Natural Gas in the UK :
An Industry in Search of a Policy?

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PREFACE

The UK gas market is the biggest gas market in Europe and has experienced rapid changes in supply, demand, imports and exports over the past decade. In 2000, UK gas production peaked and shortly thereafter, so did exports of gas. As the country returned to its historical position of being a net importer of gas, the focus of political and media attention shifted away from liberalisation and competition – where it had been since privatisation - towards security of supply. At the same time government increased its commitment to reduce carbon emissions. However, despite a number of white papers setting out policy in relation to carbon reduction, little specific energy policy has emerged still less any policy towards natural gas – by far the largest source of stationary energy, including power generation fuel, supplies.

I'm very grateful to John Elkins for writing this paper. His long career in the state-owned and the privatised British Gas, followed by his editorship of the well known publication *Gas Matters*, means that he has closely followed the changing UK gas market over the past several decades. This is a timely moment to assess the place of gas in the UK's energy (and carbon reduction) future. The study draws attention to the fact that gas is increasingly seen in government and regulatory publications as an energy security problem rather than as part of an energy supply and carbon reduction solution.

Jonathan Stern

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1. Natural gas and energy policy

Natural gas plays a central role in the UK (and the world) energy market in the first decade of the 21st century, but is facing the prospect of a decline in its importance as environmental factors combine to reduce the importance of natural gas and the other carbon-based fuels. This will inevitably result in the future of the gas industry becoming dependent on wider considerations, which can be summed up as 'environmental energy policy'. Policy makers looking to the longer term are primarily concerned with producing electricity from the least emitting fuel; reducing emissions in line with national policy and international agreements; the security of energy supplies for their own countries; and the cost of energy for national users. The future of the gas industry is a long way down the list of priorities, and this is unlikely to change.

Three questions need to be asked at this point: What is the UK's energy policy? Where does natural gas sit within that policy? and, Is there a need for more central direction? There is no easy answer to any of these questions.

The Department of Energy and Climate Change described its July 2009 *Low Carbon Transition Plan* as a 'comprehensive plan to move the UK onto a permanent low carbon footing and to maximise economic opportunities, growth and jobs',[1] with the main government target a 34% cut in 1990 emissions levels by 2020. By then '40% of electricity will be from low carbon sources, from renewables, nuclear and clean coal' and natural gas imports will be halved, while household fuel bills will increase by only 8%. A second target is to produce 15% of all energy (electricity, heat and transport) from renewables by 2020.

The Plan provides an estimate of the projected impact of its assumptions on fossil fuel consumption and the level of imports (see Tables 1 and Chart 1) but does little more to describe how the fossil fuel sector should manage its decline.

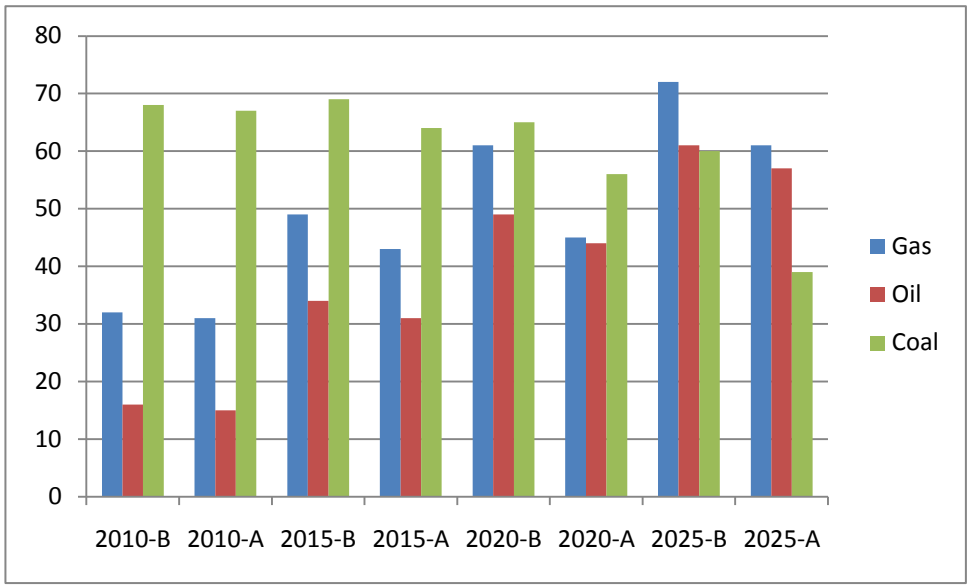
Table 1: Projected Impact of Transition Plan Measures on Fossil Fuel Consumption

Change in Consumption (%)	2010	2015	2020	2025
Gas	-2	-11	-29	-29
Oil	-1	-4	-10	-10
Coal	-4	-13	-22	-34
Total fossil fuel	-2	-9	-19	-22

Source: Department of Energy and Climate Change

[1] The UK Low Carbon Transition Plan: National Strategy for Climate and Energy, July 15, 2009. http://www.decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx

Chart 1: Projected Percentage of UK Consumption Imported Before and After Transition Plan Measures



Source: Department of Energy and Climate Change

B=Before Transition. A=After Transition.

The Transition Plan claims to be 'the most systematic response to climate change of any major developed economy'[2] and that may be so, but in concentrating so much on how low carbon fuels will help deliver the ultimate target (or at least the interim 2020 target) the Plan gives little detailed advice to the gas industry (and other fuel industries) on how to arrange its own 'exit strategy'.

This is not so surprising, because the low carbon technology targets on which government strategy is based are far reaching. They imply the development of new, low carbon technologies, such as wind, solar, wave power, and biomass. There will also be a need for a substantial nuclear generation construction programme and a programme of demand limitation through customer education. Unfortunately these developments will all take time, large investment, and choices between available or potential technologies. There are strong arguments for the view that the government's targets will at the very least need to be deferred. In the meantime, the present conventional sources of energy will need to hold the fort and themselves adapt to the new world by (literally) cleaning up their acts.

The Confederation of British Industries has already published a suggested alternative approach to energy policy.[3] In its report it criticises the government for advocating support for all possible alternative generation technologies without concentrating enough on picking winners. And in blessing the development of a new generation of

[2] Ibid.
[3] Decision time, Driving the UK towards a sustainable energy future, July 2009. http://www.cbi.org.uk/ndbs/press.nsf/38e2a44440c22db6802567300067301b/a65ac8500938c7e1802575f3005c6a02?OpenDocument

gas-fired power plants it argues that the government is simply adding to the problem of carbon disposal for as long as those plants survive. In its calculations the CBI assumes: 'Coal plants compliant with the Large Combustion Plant Directive (LCPD) are allowed to run into the early 2020s as that Directive intended, rather than in many cases being forced to close in 2016 along with about 4GW of gas-fired plant as the Commission has recently proposed. This assumption is now compatible with the proposed Industrial Emissions Directive as revised by the EU Council political agreement of 26 June 2009.' Keeping 'LCPD-compliant' coal plants on the system 'avoids a new wave of gas-fired plants before new nuclear comes on line' and setting the 2020 indicative target for renewable electricity 'at a level that enables a more cost effective balance of nuclear and renewables . . . encourages generators to press ahead with 10-15 new reactors (all on existing sites), while early clarification of the CCS framework increases the chances of a higher level of CCS penetration by 2030 with carbon and security benefits'.[4]

The CBI agrees with the government, and virtually every other commentator, in saying that central planks of emissions reduction will be to reduce consumption of all fuels by all final consumers including power generators, and to sequestrate carbon emissions where this is possible, broadly moving away from coal and oil to gas, and then to renewables. It will mean developing and applying carbon capture and sequestration technology wherever this is possible, most obviously in power generation and large industrial applications. In areas where carbon capture is not so easily applicable, and even in those where it is, it will be necessary to reduce energy consumption by a combination of more energy efficient appliances and machinery, insulation, price encouragement and taxes and other measures such as the carbon reduction commitment.

But despite a number of legislative measures designed to reinforce emissions reduction, and statements of broad policy such as those mentioned above, the energy industry is left with no clear idea of what UK energy policy is, let alone a policy for natural gas.

Among other recent contributions to the debate, a report by Malcolm Wicks MP, comes closest to grappling with the specific problems that a low carbon future will pose for the gas industry.[5] Wicks is a past Minister of State for Energy and, since October 2008, Special Representative of the Prime Minister on International Energy, so that we can assume that his views are not too far removed from those of the present UK government, although this does not necessarily imply that the government would be prepared to support them with legislation.[6] Wicks discusses several possible changes in the direction of government policy towards a more *dirigiste* style of management of the natural gas industry, although he nowhere positively recommends

[4] Ibid: page 13

[5] Malcolm Wicks MP, Energy Security: A national challenge in a changing world, August 2009. http://www.decc.gov.uk/en/content/cms/what_we_do/change_energy/int_energy/security/security.aspx

[6] "'The Government will consider carefully the report's recommendations and publish a formal response in due course', said Energy and Climate Change Secretary, Ed Miliband in the press release launching the report. http://www.decc.gov.uk/en/content/cms/news/pn090/

them. 'The Government and industry will wish to consider whether it needs to take a more strategic role in determining the fuel mix for power generation', he says. 'This would be a significant move away from "the market knows best" orthodoxy but might be justified on energy security grounds. It would echo the welcome moves to ensure that sufficient renewables capacity is installed.' He also discusses the possibility of investment in strategic gas storage and of a gas depletion policy.

But clearly his report is set against a background of there being no such policies, some would say no specific policies at all for the UK gas industry. And if the government is not laying down guidelines for the gas industry, is anyone else?

Ofgem, the British energy regulator, published some UK energy scenarios in October 2009 as part of its Project Discovery [7] whose aim, as stated in the overview to the report, is to examine 'the prospects for secure and sustainable energy supplies over the next 10-15 years '.[8] Ofgem did not recommend any particular policies, but examined four scenarios, combinations of slow or rapid environmental action, and slow or rapid economic recovery from the current recession, labelled Green Transition, Green Stimulus, Dash for Energy and Slow Growth.

Gas demand is highest in Dash for Energy because, although global economies bounce back strongly, there is no global agreement on tackling climate change.There is a significant expansion of CCGT capacity, so that gas increases its share of the generation mix. Gas demand is lowest in Green Transition and Green Stimulus, in the first case because **r**apid economic recovery linked to global agreement on tackling climate change leads to effective energy efficiency measures and rapid progress with nuclear and CCS demonstration projects. Gas imports increase until 2016 and then stabilise. With Green Stimulus, slow recovery and restricted access to finance lead to short term reductions in energy demand and rapid decarbonisation of the generation sector. Gas imports increase until 2012 and then stabilise.

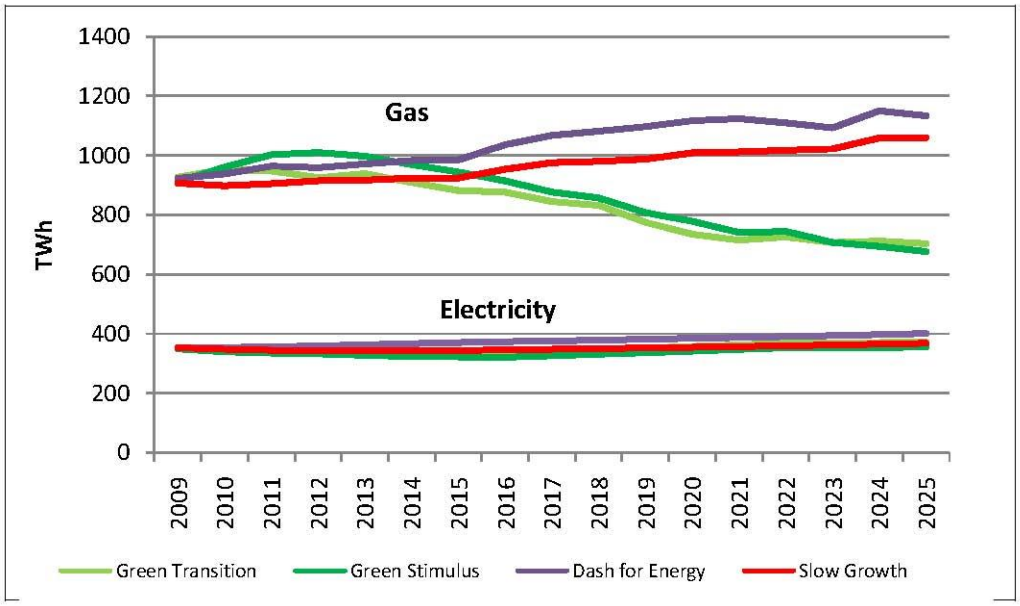
Throughout, Ofgem assumed that: 'In all our scenarios . . . market participants respond adequately to market signals. Within our model this means that we assume new investment takes place where companies could earn a reasonable return on their investment under each scenario's assumptions, taking into account the risks they face. It also means that assets are retired when they are no longer profitable.'[9]

So what do Ofgem's scenarios tell us? Demand for electricity is more or less a given, as is shown in Chart 2. In fact a message from all recent scenario work is that other fuels, gas and coal, are now subsidiary to the ultimate clean fuel, electricity. But gas demand follows one of two paths, rising slowly if there is 'slow' environmental action, and falling rapidly if there is rapid environmental action. Where gas demand rises it is fundamentally because there is a 'Dash for Energy' linked to economic recovery and a surge in gas-fired generation, or a (slower) dash for gas because of slow recovery, and limited investment in alternative generation technology. In the green transition and green stimulus scenarios, gas loses out to nuclear and alternative

[7] http://www.ofgem.gov.uk/Markets/WhlMkts/Discovery/Pages/ProjectDiscovery.aspx
[8] Ibid.
[9] Ibid: section 1.12

fuels in generation. Reliance on gas imports, particularly LNG, necessarily increases under all four scenarios.'[10]

Chart 2: Project Discovery Scenarios: Annual Gas and Electricity Demand



Source: Ofgem[11]

Perhaps the major lesson for the gas industry from the Ofgem analysis is the wide range of outcomes for gas demand (annual gas demand of 77 to 113 Bcm in 2020), low carbon generation (21% to 52% of the mix), and investment in the GB energy market over the period (excluding upstream investment) (£96 to £200 billion). As the report rightly concludes, 'This means that investors face difficult decisions before committing large sums of capital to new projects.'[12]

Apart from providing food for thought on the potential interactions between climate change polices and recovery from recession the Project Discovery, authors note that, because the need to address climate change and other environmental concerns is now embedded in EU and UK legislation, 'Government intervention in energy markets has become broader, including significant subsidies for renewable generation. The trend towards a more proactive role for Government in determining specific forms of investment means it is necessary to examine what role the market will play in delivering future investment'.[13]

[10] Extracted from 'Ofgem plots four paths through the coming energy landscape', Gas Matters, November 2009, page 24.
[11] Ibid. page 8.
[12] Ibid. page 56.
[13] Ibid. page 1.

More specifically, 'lessons from the financial crisis mean that it is prudent to examine whether we can rely on the risk management actions of individual market participants to deliver wider objectives on security of energy supply.'[14]

2. The fundamental issue for gas: security of supply

For as long as natural gas remains a major part of the UK energy balance the fundamental problems can be, and often are, summarised in one word: security. Unfortunately this over-used word can mean many things, for instance, having enough infrastructure; having enough annual gas; having enough gas to meet demand in extreme weather conditions; but most generally it refers to increased reliance on imported supplies and carries with it the assumption that indigenous supplies are inherently secure, whereas imports are inherently insecure.

Maximising UKCS production Whatever its long term plans for reducing fossil fuel usage, the UK government states consistently that it wants to maximise gas production from oil and gas fields in and around the UK, at least in the medium term, the transition period between carbon- and non-carbon economies. 'Given our own hydrocarbon reserves, the UK can also to some extent reduce its dependence on imported fossil fuels by ensuring that we maximise economic recovery of the oil and gas from the UK Continental Shelf (UKCS) and from remaining coal reserves.'[15]

Making the most of UK reserves increases UK supply security, in the sense that it reduces or defers fuel imports, although it raises the question whether it is 'secure' to depend on production at any particular rate from declining fields. Nevertheless, maximising indigenous reserves implies slowing down the inevitable decline in indigenous production rates, and making sure that reserves are exploited as much as possible in the relatively small fields which remain to be developed in the mature UKCS exploration province. The possibility of developing small reserves often depends on being able to gain access to existing infrastructure built for larger fields reaching the end of their economic lives.

In 2004 the Government launched a *Code of Practice on Access to Upstream Oil and Gas Infrastructure on the UK Continental Shelf,* to update an existing 1996 Infrastructure Code of Practice.[16] Its key principles were:

• Parties provide meaningful information to each other prior to and during commercial negotiations
• Parties support negotiated access in a timely manner
• Parties undertake to ultimately settle disputes with an automatic referral to the Secretary of State
• Parties resolve conflicts of interest
• Infrastructure owners provide transparent and non-discriminatory access

[14] Ibid. page 2.
[15] White Paper on Energy - Meeting the Energy Challenge - May 2007 http://www.berr.gov.uk/files/file39387.pdf
[16] http://www.ukooa.co.uk/issues/economic/icopfinal.pdf

• Infrastructure owners provide tariffs and terms for unbundled services, where requested and practicable
• Parties seek to agree fair and reasonable tariffs and terms, where risks taken are reflected by rewards
• Parties publish key, agreed commercial provisions.[17]

This is an admirable set of principles, but it is clear that, from the Government's point of view, it is up to infrastructure owners and companies interested in obtaining access to the infrastructure to sort out their own arrangements, although it concedes that it needs to provide a framework within which this can take place. ('If we are to maximise economic recovery of remaining UKCS reserves we must maintain a supportive regulatory environment that attracts a wide range of companies to exploit existing and prospective fields.')[18]

The question is whether Government encouragement is enough to bring about the desired result – maximisation of UKCS reserves – or whether some element of central direction is called for.

In its submission to the 2006 Energy Review, the UK Offshore Operators Association (UKOOA) said: 'The government should also ensure that the fiscal and regulatory frameworks actively promote security of supply and the maximum economic recovery of the UK's own oil and gas. Current fiscal policy is demonstrably unstable and will not, in its current state, achieve the desired result. Various aspects of the non fiscal regulatory regime also fail to encourage the maximum development and recovery of our own reserves. The regime regarding the decommissioning of offshore structures is a particularly good example where . . . the unsatisfactory nature of the relevant regulations all conspire to impede trade in mature assets and hence increase the risks of premature decommissioning of offshore infrastructure. This will be to the detriment of future oil and gas production.' [19]

The Energy Act 2008, which was given Royal Assent on 26 November 2008, included measures 'strengthening regulation to allow for private sector investment to help maintain the UK's reliable energy supplies. This is crucial, as we expect to have to rely on imported gas to meet up to 80 percent of our energy demands by 2020.'[20] There was no hint of a plan to identify potential reserves centrally and, perhaps more important, to manage the development of small fields by identifying infrastructure coming to the end of its 'normal' life on the field(s) for which it was put in place.

We should also note that offshore (and onshore) gas fields themselves are potentially re-usable for seasonal storage of natural gas and long term storage of carbon captured further down the gas chain.

The offshore industry is particularly resistant to government interference in its decision making. Nevertheless, in the same submission, UKOOA called on the government to 'elevate the importance of energy policy and the implementation of

[17] Ibid page 3.
[18] Meeting the Energy Challenge: A White Paper on Energy: Department of Trade and Industry. May 2007.page 110 http://www.berr.gov.uk/files/file39568.pdf
[19] http://www.ukooa.co.uk/issues/economic/energy_review.pdf page 24.
[20] http://www.decc.gov.uk/en/content/cms/legislation/energy_act_08/energy_act_08.aspx

that policy, both at home and abroad, by focussing all energy issues within a new, properly resourced Department of Energy headed by a Secretary of State'.[21] Energy is in fact now dealt with by the Department of Energy and Climate Change (DECC), instead of the Department for Business, Enterprise and Regulatory Reform but it is too soon to say whether the change of organisation will bring a change in approach and policy.

Despite its call for attention to decommissioning and re-use of assets and for stability in fiscal policy, it is of interest that UKOOA also commented that increasing dependence on imported gas was not a problem in itself. 'Future security of energy supply for the UK will be best achieved through open markets providing gas supplies from a diverse range of sources. We believe that the new import routes can provide such diversity and, therefore, security of supply.' [22] It also challenged the view that three-quarters of primary energy would need to be imported by 2020, arguing that indigenous production of oil and gas could still account for about half of oil and gas supplies unless 'the UK fails to sustain investment in its own oil and gas resources'.[23]

Network infrastructure The UK's gas distribution and transmission networks are monopolies regulated by Ofgem. All are subject to price controls which are fixed for the National Transmission System for five-year periods, currently from April 2007 to March 2012. The gas distribution networks (GDNs) are similarly constrained, currently for five years from April 2008.

In discussion with the network owners and operators, Ofgem errs on the side of market testing when it comes to authorising new system investment, and this can result in controversial decisions, for instance, when potential users of system capacity fail to register their interest in the regular public auctions of capacity. If users are reluctant to book capacity beyond the immediate few years ahead, there is no long-term signal which would help identify and justify the need for new investment.

National Grid produces an annual Ten Year Statement, in line with Special Condition C2 of its Gas Transporters' Licence.[24] This comprehensive document contains scenarios of future gas demand and of investment in the transmission system and is, inevitably, a starting point for much gas industry planning. It is the basis for an annual industry-wide consultation process which is necessary, given the diffusion of responsibility for marketing, planning and operating distribution and transmission systems. The GDNs (some of which are owned by National Grid) are similarly required to produce regular forecasts of their plans.

The latest version of this document was produced in July 2009 and, as National Grid explains, because of 'forecasts of lower demands with little or no growth and completed or near completed import infrastructure . . . the emphasis on new NTS investments has shifted to include alternative topics such as 2020 targets and security of supply. To reflect this we have changed the name of this publication from

[21] http://www.ukooa.co.uk/issues/economic/energy_review.pdf page 24.
[22] http://www.ukooa.co.uk/issues/economic/energy_review.pdf page 25.
[23] Ibid
[24] http://www.nationalgrid.com/uk/Gas/TYS/

"Development of NTS Investment Scenarios" to "Development of Energy Scenarios".'[25]

Although National Grid and the GDNs hold a central role in forecasting the need for, and in delivering increases in, capacity, their access to data is necessarily imperfect in a liberalised market. They are the only organisations with direct access to information on actual gas flows, and they are best equipped to deconstruct it into usable algorithms for forecasting demand in the various market sectors. However, even they need to consult with other industry players to check their own views about future developments in gas usage, storage availability, pipeline gas and LNG import infrastructure, (although the larger gas suppliers also model their own gas flows, relying more or less on data collected by National Grid).

The Ten Year Statement is part of the process leading to the production of scenarios of demand and supply based on the aggregated intentions of importers, wholesalers and marketers. National Grid also maintains close contacts with Oil and Gas UK, the trade organisation representing the UK offshore oil and gas industry and, in its own words, 'the definitive source of information about the UK upstream'.[26]

When it comes to gas imports, National Grid is on less firm ground, without direct access to the plans of companies importing gas from Norway or Continental Europe through the various interconnector pipelines, or importing LNG through the various import terminals. Similarly, with storage capacity, National Grid is at one remove from knowing how much capacity is likely to become available, although, like actual storage users, it knows how much capacity currently exists and what information developers choose to make available. It also, of course, discusses with developers how and when they might require connections to the grid and how much injection and withdrawal capacity they will require.

Nevertheless, National Grid's published surveys of future developments are, for many players in the market, the only consistent, detailed collections of data available against which to test their own plans, and they provide projections of existing trends, with some alternative scenarios.

National Grid is also the operator of Great Britain's electricity grid and is co-operating with the government's Department of Energy and Climate Change (DECC)[27] as well as with Ofgem, to consider the potential impact of the European Union's targets for renewable energy development and emissions reduction, which have been accepted by the UK government. As part of this work, National Grid has been developing 15-year scenarios concentrating on the detailed implications of these policies.

Interconnectors, LNG and Storage Although expansions of both the gas and electricity grids are subject to discussion and agreement with Ofgem, interconnector

[25] http://www.nationalgrid.com/uk/Gas/OperationalInfo/TBE/ - executive summary.
[26] http://www.oilandgas.org.uk/ukooa/
[27] Energy was previously dealt with in the Department for Business, Enterprise and Regulatory Reform (BERR) and before that in the Department of Trade and Industry (Dti)

pipelines, storage, and LNG importation projects are subject to much looser regulation than onshore networks, and investment depends on 'the market', defined as individual companies deciding which investments would be profitable. There is, as in the offshore sector, no overall plan.

In a speech to the Adam Smith Institute on 17 March 2009, Sam Laidlaw, the chief executive of Centrica, said that gas storage developments in the UK 'have been painfully slow in coming to the market; the facts speak for themselves. Since the conversion of the Rough offshore field in 1983 there have been just four new gas storage projects; Hornsea, Humbly Grove, Hatfield Moor and Hole House Farm. All of these are relatively small onshore facilities.'[28]

Although several companies are planning to develop new stores against the background of increasing reliance on imported gas and falling access to swing supplies from the UKCS, their plans are developed to their own timetables, and depend on their own access to finance and expectations of profit.

It is the same with pipeline interconnectors and LNG regasification terminals. While the government recognises the need for and encourages the development of new gas importation infrastructure it is a matter of chance rather than design whether the 'right' quantities of incremental capacity are built at the right time.

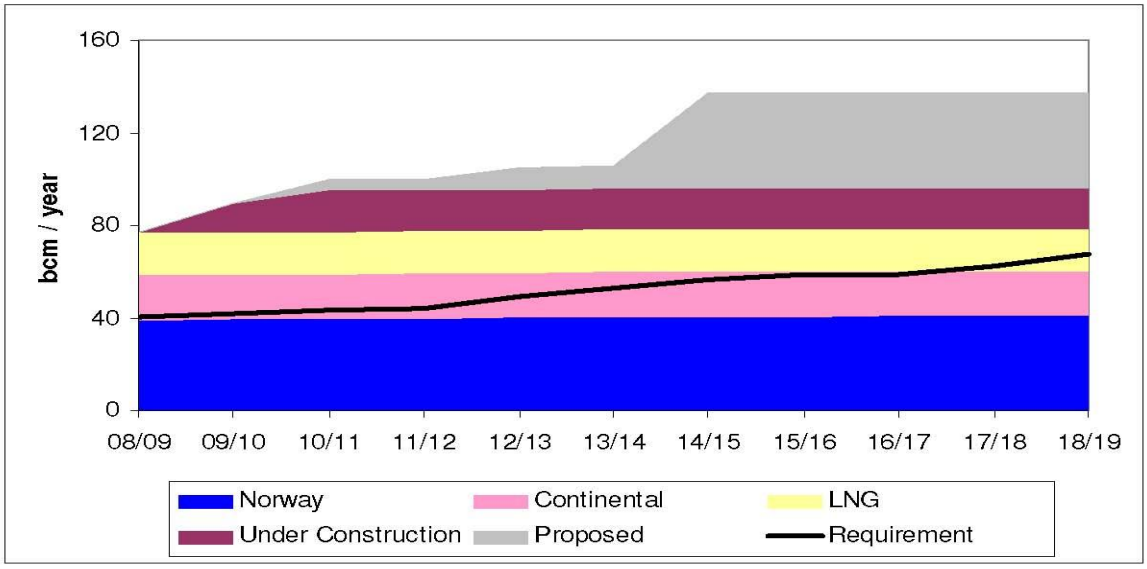
The result is that the liberal market has been extremely successful in delivering import capacity – from Norway, the Netherlands and Belgium, and as LNG – much more so than in creating new gas storage.

In fact National Grid estimates that the UK's import capacity, including capacity under construction and planned, will plateau at about 140 Bcm/year from 2014/15.[29]

Chart 3: Import Requirements vs De-rated Import Capacity

[28] http://www.centrica.co.uk/files/presentations/2009/20090317/2009_strategic_challenges_transcript.pdf page 4.

[29] In *Transporting Britain's Energy 2009: Development of Energy Scenarios, July 2009*) http://www.nationalgrid.com/uk/Gas/OperationalInfo/TBE/



Source: National Grid[30]

n.b. De-rated capacity reflects 'operational experience and expectations of future use'. For import pipelines apart from IUK National Grid assumed a de-rated annual capacity of 85%. For LNG and IUK imports the assumed de-rated annual capacity was 75%, 50% or 25% depending on the state of completion.

Chart 3 demonstrates that even without capacity under construction, there would be a plateau of around 100 Bcm/year, which comfortably exceeds forecast base case import requirements until 2020. And although all these forecasts are subject to uncertainty the least likely variation is that gas imports will increase dramatically.

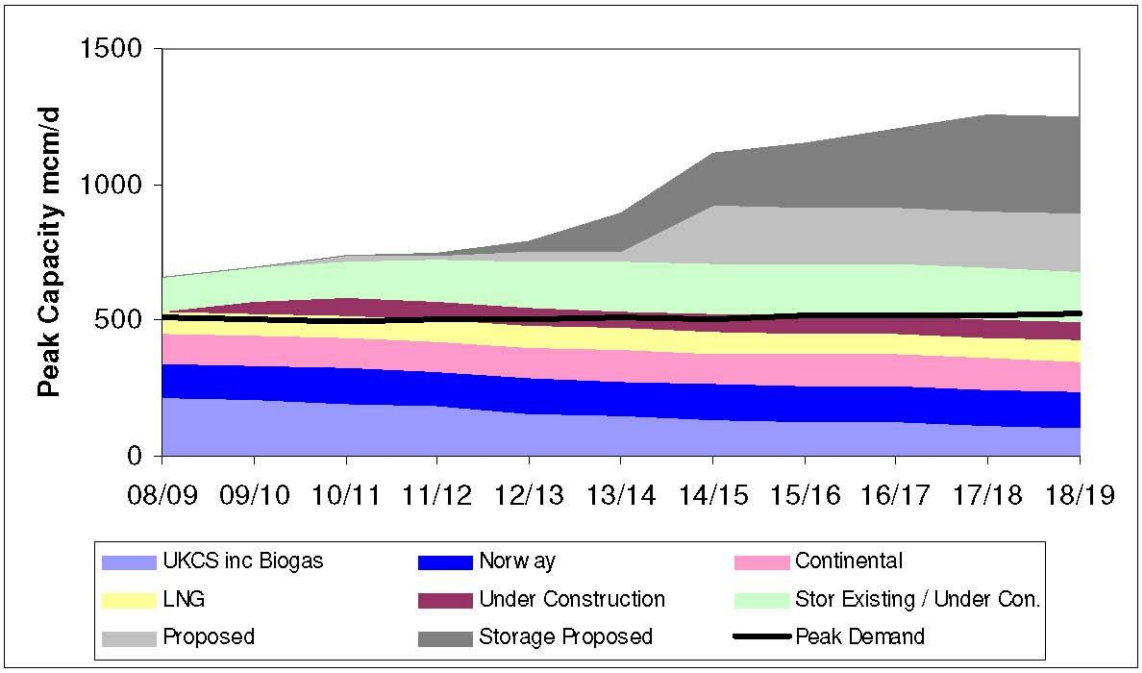
Peak capacity is similarly well in excess of likely undiversified 1 in 20 peak demand, with all imports at their maximum capacities, i.e. not de-rated, even if 'proposed' storage and importation projects are ignored. Although this suggests that the UK has enough storage, pipeline and LNG capacity to survive in very cold weather, it needs to be said that it does not allow for any interruptions or reductions in any of the supplies, of the kind which have already happened with Norwegian supplies in January 2010,[31] and with continental gas availability during the January 2009 Russia-Ukraine type of crisis.[32]

Chart 4: Potential Peak Supply

[30] Ibid.: page 19

[31] See for instance 'Surprise! Surprise! Markets work: Why reports of a January British gas supply crisis were overheated', Gas Matters, February 2010.

[32] See for instance 'The Russo-Ukrainian gas dispute of January 2009: a comprehensive assessment', Simon Pirani, Jonathan Stern and Katja Yafimava, Oxford Institute for Energy Studies, February 2009: http://www.oxfordenergy.org/pdfs/NG27.pdf

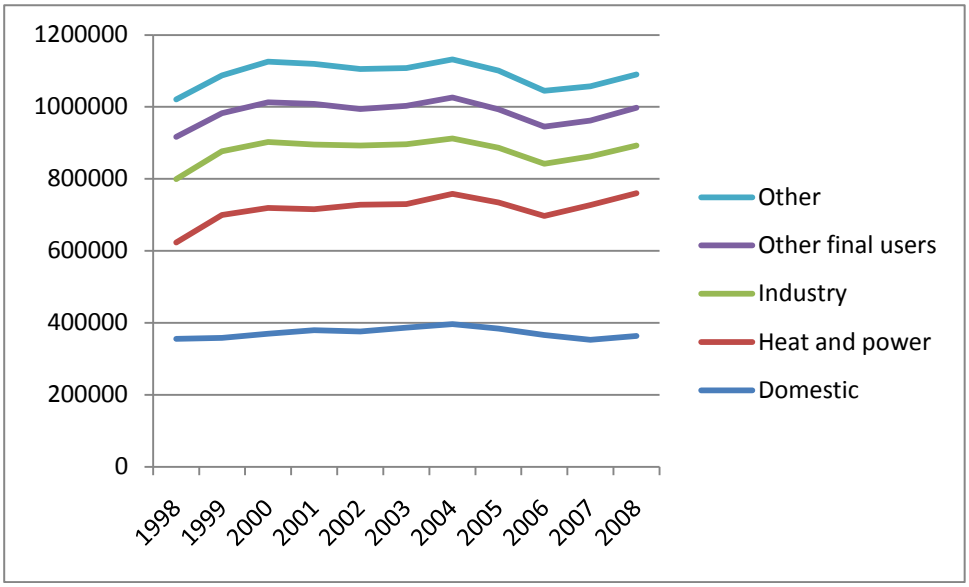


Source: National Grid

As the UK becomes more and more heavily dependent on imported gas, it is inevitable that there will be increasing calls for surplus, or strategic storage, to cover just these kinds of situations. The market has not provided such cover until now, and it seems unlikely that commercial investors will be attracted to a type of supply which will be in operation infrequently and erratically.

Gas Supplies The British residential market is mature, with only low growth in prospect. One of the most likely results of a strict adherence to British and European emissions reduction policies is that gas demand will actually fall as more efficient appliances and buildings are developed and introduced into the housing stock, and as consumer gas prices increase. These increases are likely as British customers become more dependent on gas imported by pipeline from Continental Europe or as LNG, in both cases at prices which are, for the present, at least fundamentally linked to oil prices.

Chart 5: Natural Gas Demand (GWh)



Source: Department of Energy and Climate Change

Despite an overall increase in demand of 6.7% since 1998 domestic demand has risen by only 2% and industrial demand, after a high in 2000, has steadily fallen to 75% of the 1998 level. The only strong growth has been seen in power generation, which increased by 48% and looks set to be the only prospect of significant growth for gas, at least in the next ten to twenty years. In the longer term, as environmental policies work their way through, even the power generation market for gas is likely to decline, as power generation from a combination of clean coal, new nuclear power stations and renewable projects makes increasing inroads into the demand for gas-fired generation. This trend may be mitigated by the widely forecast need for a stand-by generation fuel to plug gaps when renewable fuels are not available, most probably because of fluctuations in wind, wave and other conditions.

Since network infrastructure in Great Britain is also mature, this suggests that long-term infrastructure planning in the British gas market is set to become a matter of checking up on potential pinch points as gas flows take new directions, responding to new import pipelines, storage developments, gas-fired power stations and LNG terminals.

But providing infrastructure and providing gas to flow through it are radically different things. We have become familiar at various times with regasification plants in North America or Europe standing unused as potential cargoes of LNG seek more rewarding destinations. We have also seen interconnector pipelines not necessarily despatching gas to Great Britain when the demand and price on offer suggest they should.

There has been a potential for supply shortages in recent years as UKCS supplies have declined, but a succession of warm winters has helped to maintain a supply/demand balance. The only significant shortage of natural gas capacity in Great Britain in

recent years was the closure of the Rough field gas store in 2006,[33] but in general there has been and is sufficient transmission and distribution capacity.

National Grid's most recent published scenario document examines the impact of a failure of imported annual supplies from any one of three external sources – Norway, Continental Europe, and LNG. In theory, according to National Grid, 'even the loss of one type of imported gas could be covered by additional supplies from other supply types at acceptable levels for the next two to three years. Thereafter the increasing level of import dependency means that a loss of one type of supply results in the need for significant flows from alternative import sources. With only modest levels of storage the loss of any import source would provide challenging conditions, notably in the winter period. Hence there is a continued need for new supply infrastructure in terms of new storage or for further imports.' [34]

Norwegian supplies from 2013/14 would need to be taken at 'challenging' (70-85%) rising to 'unrealistically high' (85-100%) load factors in the event of a complete failure of LNG imports. Similarly a loss of Norwegian supplies could drive annual LNG load factors above 50% by 2012 and above 80% by 2020. The loss of Norwegian or LNG supplies would force Continental imports up to 50 or 60% load factor. In all these cases, of course, the high load factors would be a requirement rather an automatic option; getting replacement gas supplies at short notice would under current government policy depend to a large extent on 'the market', that is, on prices rising to a level where supplies would be attracted into the UK.

Ofgem, in its Project Discovery scenarios,[35] takes a slightly different approach by defining and exploring the consequences of five 'stress tests':

* Re-direction of LNG supplies away from GB market due to higher prices in other global markets;
* Reverse gas interconnector flows resulting from a Russia-Ukraine gas dispute
* Outage at GB gas import facility (Bacton)
* No output from GB wind generation fleet
* Reverse electricity interconnector flows due to sharper price signals in European countries.

In each case the stress test is assumed to take place during periods of severe winter demand.

Ofgem concludes that the greatest risks would fall in the two scenarios based on a slow take up of 'environmental' measures and would result from increased dependence on imported gas rather than from shortage of infrastructure – although it does assume a successful growth in British storage capacity. Its two 'green' scenarios assume reduced gas demand and therefore less risk from gas supply interruptions.

[33] See for instance http://www.centrica-sl.co.uk/index.asp?PageID=22&Year=2006&NewsID=35
[34] *Transporting Britain's Energy 2009: Development of Energy Scenarios*. Page 36.
[35] See note 7.

It is difficult to see what central measures could be taken to override the market and ensure supplies of gas in such abnormal circumstances. Individual gas marketing and gas-fired generation companies set their own targets for reducing the risk of gas failure in normal circumstances. For instance Centrica is aiming to produce an increasing proportion of its gas and electricity needs in house, rising from 21% in 2006 to 35% and eventually 50%, by investing an average £500 million/year through to 2020 in production assets in the UK and Norway, operating a limited exploration programme, looking for LNG opportunities to fill Isle of Grain capacity, and increasing its access to gas storage. In August 2009 it acquired a controlling interest in Venture Production plc, providing a significant boost in gas reserves. [36]

There are some policy measures that could be taken if peak shortages looked like becoming endemic. Government could make it easier for storage projects to overcome planning hurdles and, more extreme, it could compel the energy industry to organise 'strategic storage', in which a large volume of gas would be held for use only in the event of major interruptions in gas supplies. Until now the government has rejected this alternative because it could lessen the incentives for commercial storage operators to build new stores. It would raise tricky questions: 'Who would pay for the strategic store and the gas to be stored in it?' and: 'Who would decide how and when the gas should be used?'

Malcolm Wicks [37] has raised the possibility of strategic gas stores, and even of strategic gas fields, that is, gas fields held in reserve and not normally depleted. Liberal market theory would say that market mechanisms (including short term trading) are likely to guarantee that enough gas will flow to the market offering the best price, but it is not at all clear that this works for energy, partly because security of supply regulations in Continental European countries who might compete with Britain for gas supplies, already require utilities to build up and maintain much higher stock levels than have been seen in Britain.

The volume of gas that can be stored in the UK is a much lower proportion of annual demand than is common in Continental Europe. Wicks quotes Centrica estimates that the UK has storage capacity for around 5% of annual gas demand, while France and Germany have between 20 and 25%. The explanation is that the UK has been able - until the early 2000s, when the decline in UKCS production started to accelerate - to rely on excess capacity and flexibility in output from the UKCS fields to survive shortfalls in planned supplies. The Netherlands are in a similar situation and only have storage capacity for a little over 10% of annual demand. It can be argued that the diversity of supply sources which will be available to the UK through import pipelines and LNG terminals will leave it comfortably able to increase supplies from one or other import source if necessary. But of course, relying on increased output from indigenous gas fields is very different from relying on international gas markets or on the goodwill of exporting countries. This is particularly true if, as is the case with Great Britain unlike Continental Europe, we have in general chosen not to set up a framework of long term import contracts. In a situation of regional supply/demand stringency, the price of imported short term stopgap supplies is unlikely to be low.

[36] http://www.centrica.co.uk/index.asp?pageid=39&newsid=1866
[37] Wicks, Ibid.

The government's transition plan[38] homes in on the political aspects of security, emphasising that it will continue to provide the conditions for diverse and reliable gas supplies to the UK, by which it seems to mean securing good relations with gas exporting countries, and encouraging the development of a properly functioning EU gas market and a global gas market. While good political relationships with potential suppliers are very important when contracts are signed, and possibly at times of crisis in gas supply, there is no hint of anything more specific in the plan.

Over-reliance on one or more supplier? At present companies operating in the British market are free to contract for gas supplies where they choose, or maybe where they can. There is no legislation such as that in Spain which restricts the total quantity of gas which can be bought from any one country. In the case of Spain, this means Algeria: in the UK at present it might be Norway! Such a restriction could be imposed for political reasons, but would be more likely to reflect a feeling of insecurity arising from relying too much on gas from one, even friendly, source. This could be expressed for Britain as a requirement that imports from any country should not exceed, for example, 25% of total imports or 25% of total gas usage.

In the wake of the interruption of Russian exports through Ukraine in 2009, it is not difficult to see how a drive for such a restriction could arise, and it is even conceivable that specific restrictions could be imposed on nominated sources, but there is no sign so far of a political will to pass such legislation. Furthermore, given that the largest single source of imported gas is Norway, it seems unlikely that any restrictions will be imposed.

Cold weather The UK gas industry still works within the framework of the 1 in 20 peak day and 1 in 50 cold winter demand criteria. Pipeline network operators must provide enough capacity, and gas marketers must provide enough gas, to supply the levels of demand that would be met in such circumstances. Operators of gas stores, import pipelines and LNG regasification terminals are not, however, subject to the criteria because it is not obvious in advance that any particular infrastructure will be needed when cold weather arrives. In a situation where the balance of supply and demand was tight, and where all equipment would demonstrably be needed to operate at capacity to keep the gas flowing, it is conceivable that an obligation to keep equipment working could be imposed, but there is no sign of such an obligation at present. Thus, meeting this definition of supply security depends on commercial companies acting in line with forecasts made, for instance, by National Grid to invest early enough in building the right kind of infrastructure in sufficient quantity. No agency has the power to insist on new capacity being built.

Energy conservation One of the most effective ways of bringing down energy demand levels and, maybe, selectively targeting particular fuels, is price. Unfortunately for governments, allowing energy prices to rise, or forcing them to rise, brings with it an electoral dimension, because it makes voters unhappy. In the commercial world, increasing prices can drive customers away but, as UK gas customers have found over recent years, suppliers seem to march in step when it comes to raising prices, ultimately because they are all buying gas from a similar

[38] See note 1.

cocktail of sources. Thus, while customers are free to switch, the benefits of doing so may not be great.

But higher prices do mean lower consumption, and in 2008-09 this effect has been compounded by the effects of world recession. National Grid has observed a 5% fall in gas demand on local distribution networks (DNs) – even after weather correction – in the financial year 2008/9, and a 4% reduction in electricity demand from National Grid's transmission system.

Of course we cannot rely on recession to keep reducing consumption of carbon emitting fuels, whether in the residential or industrial sectors, but it is a question for government to consider where the balance should be struck between raising fuel prices to control demand and chasing possibly ever more expensive fuel to satisfy demand.

If government policy should be to reduce demand then there are already some ways of doing this, including encouraging energy supply businesses to 'sell' energy efficiency advice and services. This process has already started and will lead to the universal installation of smart meters by 2020 and some development of micro-generation, as well as the more traditional forms of insulation.[39]

Raising energy efficiency standards will be crucial, but rising energy prices will also be key. This will present the government with the difficulty of an increase in the numbers of 'fuel poor' consumers, which is inescapably a matter for central government policy, even if the day-to-day mechanisms for dealing with fuel poverty are passed to energy providers.

3. The position in 2010

In summary, the liberalised UK gas market has delivered more than enough internal pipeline capacity to cope with likely annual and peak demands to 2020, and more than enough pipeline and LNG import capacity to cope with the likely range of annual and peak imports, probably enough storage to cope with peak demand, but not enough storage capacity to compensate for a prolonged interruption of supplies (see Charts 3 and 4 above). On the other hand, supplies into the UK are sufficiently diverse – UKCS, Norway, Continental Europe, LNG from various sources – that if price signals from the UK can be relied upon to attract gas imports sufficiently quickly, it seems just possible that the loss of any one source of supply could be balanced by increases in others..

What the liberalised market has not delivered is a low carbon economy because, fundamentally, there has not been a prospect of secure profit in it, because of the high costs, the risks associated with new technology and regulatory uncertainty. It will be the government's job, through taxation and subsidy, to make sure that there will be a profit, or at least that the present mix of fuels becomes less attractive

[39] See for instance, *The UK Low Carbon Transition Plan*, Chapter 4, Transforming our homes and communities.

And the other significant 'failure' of the liberalised market has been to guarantee long term gas deliveries. There has been a steady increase in the proportion of short term traded gas and a decline in the proportion of long term contracts which is seen at the extreme in relation to LNG. The UK now has LNG terminals where capacity has been booked but where deliveries have until now been largely dependent on the relationship between prices in the UK and prices in North America and Asia. In this situation, the UK will remain dependent on offering sufficiently high prices to attract LNG. In other words it will have to outbid other LNG importers, particularly in the Atlantic Basin; it is virtually impossible to outbid Pacific Basin importers (with the exception of China and India) because of their total dependence on imported LNG for gas supplies.

4. Some numerical projections

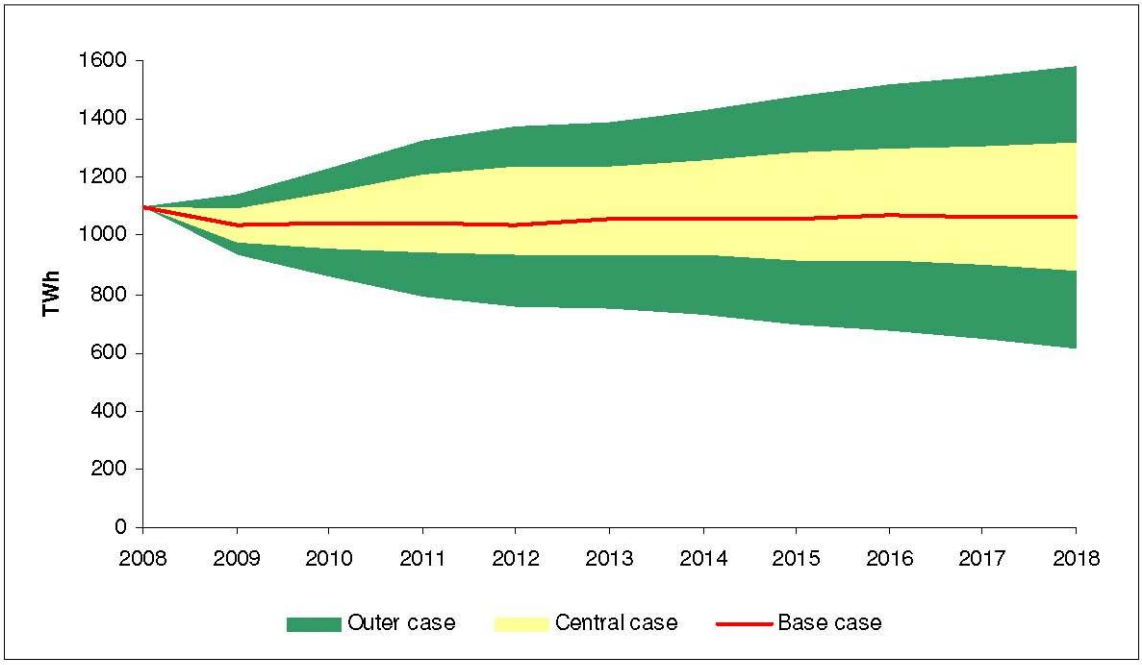
It is easy to get dragged down into the details of numerical projections, and long term scenarios are designed to explain and explore broad sweeps of outcomes. National Grid's 2009 base case ten-year scenario concludes that total annual gas demand, including exports to Ireland and Continental Europe, will fall slightly – by an average of 0.25%/year between 2008 and 2018. Within the total, demand arising in the local distribution networks will fall by 0.7%/year, while demand from the larger customers on the National Transmission System will rise by 0.4%/year. NG considered alternative sets of assumptions and gives a range around the 'central case' of around +/- 200 TWh by 2018, while at the extreme ends of the range, where all factors act independently and push demand in one direction, the variation is +/-500 TWh. Thus the potential extreme range of NG's 'outer cases' is 1,000 TWh, almost as large as the base case itself, which falls lightly over the ten years to around 1,100 TWh.

Peak gas demand rises slowly over the period by 0.3%/year, with annual changes of between +3 and -2%.

Central case annual and peak gas demands remain fairly steady at around 100 Bcm/y and 500 MMcm/d over the period, but import dependency rises to 46% in 2010/11 and 69% in 2018/19.

While all the assumptions underlying these projections can, and will be challenged in a public debate which NG provokes every year by publishing the scenarios, perhaps the most important message is that the range of annual outcomes is extremely wide.

Chart 6: Sensitivities Around Base Case Demand Forecast



Source: National Grid, Transporting Britain's Energy 2009, page 8

The CBI report uses two scenarios developed using McKinsey's Global Gas Model, and shows a similar wide range of outcomes.[40] Under a Business as Usual Scenario, in which the impact of current Government policies is extrapolated, total gas demand rises to 109 Bcm in 2022 and then falls to 99 Bcm in 2030. But in the 'Balanced Pathway' scenario which the CBI recommends, a 'stronger push for low-carbon generation' results in total gas demand 15% lower in 2020 and 19% lower in 2030.

Table 2: CBI forecasts of gas demand (Bcm)

	2022	2030
Gas for Power Generation		
Business as Usual	41	32
Balanced Pathway	n/a	13
Total Gas Demand		
Business as Usual	109	99
Balanced Pathway	93	80

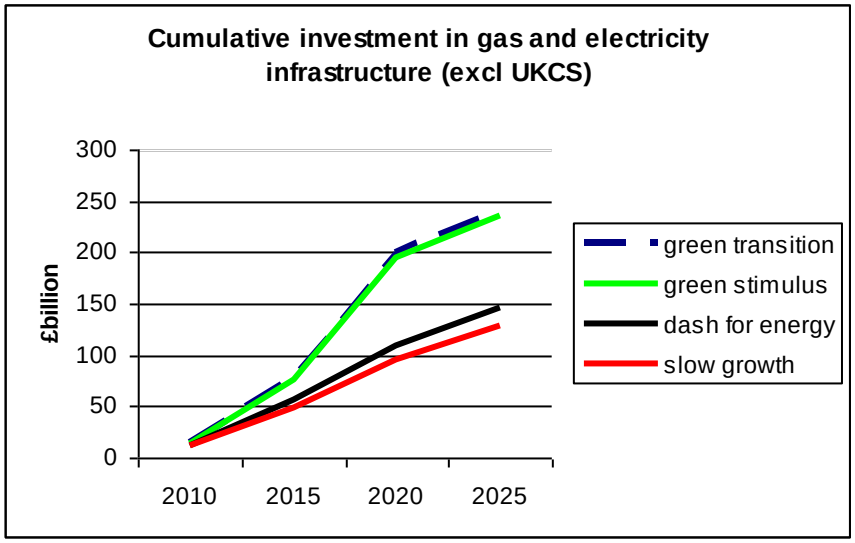
Source: CBI, Decision ime page 33.

Once again, it is not so much the numbers themselves as the extent of the variation which should concern policy makers.

Project Discovery identifies a similar wide range in the investment in gas and electricity infrastructure required to respond to its environmental policy and economic recovery scenarios, with cumulative investment by 2025 ranging between £128 billion and £240 billion.

[40] http://www.cbi.org.uk/pdf/20090713-cbi-decision-time.pdf

Chart 7. Investment in Infrastructure



Source: Project Discovery Scenarios, page 8.

So is anyone taking charge? For all the reasons mentioned above the first question that has to be asked is: 'Is anyone taking charge of policy and long term planning for the gas industry?' And since the answer is clearly 'no' the second question is: 'Should someone be in charge?' At present the responsibility for guiding the gas industry is split between government, energy companies of various descriptions and specialisation, gas customers and 'the market'.

The government could argue that it has set overall policy guidelines for reducing emissions, is actively encouraging fuel efficiency and supply diversity, and can see major gas companies actively planning developments along the right lines.

To take two examples, Centrica commissioned Ernst & Young to assess the need for capital investment in the UK energy sector to 2025.[41] In a February 2009 update to its original report Ernst & Young estimated that £234 billion of new investment, which the energy supply industry would be responsible for funding, would be required by 2025. It noted that 'securing this investment is not guaranteed' but drew as its main conclusion that 'without sufficient confidence that future returns on new investment will be adequate to cover financing costs, in addition to sustainable shareholder return, there is a risk that the UK's energy investment needs will not be met and that investment capital is redeployed to other sectors of the economy and possibly other countries. Alongside this fundamental financing challenge lies the dilemma of deploying this substantial level of investment in the most cost effective manner, which reinforces the need for a continuing focus from industry and government on demand reduction and energy efficiency.'[42]

[41] Securing the UK's energy future – meeting the financing challenge - An update to the Ernst & Young 'Costing the earth? The impact of climate change mitigation on UK domestic customer energy bills' study - February 2009
http://www.centrica.co.uk/files/results/interim09/Interim09_EY_securing_energy_future_feb09.pdf
[42] Ibid page 1.

In another presentation to the Adam Smith Institute in March 2009 E.ON UK chief executive Paul Golby referred to E.ON's publication just under a year earlier of 'Carbon, Cost and Consequences', which he described as a call for an informed debate about the best way to meet the 'trilemma' of low carbon, affordability and energy security.[43] In that paper, which considered possible developments across the fuel spectrum, Golby said that E.ON believed that the Government's policy framework was 'broadly correct – reforming the planning system, supporting a new nuclear programme, promoting renewables, taking forward clean coal and examining the barriers to uptake of decentralised energy'.

Among other detailed points, the paper called on the Government to 'ensure that there is a calculation and analysis of the need to provide flexible fossil-fuelled back-up capacity for the increased level of intermittent renewable (e.g. marine and wind) generation. Estimates suggest that this back-up capability could amount to over 90 per cent of this intermittent capacity itself.' It also called on the Government 'to use the latest discussion of energy policy to set a new tone for the public energy debate. We want the debate to stop looking only at the issue of the day, be it carbon or cost or energy security – and start to look at the connections and trade-offs between them all.'[44]

These two reports, from major players in the UK energy industry, coupled with other similar research by other companies, and the regular overview of transmission and distribution networks by Ofgem, National Grid, and the distribution companies, will probably give the government confidence that things are going well. This is how an efficient liberalised market should work, with the major public and private players seeking profitable opportunities and thinking seriously about the big issues.

But others disagree. National Grid Chief Executive, Steve Holliday called on 23 March 2009 for a 'UK Masterplan to be developed, to determine the route-map for a low-carbon economy. . . National Grid is committed to playing its part in addressing climate change, alongside others. But we need a Masterplan, with Government, industry and consumer collaboration, to determine the route-map for meeting Government targets of 80 per cent emissions reduction by 2050, and 15 per cent renewable energy sources by 2020. This joined-up approach is essential to get the right legislative and regulatory frameworks in place and ensure necessary infrastructure investment is available in a timely manner for the connection of new renewable sources of electricity generation, and development of technologies such as biogas production, and linking smart meters into smart grids.'[45]

There is now a masterplan - The Low Carbon Strategy [46]– but it says very little about gas. (One interesting feature of Holliday's statement was that, despite references to greenhouse gas and biogas, and to the fact that National Grid operates gas networks, there was no specific reference to natural gas.)

[43] http://www.eon-uk.com/downloads/Manifesto_Brochure_-_final_30_05_08.pdf
[44] Ibid., page 23.
[45] http://www.nationalgrid.com/corporate/Media+Centre/Press+Releases/Global+Press+Releases/230309.htm
[46] See note 1.

And what if things go wrong? What if investment is delayed, as has recently happened in the offshore wind sector? What if the development of policy and the raising of capital take longer than expected? And what if companies simply fail to invest in projects such as coal carbon capture and storage and nuclear, in a sector which is not likely to offer sufficient reward, for whatever reason, including increased and possibly unpredictable risks and regulation?

Ultimately, there is no agency with sufficient authority to control or change the direction in which investment, whether in the overall energy industry, or in the gas subset, is going in response to sudden changes in the environment. The risks are that:

* UKCS reserves might be lost through lack of co-ordination;
* New gas stores (and possibly import links) may not be built soon enough;
* The level of contracted gas supplies, and the duration od the contracts, may be insufficient to guarantee supply security;
* Environmental targets may be missed through lack of co-ordination between the energy industries.

National Grid regularly disseminates actual and forecast data to the market, but is not in direct contact with final customers; it agrees investment plans with Ofgem but has no control over, nor direct involvement in storage, and import projects.

Energy supply companies are increasingly looking at diversifying their own operations, in order to provide back-up for their traditional gas supply or power generation activities with alternative generation technologies and fuel efficiency recommendations to customers.

With governments over the past 20 years focussing on encouragement rather than control, a large question mark stills hangs over the gas sector. Does there need to be a specific gas policy identifying specific gas targets and how they might relate to the wider targets for energy security and carbon reduction? And who would set the targets and monitor them? The government? The regulator? The market?

5. Is it time for more central direction?

The 'Wicks report' actually discusses the possibility of a change in direction by government; some movement back towards central planning in some areas, as does OFGEM (see below). In relation to fuel inputs to power generation Wicks asks: 'Can market arrangements deliver an appropriate fuel mix?'[47]

'The Government and industry will wish to consider whether it needs to take a more strategic role in determining the fuel mix for power generation perhaps within bands, to try to avoid a "dash for gas ".' Operators would need to be convinced that they would be able to sell the power that they generated to justify investment in non-fossil power-generation. This would be a significant move away from "the market knows best" orthodoxy but might be justified on energy security grounds.'[48]

[47] Wicks Page 111
[48] Ibid.

On strategic storage Wicks comments: 'Commercial concerns are noted, but we must review these matters against a more vital bottom line - Britain's national interest.' [49]

Going for a full-blown depletion policy is a policy too far for Wicks, however, or even a policy too late, given the stage of decline that has been reached in UKCS production and reserves. He suggests that it is better at this stage to continue to encourage maximum production potential rather than to set fields aside for emergency use. He does not discuss the possibility of deciding how much gas should be produced year by year. He does however favour an increased level of disclosure to the government of importers' and distributors' contractual arrangements. 'For reasons of energy security the Government should be informed about the contractual arrangements of our key suppliers. Other countries require this; in France, suppliers are required to supply to the Energy Secretary details of all the gas they have procured or intend to.'[50]

Finally, he is also concerned that the move away from dependence on UKCS supplies has been accompanied by a move towards short term rather than long term importation contracts. This 'could leave the UK vulnerable, exposing it to increased price volatility and potentially preventing it physically receiving the gas needed to meet demand, especially during very harsh winters but also at times of geopolitical risk or crisis. The Government should therefore assess whether there is action that should be taken to avoid exposure to supply disruption. It would be advantageous to the security of our gas supplies if long-term, fixed volume contracts were in place for a greater proportion of our future import requirement. The Government should consider ways of supporting UK energy suppliers and users in securing such agreements.'[51]

Given his close relationship with the UK government, his remarks could be seen as testing the water, in advance of a partial move back towards central planning. The diffusion of responsibility for planning was acceptable in an era of cheap, abundant and 'local' gas in the UKCS, but it can be argued that such a policy cannot deliver acceptable outcomes in a new era of declining UKCS production, insufficient storage, rapidly rising gas prices, and carbon reduction targets. Wicks seems to be saying that a reliable and affordable supply of gas and other fuels is too important for the British economy to be left to the workings of the market. Or at least he is posing the question.

Such a move would certainly be a fundamental change from the language of, for instance, the May 2007 White Paper on Energy - Meeting the Energy Challenge: 'Our market framework relies on the price mechanism to balance demand and supply. Prices provide signals to gas market participants (producers, shippers, suppliers and consumers) who then respond with the appropriate consumption and investment decisions.' [52]Also: 'We therefore need to be confident that the market for fossil fuels, supported by appropriate Government policies, continues to ensure reliable supplies of these fuels at competitive prices to people and businesses. We also need to make

[49] Ibid., page 117
[50] Ibid., page 113
[51] Ibid., page 114
[52] http://www.berr.gov.uk/files/file39387.pdf page 117

sure that an appropriate market framework is in place to mitigate the impact of the use of fossil fuels as we move towards a low-carbon economy.'[53]

But by February 2010, Ed Miliband, the Energy and Climate Change Secretary, told The Times newspaper that his government was becoming convinced of the need for an overhaul of at least some parts of the market-dependent energy policy. 'We are going to need a more interventionist energy policy to deliver the low-carbon investment we need', he said, adding that changes being considered included: reform of Ofgem, an overhaul of Britain's existing electricity trading arrangements (Neta), and the introduction of 'capacity payments' to guarantee returns to developers of low-carbon sources of power. Details of the reforms would be published with the 2010 Budget. [54]

While Miliband was clearly thinking about the need to encourage, or control, investment in low carbon power generation, it would not be a long step towards applying the same principles to strategic gas storage.

Shortly afterwards, on 3 February 2010, Ofgem published its recommendations following the analysis and consultation phase of its Project Discovery project. Ofgem also now showed itself ready to think about reducing dependence on the market to deliver energy security. 'The decline in our indigenous gas supplies and the need to make demanding cuts in carbon emission levels, represent unprecedented challenges, which will grow over the next two decades. We estimate that up to £200 billion of investment might be required by 2020 alone, in the face of huge global demand for investment in energy infrastructure; volatile commodities prices; and the ongoing effects of the financial crisis.'[55]

While these sentiments were not new, Ofgem's proposed response to them included some controversial ideas. It suggested for discussion five 'possible policy packages', starting with measures 'involving the least reform and intervention in the market . . . (although even this package involves significant changes) and moving to the most dramatic move away from competitive markets'.[56] The individual measures include, in increasing order of drama:

* A minimum carbon price, to provide long term certainty for investors;
* Improved price signals coupled with measures to promote demand side response, to increase the incentives to make peak energy supplies available and invest in peaking capacity including storage;
* Enhanced obligations on industry players to deliver a specific level of supply security;
* The concept of a centralised renewables market designed to help manage the variability of some forms of renewable energy sources for both the generator and the system operator;
* Long term capacity tenders covering renewables, low carbon generation and/or gas storage to facilitate;
* Short term capacity tenders for all generation and demand side response;

[53] Ibid., page 116
[54] http://business.timesonline.co.uk/tol/business/industry_sectors/natural_resources/article7010355.ece
[55] http://www.ofgem.gov.uk/Markets/WhlMkts/Discovery/Pages/ProjectDiscovery.aspx page 1.
[56] Ibid., page 2.

* A Central Energy Buyer, a single entity responsible for coordinating the procurement of new energy supplies, or at least certain forms of energy supplies or infrastructure such as strategic gas storage.

Ofgem's proposals are for discussion, and it remains to be seen how the players in the still liberalised UK market will react. The situation is made more complex by the widespread diversification of traditional gas companies into other parts of the energy market – for instance, power generation using traditional and new technologies, and sales of electricity to final customers. Thus, rather than just gas companies, we now have integrated, and often international, energy companies dealing with all aspects of the purchase, production and supply of gas and electricity to final customers. All these companies talk to regulators, government departments and each other and, as a group, they would probably argue for leaving the market to work out what is best for the UK.

Despite many calls for greater 'central involvement', there seems to be little danger of a UK government promoting the re-emergence of a national energy champion. Such an approach would be pointless unless the champion had sufficient assets and sufficient investment clout to be able to dominate the market and enforce political decisions. The British energy market is now too diverse for that.

6. Is gas still the solution, at least until 2020?

By 2010, it had become fashionable to say that, from being part of the solution to reducing carbon emissions, gas has become part of the problem. This is both true and false. True, because any increase in gas usage adds to emissions. False, because switching from coal and oil to gas in power generation reduces emissions and has, for instance, already significantly reduced power generation emissions in the UK. It looks set to deliver similar improvements around the world as growing demand for electricity is satisfied (in part) by the construction of relatively cheap, relatively quick to build, and relatively clean CCGT plants. We are not just talking about power generation in centrally operated plants. The technology exists to expand the generation of power at an individual household level using gas as an input, which could produce very large savings in primary energy consumption.

There are good prospects now for a second dash for gas in the UK to fill the gap created by increasing demand for 'clean' electricity, the retirement of around 20 GW of existing plant, and the time needed to construct a new generation of very low emission plant in the long term. No other fuel offers the possibility of plugging the gap.

But there are also questions of timing. CCGTs can be built more quickly than any other generation plant and they will be built if the UK drifts into a dash for gas over the period until roughly 2020. But if the government thinks that this will endanger longer term carbon reduction targets,[57] or if developers think that there is a significant

[57] See for instance Wicks page 111. 'These gas-fired power stations would then be a part of our power mix for decades afterwards. We would potentially be locking-in import-dependence at an uncomfortable level and have an unbalanced fuel mix leaving UK businesses and consumers highly exposed to future moves in international gas prices.'

risk that their CCGTs will not be allowed to operate at the levels needed to justify investment, then decisions must be made quickly.

The solution might be, partly, to defer the closure of ageing coal and nuclear generation capacity, if this can be done within existing regulations, as the CBI has suggested. [58]

The widely, but not universally, acknowledged acceptance that a rapid increase in the use of gas-fired generation over the period until 2020 and beyond is unavoidable (and possibly welcome), is a good example of a gas industry outcome which was not deliberately defined in government policy. It is almost certainly true to say that the government's major environmental objectives are not defined in ways which directly apply to the gas industry. The gas industry is expected to play its part, whatever that may be, although it seems likely that it is (will be?) expected to plug any gaps left by delays in the implementation of alternative power generation technologies. It has certainly been given no measurable targets to aim for. Perhaps that is the way that liberal markets have to work, but it suggests that, at least in this sector of the UK energy industry, there is no obvious way of ensuring that developments are on track within a timetable appropriate to fit in with overall government targets. There is certainly no obvious way of adjusting overall gas industry plans to changes in the economic environment, most obviously to respond to the present recession.

Perhaps the Wicks and the Project Discovery reports really are precursors of an increased level of intervention by government. But there is one level of intervention which cannot be side-stepped. The UK government must decide how serious it is about meeting both its 2020 and its 2050 emissions targets and maintaining energy security, however this is to be defined. The government gives every sign that it is serious, and if so then it must consider seriously whether the emissions targets can be achieved without a surge in gas-fired power generation, especially for 2020, and if so how.

Ofgem's Project Discovery scenarios (Chart 2 above) are not the only ones possible, but they do illustrate some of the relevant points. Gas demand only falls in the two 'Green' scenarios, and then because either there is a rapid recovery from the recession, coupled with plenty of investment in alternative technology, or there is slow recovery, less investment, and depressed demand for energy, including gas. In both cases, it is assumed that the government sticks to its carbon reduction strategy and is successful. A dash for gas-fired generation is averted either because alternative technologies, including fuel conservation, are successful enough, or because the demand for electricity is depressed enough to reduce the need for gas.

Gas demand only rises where there is less success in achieving carbon reduction, allowing a dash for gas if there is sufficient finance after a rapid recovery from recession, or if continuing recession limits investment and results in a dash for the cheapest power generation fuel – gas. Another way of putting it is that a reduction in gas demand can only happen if there is a strong government commitment to carbon reduction, probably including some degree of central decision-making about investment.

[58] See note 4.

Returning to the three questions posed at the beginning of this paper, we can now suggest some preliminary answers.

What is the UK's energy policy? There is a carbon reduction policy, but it is not specific about the policy for individual fuels.

Where does natural gas sit within that policy? There is no clear answer. The assumption is that the role of gas will be to plug gaps and compensate for the lack of preferred generation fuels, but it is only an assumption.

Is there a need for more central direction? Almost certainly yes, both for overall energy planning and for gas, even if only in certain defined areas, such as supply security.

7. Appendix. Central planning in British Gas until the mid 1980s

Central to planning in the gas industry is the supply/demand match (or balance), in other words, arranging for supplies of gas to be adequate to meet annual and peak demands, with sufficient system capacity to deliver gas to customers at all times of the year. The decline in production from UKCS fields, combined with the 2009 Russia-Ukraine supply interruption, have brought matching to the fronts of the minds of politicians all over Europe, as well as in the UK. Security of supply is now a big political issue, and another big issue is whose job it is to plan and implement security.

In the fully integrated British Gas regime all aspects of supply/demand forecasting and matching, and infrastructure planning in the short, medium, and long term were carried out by British Gas. This was possible because:

* Until the 1990s, virtually all gas users were supplied by British Gas. This gave the company the possibility of tracking past demand in as much detail as it wished.

* This knowledge of customer demand was tracked by 12 Regional distribution companies which developed an understanding of their own regional economies. HQ looked after the largest customers, supplied directly from the National Transmission System. This knowledge was used to model future demand patterns.

* Apart from its monopoly of supply, British Gas had a monopsony of gas purchases from the UK Continental Shelf. This put the company in a unique negotiating position, and gave it a unique knowledge of the behaviour of producing fields and the availability of future gas supplies. British Gas was also the only company importing gas: Algerian LNG starting in 1964, and Norwegian pipeline gas from the late 1970s.

* British Gas controlled, maintained and operated the National Transmission System and, through its 12 local distribution subsidiaries, the local distribution grids. Gas flows and possible future marketing and supply developments could therefore be modelled centrally, and the need for and the impact of new investment could be monitored.

* There was one 'point of contact' between the gas industry and the relevant departments of government and, from the late 1980s, with the energy regulator – Ofgas, which became Ofgem in 1999 when it was merged with the Electricity regulator, Offer. Although British Gas was, at various times, subject to political and more latterly by regulatory pressures it was effectively able to determine how the UK's natural gas reserves should be developed, which it did through a more or less formal depletion policy.

Thus there was a clear, single, responsibility for all planning, investment, and customer care, with a well-defined methodology (1 in 20/1 in 50), and modelling capability which had been developed by British Gas. There was central planning, reporting and system operation. Perhaps to an unacceptable degree, the British Gas concentrated on the gas industry, because the era of extensive gas consumption in power generation was still developing.

Liberalisation - the Market decides (from the mid 1980s)

Liberalisation, of course, changed all that.

* Customers are now free to choose their supplier and any qualified gas supplier can build its own portfolio of customers. Although suppliers should be expected to know who their customers are and something about their demand patterns, they are not as well placed as was British Gas to model the demand patterns of their small customers, and have relied heavily on calculations carried out by National Grid which, with the owners of the local distribution networks, is the only agency able to disaggregate national customer demands into usable sector data.

* The 12 British Gas regional distribution subsidiaries have now been reformed into eight gas distribution networks (GDNs) of which four are owned by National Grid and the other four by three separate companies. The GDNs are responsible for monitoring demand trends in their own networks and presenting forecasts to the regulator, and there is a degree of co-operation between them and National Grid, which still models demand patterns in each of the 12 distribution networks. But the link between system operator and the marketing function has been considerable (and legally) weakened. If the distribution companies and National Grid now want to calculate how demands may change in future, they must do this from the outside, rather than in co-operation with marketers, who cannot be compelled to make commercial information available.

* There is now no monopoly of supply or purchase. Each gas supplier must find its own sources of gas, and decide whether to try to cover its expected demand entirely from long term contracts or, more likely, partly from long term contracts and partly from the spot market, which did not exist under the British Gas monopoly. Wholesale prices are being increasingly linked to prices at the National Balancing Point where, in turn, prices are becoming more aligned with, although not formally linked to, the oil-linked prices which are the norm in continental Europe. As UKCS production decreases, it is marketers who take decisions about importing gas.

* The National Gas Transmission System is still a monopoly operation, controlled, maintained and operated by National Grid, which is still well placed to model the need for and the impact of new investment, although it now has no direct contact with the ultimate customers for its capacity.

* The one ‘point of contact’ no longer applies. All marketing, transmission, distribution, storage, pipeline importing and LNG importing companies are now subject separately to European, national and specific gas industry regulation. Thus there is much less scope for individual companies to influence national policy, except through their own lobbying abilities. The most pervasive regulatory agency is Ofgem.

What we now have is an industry in which decisions are ‘market-driven’. Successive governments have upheld the principle of market dominance since the 1990s and the principle stands to this day, although, as we have seen, Malcolm Wicks, among many others, has raised the question whether it is time for central direction to take over from the market at least in some strategic areas.

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