saved pa

(*see worksheet A attached)*

As the typical DCHP user may well be one who has above average consumption – this is likely to increase the scope of energy and CO_2 savings. Overall, energy and emissions savings per pound invested in DCHP exceeds that for comparable measures such as condensing boilers, dry-lining insulation, or photo-voltaics. Hence, it provides a means of ensuring the domestic sector makes its own contribution to emissions reduction in a cost effective way.

Opening the door to new technologies

As the first, mass-market, small-scale embedded generation technology, DCHP will open the door for others – photo-voltaics, fuel cells etc to follow. The issues and challenges DCHP must find solutions to - grid connections, cost-effective mechanisms for measurement of exports, trading and settlement, consumer inertia etc – are common to all small scale embedded generation technologies. DCHP's success should move the UK towards a position where renewables benefit from, and are developed alongside, other small-scale embedded generation.

Boosting resource productivity and supply security

By making more efficient use of gas's thermal energy – 93% in usable electricity and heat - DCHP boosts resource productivity, while actually reducing levels of domestic gas use. This compares with remote generation by CCGT, where only 45% of the primary energy is delivered to the home as useable electricity. Network security is enhanced, as more than half the domestic power requirement is met through DCHP generation, therefore reducing load on the network, particularly at periods of peak demand in the early morning and early evening when DCHP is most likely to be operating to meet domestic space and water heating needs.

As more DCHP is installed, it defers the need for reinforcement of electricity distribution infrastructure to keep pace with rising domestic demand, and for the construction of additional remote large-scale generators. Diversity of generation sources and ownership also increases overall supply security and competition. During power cuts, DCHP continues to operate, providing baseload domestic electricity requirements and ensuring central heating continues to operate.

Substantial savings on fuel bills

As well as increasing consumer choice, the deployment of DCHP substantially reduces domestic fuel bills by around a third – £200 per annum, for a household with average consumption + income from electricity exports. This, together with the improved security of supply, should mean DCHP is the application of choice for tackling domestic fuel poverty.

In time, the development of cost-effective smart metering will allow householders to manage and target their use of DCHP even more effectively.

Government support is required to ensure a mass-market

Action by Government is needed if DCHP is to be successful in the UK marketplace. Currently there are no incentives on electricity distributors to encourage embedded generation, there are no incentives on suppliers to buy CHP exports, and support is needed for demonstration and deployment of DCHP to boost its take-up.

If this does happen, then, on the Government's own forecasts[1], around 10 million houses are likely to have DCHP installed by 2020-2030. Based on current technology, this would represent:

- 10,000 – 20,000 MW installed capacity
- 20 TWh electricity produced pa
- 15m tonnes CO_2 saved pa

[1] DEFRA estimate of DCHP penetration – presentation to SBGI seminar 11.7.2001

In practice, consumer product markets tend to behave in "S-curves" and so if DCHP is successful, then it is likely to become more or less universal by 2020, as the replacement period for domestic boilers is around 15 years. And, by 2020 fuel cells may have replaced the core Stirling Engine technology in DCHP, delivering substantially higher electrical efficiencies and emissions savings.

Barriers to implementation

There is a range of barriers to implementation of DCHP, which could be regarded as potential "show-stoppers" and unless these are removed, it is unlikely that any DCHP product launch could be successful.

i) Grid connections

At the moment, the costs of establishing a connection to the low-voltage network is around three times the cost of the DCHP appliance – the connection has to be negotiated for each unit installed, and the final decision rests with the Distribution Network Operator (DNO). What is required is a simple, low-cost process for connection on an type-approval basis, equivalent to the arrangements for connecting domestic boilers into the gas supply that obviates the need for:

- individual certification of the unit
- a process of application to, and approval by, the DNO for individual units
- witness installation and testing of appliances
- requirement for an externally located lockable isolator switch
- levying of connection charges by the DNO on the householder or installer
- application of high standing charges for DCHP customers

Instead, type standards and certification are required for the connection and for the procedure for installation (as with domestic gas boiler). The following electricity safety management regulations may need to be amended accordingly: Draft Electricity Safety, Quality and Continuity Regulations 2001, Electricity Supply Regulations 1998.

Need for standardisation

BG believes that the installation standards and procedures required for a domestic gas boiler, covering safety and security of the network, should provide the template for standardizing DCHP installation. There is no evidence from Holland or Denmark, which have significant levels of small-scale embedded generation (40-50%), that there is any detrimental impact on distribution networks. On the contrary, the wide-scale availability of DCHP which tends to maximize output to coincide with peak demand (see fig. 2), therefore reduces peak loads on the network and will tend to increase stability and supply security.

ii) DNO charges for reinforcement

While the DNOs themselves acknowledge there is no evidence that wide-scale installation of DCHP will cause instability to the network, they suggest there may need to be some localised reinforcement. If the costs of any reinforcement were imposed on Investment in active networks domestic householders installing DCHP, this would form a very significant barrier to take up.

BG believes the regulatory mechanisms governing DNO's capital investment should properly take account of the benefits of embedded generation, and reward investment in "active" networks that would fully accommodate DCHP. Any costs for localized network enhancement should be set against the overall impact DCHP in reducing the load on distribution networks, and so lessening the need for overall reinforcement in the face of continued demand growth.

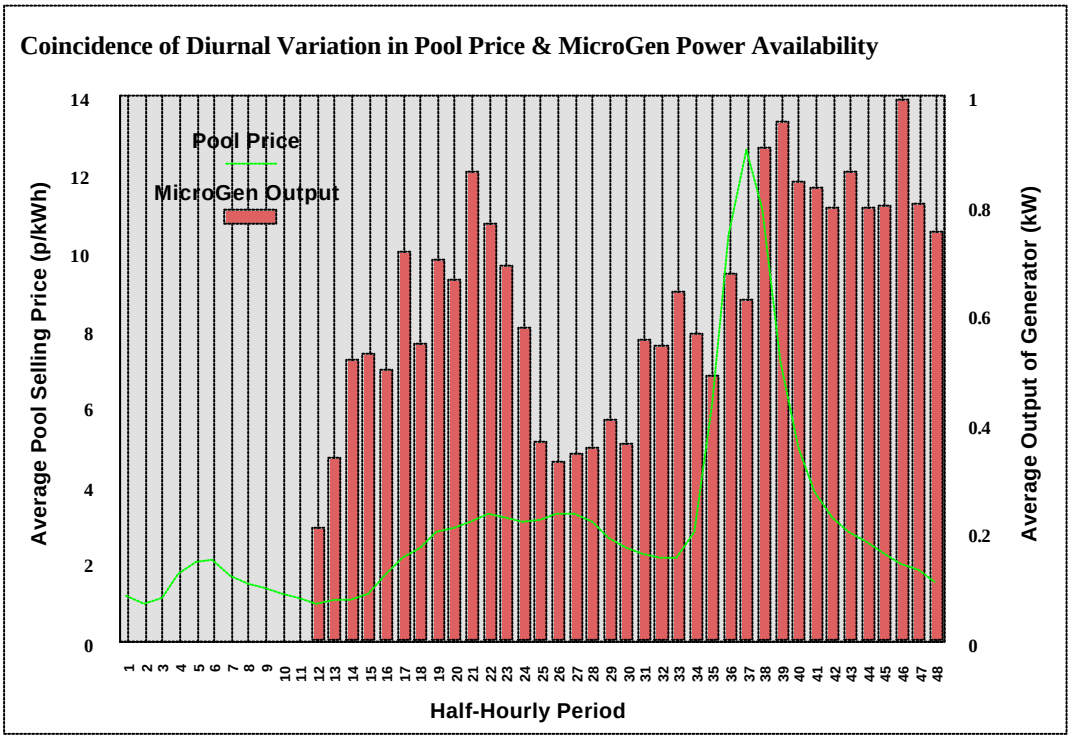

Fig 2

iii) Metering

It is important, and fair, that the customer should benefit from exported electricity. This requires a basis for measuring exports (either by individual household, or on a type basis) according to volume, and time – given the varying price of electricity in the wholesale market. "Smart" metering –

including net-meters and bi-directional meters provide an obvious solution, however there are various potential barriers to their wide-scale application:

- remote real-time reading + pricing – if this is to be required to determine the price for each unit exported at any particular time – it would add significant cost and complexity, and is not something the an individual householder can easily administer and verify.
- identification of purchaser/need for participation in trading market + mechanism for settlement
- standards for meters, and connection
- connection charges, standing charges and cost of meter rental

Interim non-metered solutions

As the prospect of universal low-cost smart metering is still some way off, BG believes interim or transitional measures may be required to ensure customers see an immediate benefit from electricity exports, which would need to be sanctioned by Government and Ofgem. One approach could be the creation of profiles for different generic housing/household types, which would be applied by the supplier to calculate a discount to the customer. For a local authority which has fitted micro-CHP to a number of its properties, this might be done through a rebate on the Council's own electricity bill, monies which can then be returned to tenants in reduced rents.

Another approach may be to create a standard DCHP tariff, for domestic customers with an installed unit, which is analogous perhaps to Economy 7, and which ensures the householder pays less per unit than other users. Both of these approaches go with the grain of the competitive market in energy supply, and provide low cost interim solutions up to the point that affordable smart metering technology is available. Baselines will need to be established through rigorous large-scale field trials.

In both cases there is a clear need for an obligation on the supplier to purchase exported electricity. The price to the householder would be boosted if the Government imposed a CHP requirement on suppliers - requiring them to purchase a minimum % CHP generated power with a buyout threshold - corresponding to the Renewables Obligation.

iv) Access to wholesale market

If a metered solution is achieved, this still leaves open the issue of cost-effective access to the wholesale markets or other mechanisms by which individuals, or more likely Energy Service Companies (ESCos) can sell the electricity generated. Again, barriers exist:

- high risk for small non-portfolio players participating in the balancing market
- 28-day rule that allows switching of energy supply contracts undermines ESCos
- cost associated with establishing trading infrastructure
- complexity for small players and individuals - or additional costs of using energy trading intermediaries

v) Predatory pricing

There is evidence from the German power market that, *unless prevented by clear regulation*, suppliers may adjust their tariffs in an anti-competitive way that discriminates against low-users, loading high charges on to the initial units consumed, while slashing margins on higher bands of consumption. This would be detrimental to DCHP customers, most fuel poor households, and most single person households.

vi) Installers

The installation and servicing of DCHP units will require the introduction of new standards and qualifications for engineers covering both gas and electrical installation. BG is committed to playing its full part in achieving this, however there are a number of barriers:

- shortage of skilled installers, and problems in recruiting new people into the profession
- considerable resistance among existing installers to undertake re-training
- fragmented structure of the industry, with high percentage of sole traders and few installer networks,
- attitudinal barriers, with installers reluctant to advocate new technologies such as condensing boilers to customers – this has acted as a significant market restraint.

vii) Compliance issues

The Boiler Efficiency Directive sets a minimum efficiency standard for certification of all new boilers coming onto the market. This sets a minimum requirement of 83.5% "heat" efficiency. However, BG's device, MicroGen, while being 93% energy efficient, uses @15% of the gas energy for generating electricity (hence micro-CHP), and only @78% of the energy to produce heat.

The issue therefore is interpretation of the BED, and *clarification is required that a DCHP device will not be designated as a boiler*. In fact, the DCHP system displaces a small proportion of a power station, which tend to operate with less than 50% efficiency.

Product labeling should highlight the premium energy saving benefits of DCHP – above and beyond boilers.

vii) Lease financing rules

The existing 5-year limitation on lease-financing packages for household appliances could present a barrier to consumer take-up.

Greater flexibility is required to allow ESCos and leasing businesses to create installation, servicing and home energy packages which reflect the minimum operating lifetime of the equipment – 10 years.

Worksheet A

Assumption – 4m homes with installed DCHP by 2010
(*source BG Group, DTI seminar 11.7.2001)*

Installed capacity
DCHP near-ready for market range from around 1kWe (*BG Group* + *WhisperTech*), to 3 kWe (*Sigma*) – about the largest size required for individual domestic dwelling.

Range	
Lower forecast:	4 million homes x 1kWe = 4,000 MW or 4 GW installed
Upper forecast:	2 million x 1kWe + 2 million x 3kWe = 8,000 MW or 8 GW installed
	or 1.33m x 1kWe + 1.33 x 2kWe + 1.33 x 3kWe = 8 GW installed

Electricity produced per annum
With typical heat demand-led usage pattern for1.1kWe appliance, around 2,200 kWh – approximately half – of domestic electricity requirement is met by DCHP generation per annum (excluding exports - approximately 500kWh) (*source BG Group*).

DCHP is designed as "heat-following", therefore while *Sigma's* 3kWe should produce around 3 x electricity output it also produces 3 x heat and so, if energy efficient, it will operate for less time during the day in an equivalent house.

Forecast	
For homes with typical heating requirements (*no exports*):	4m homes x 2,200kWh = 8,800 GWh, or 8.8 TWh pa

Primary energy saved

CCGT generation is on average 50% efficient, a further 10% of output is lost in transmission + distribution – hence 55% of primary energy is lost to householder. Average installed domestic boiler is 68% efficient in production of useable heat.
BG Group DCHP is 93% efficient in production of useable electricity and heat.

Therefore across domestic heat and power requirements (excluding exports), *BG Group DCHP* reduces consumption of primary energy from 35,000kWh pa to 25,100kWh pa for 3-bed semi – a cut of 9,900kWh or 28% (*source BG Group)*.

Forecast	
For typical usage (*no exports)*:	4m homes x 9,900kWh = 39.6 TWh pa

CO_2 savings
On the basis of displaced remote generation, and increased heating efficiency of *BG Group DCHP* over average installed domestic boilers (see above), operation of 1.1 kWe DCHP reduces CO_2 emissions by 1.5 tonnes pa.

Forecast	
For typical usage (*no exports*):	4m homes x 1.5 tonnes CO_2 = 6m tones CO_2 pa

September 2001

GB Energy Review – BG Group's submission to the PIU

BG key strategic themes

- Security of supply for the UK will come not from imposing or seeking to impose an artificial limit on gas's share of the market but from helping secure for the UK and the EU a diverse range of sources of gas supply
- The broader and the more transparent the liberalised gas market in which the UK operates and the more international trade in gas takes place, the stronger the downward pressure on gas-prices will tend to be, regardless of gas's market-share
- A benign climate for maximising the production potential of the North Sea and for infrastructure investment is central to addressing UK security of supply concerns
- Resolution of the outstanding legal, regulatory and market issues relating to embedded generation is essential if the UK is to derive the maximum energy efficiency, environmental and security of supply benefits from DCHP

BG Group is one of the very few integrated gas companies with expertise and experience from gas production, through transmission, distribution and marketing to the consumer.

Since Centrica and Transco demerged from BG, the centre of gravity of the business – around 65% of activity – is in exploration and production and the company has played a part in some of the biggest gas finds in the world in recent years – in Trinidad, Bolivia, the Nile Delta and Indonesia.

The company has interests in around 20 countries worldwide but its bases is still solidly in the UK, which accounts for 55% of current production. BG Group is currently one of the FTSE 100's top 30 companies.

BG's key points

Overview

- **Natural gas is a clean, convenient, cheap fuel popular with consumers. As many consumers as possible should be in a position to take advantage of its environmental, economic and efficiency benefits**

The environment

- The case for natural gas is an environmental case
- Gas is the cleanest hydrocarbon and safer than nuclear power. It has already contributed significantly to the UK meeting its Kyoto target
- Domestic Combined Heat and Power and Natural Gas Vehicle technologies can deliver major reductions in CO2 emissions and significant improvements in air quality respectively
- Policy makers should not treat all hydrocarbons as though they all have the same environmental impact

DCHP[2]

- Domestic Combined Heat and Power (DCHP) offers the opportunity to implement a technology which can quickly have a major impact by producing further significant cuts to CO2 emissions in the UK and boosting energy efficiency
- DCHP technology is well placed to help UK Govt launch embedded generation and to produce very significant savings (28%) in primary energy used for domestic purposes
- BG Group believes that a market penetration of 4 million homes by 2010 of all types of DCHP is realistic if Government creates the right environment – by supporting development, removing regulatory and other barriers and providing market support for early adopters
- With DEFRA forecasting penetration of 12m-15m homes by 2020-2030 and 1.5 tonnes of CO2 emissions reduced per annum per average household, potential reductions in emissions can range from 6m to 22.5m tonnes per annum over the next 10-30 years. These figures compare with the UK's Kyoto target of 88m tonnes of CO2.
- BG technology could be ready for mass market in 2003
- As the first mass-market, small-scale embedded generation technology, DCHP will open the door for others – photo-voltaics, fuel cells etc to follow, as the issues and challenges - grid connections, cost-effective mechanisms for measurement of exports, trading and settlement, consumer

[2] See separate note attached on DCHP

inertia etc – are common to all small scale embedded generation technologies

- DCHP's success should move the UK towards a position where renewables benefit from, and are developed alongside, other small-scale embedded generation
- DCHP's 93% thermal efficiency boosts resource productivity, while reducing overall levels of domestic gas use, comparing favourably even with remote generation by CCGT, with efficiency of up to 53%.
- DCHP can defer the need for construction of additional remote large-scale generators to keep pace with rising domestic demand
- During power cuts, DCHP keeps the lights on and enables, for example, small businesses to continue operating. By extending generation sources and ownership, the technology also increases overall reliability of supply
- Given policy support to facilitate its introduction in deprived areas, DCHP can help tackle fuel poverty, providing @£200 savings per year for the average household
- For all of the reasons of energy efficiency, environmental and economic benefits and security of supply, the Govt should do all it can to maximise the number of consumers in a position to take advantage of DCHP

Natural Gas Vehicles

- Natural gas fuels eliminate four-fifths of the toxic pollutants and particulates of an equivalent diesel vehicle, also reducing smog forming emissions - i.e. NOx - by one-fifth without increasing overall emissions of greenhouse gases.
- Compared to an equivalent petrol engine, natural gas reduces greenhouse gas emissions by one-fifth and carbon monoxide by one-half.
- Need to focus on air-quality improvements NGVs can deliver – not just greenhouse gases – because of the significant improvements they can provide in big towns and cities
- UK Govt has done much to help by cutting duty on natural gas fuels but guaranteeing the differential with less clean fuels until at least 2010 would help significantly in persuading drivers to switch
- Many cities and states across the world are considerably ahead of the UK in establishing NGV markets – notably Gujurat state, Buenos Aires, Sao Paolo and, increasingly, parts of the US but the technology still needs further political impetus to take off domestically
- UK Govt should follow example of France and Italy and set rising targets of NGV/other alternative fuel vehicles for local authority and other public bodies' fleets

Security of supply

- Security of supply comes not from limiting a given fuel's share of the market but in ensuring a diverse range of sources of supply of fuels of choice
- Limiting gas's share of domestic heating and/or power generation markets likely to hit investment in the North Sea
- Capping gas's share of power generation will mean more costly electricity and make imported power more attractive
- It would also disadvantage some consumers, preventing some willing buyers and willing sellers from freely entering into transactions
- UK Govt should be fully aware of the significant environmental, economic and efficiency savings CHP or DCHP technologies can deliver and be very careful to ensure that their development and benefits are not impeded by curbs on gas
- Europe set within a sea of gas, with potential access to @70% of the world's gas reserves; UK already connected by pipeline network to @45% of existing global reserves
- Need for UK Govt and EU to lend support to pursuit of diverse sources of gas supply within economic transportation of EU and to help develop a range of pipeline routes to transport that gas
- Developing countries need export revenues as much as we need their gas imports…
- …but security enhanced by achieving a balance of sources of supply
- Norway likely to be central to meeting UK gas demand over next few decades
- BG's contribution to UK/EU security of supply will come from Kazakhstan and Egypt as well as the North Sea. Norway another potential source of BG activity and exports
- Those fearful of so-called 'import dependency' should recall that, throughout the 1980s, 25% of British gas supplies were imported from Norway; and that imports can be managed without undue political risk, as has been seen in Germany, France, Italy and Spain – not to mention Japan, which imports all of its gas, ensuring security of supply through a range of measures including a variety of LNG suppliers
- As import requirements rise, a light-handed regulatory framework that encourages companies to invest in interconnectors and offshore infrastructure is essential
- Onshore, an improved method of allocating and investing in long-term entry capacity by Transco to ensure sufficient capacity to meet gas demand needs is required[3]

[3] See BG response to scoping note questions on electricity and gas networks - attached

- UK fiscal climate should be set to maximize full production potential of North Sea

Liberalisation/gas-prices

- The liberalised UK market is delivering cheaper gas than in all of our main EU competitor countries[4]
- The more transparent and the broader a liberalised gas market is, the greater will tend to be the downward pressure on prices[5]
- Liquefied natural gas (LNG) will increasingly tend to act as a factor in holding down prices, acting as a ceiling to pipeline gas-prices[6]
- Recent price-spikes caused by Interconnector juxtaposing liberalised UK gas market and only partially liberalised European gas market, reintroducing oil-gas price-link by back door because European gas contracts tend to be indexed to oil and oil products
- Solution not to shut Interconnecter, as interconnectors improve security of supply, but to press ahead with liberalisation
- Liberalisation doesn't always guarantee low prices but it does give the UK and other European states the best possible chance of low prices in the short, medium and long-term.
- As gas trading hubs emerge in Europe, prices will increasingly be spot market-related rather than linked to oil
- The more liquidity at trading hubs, the better the chance of a natural move away from oil-indexation – but there will always be a link between gas-prices and the price of oil or the nearest alternative fuel at times of peak demand because of the way open commodity markets operate
- Need to encourage full liberalisation across EU and ratification of Energy Charter Treaty by Russia to ensure maximum benefits of lowest possible prices and diversity of sources of supply
- Critical to draw the correct conclusions from California – poorly designed liberalisation combined with a lack of investment in generation and transmission capacity, preventing markets from functioning properly[7]
- Limiting gas's share of the UK market artificially would mean there was not true competition between fuels and would mean an element of subsidy to other fuels displacing 'blocked' gas-supplies

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[4] Energy Advice Ltd independent monthly analysis, Jan-June 2001.

[5] BG would draw the Review's attention to the analysis of future gas-prices as outlined by John Mitchell in *The New Economy of Oil, RIIA Energy and Environment programme, 2001,* and to a more detailed version of BG's position in Chapter 3 of BG's response to the EC's Green Paper on security of energy supply, *An active diplomacy for Europe.*

[6] See separate section on LNG below

[7] See *California in the Dark, CERA News, 19/3/01, Makovich/Yergin.* http://www.cera.com/news/details/1,1345

- Limiting gas's share of the UK market artificially would represent a backward step en route to the liberalisation that has already delivered lower prices to UK consumers

LNG

- LNG will develop into an increasingly significant element in meeting demand, providing vibrant gas-to-gas competition and reducing price-volatility
- Cargoes will become increasingly available globally to meet short-term, unforeseen demand in any given location
- World trade now worth US$15bn and on track to double by 2010
- Companies now beginning to build LNG ships even without the pledge of secure, long-term contracts, as was always the case in the past; a form of LNG spot market emerging
- LNG is already being shipped into Europe from Trinidad
- Is a LNG cargo a significant quantity of fuel? One cargo could supply the domestic gas demand of a UK city or large town the size of Exeter, Basildon, Blackburn or Cambridge for a full year.
- UK market may require new LNG terminals for imports

Regulation

- Well designed markets better allocators of resources than state planning or intrusive regulation
- UK regulatory system in danger of taking a wrong turning: OFGEM overly interventionist in seeking to determine detailed market structures rather than overseeing the operation of the market and cutting regulation as competition grows
- Entry capacity auctions poorly designed because revenue over-recovery mechanism has lead to higher than necessary capacity prices
- OFGEM hourly balancing proposals risk increasing price-volatility, raising barriers to entry and requiring wholesale renegotiation of upstream contracts
- Costs of implementation of hourly balancing not only well in excess of benefits but would seriously affect the economics of North Sea production
- The offshore consists of many pipeline networks, transporting products of different qualities – not a homogenous product as carried by Transco – so not suited to a 'one-size-fits-all' type of regulation, given that all transportation and processing contracts are bespoke.
- Offshore is not a natural monopoly, unlike the Transco onshore transmission system, so transportation charges set by the interaction of market forces – backed up by effective Offshore Code of Practice with ultimate recourse to Sec of State in the event of disputes.

September 2001

Documents attached:

1) BG Group responses to key questions from the Energy Review gas scooping note
2) BG Group submission on DCHP

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