

United Kingdom Natural Gas & Power Winter Supply Uncertainties

David Wood

David Wood & Associates, Lincoln UK

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Since 2004 the UK, like many other regions, has seen energy prices rise substantially, but this has also been accompanied by significant uncertainty about sustainable future supplies and even where the next winter's peak demand is coming from. Hence in recent winters warnings of pending power blackouts were mixed with claims that the nation would be awash with surplus energy. This winter is no exception and it continues to result in price volatility and poses problems for gas and power consumers. This article reviews the underlying causes of this situation and suggests how it might be improved.

When the UK gas and power system operator (National Grid) issued its Winter Outlook Report 2008/9 in October 2008, suggesting only limited spare capacity, it was interpreted by some to indicate pending shortages for both gas and power, causing prices to strengthen. Indeed electricity prices for November delivery increased by some 7% in a matter of hours (gas prices already at about 75 p/therm moved above 80 p/therm). In response National Grid reiterated that it had some 4 GW of surplus power capacity as emergency back-up that could cope across a harsh winter, and dismissed the possibility of any supply difficulties. It subsequently back-tracked and reduced that surplus to about 0.75 GW for a week in November, well below the 5GW expected for the time of year, and leaving very little room for unplanned plant outages. As has been the case for past recent winters the adequacy of power and gas supplies could actually go either way, and it is possible to mount an argument to support each outcome, depending upon whether new gas capacity approaching commissioning actually receives significant supply this winter.

On the power side the problem is partly an issue of available capacity and partly an issue of competing fuel prices linked to the availability of gas supply. On the gas side the problem is uncertainty about available supplies which are strongly dependent on gas prices in continental Europe, international LNG demand and price, and how harsh the winter will be across Europe and in UK, plus many other factors (Figure 1). The UK power industry sees gas as part of a long-term balanced portfolio of energy sources including coal, nuclear capacity and renewables with emergency short-term, back-up from distillate, but, together with politicians, is dithering over which to invest in.

The capacity concerns for power revolve around two nuclear power stations (Heysham and Hartlepool) being out of service and the risk that they may not be back on line in time for peak winter demand. Forward prices (in October 2008) for coal, oil, gas and carbon suggest that generators would secure better spark spreads from burning coal rather than gas. Most UK coal plants have now completed retro-fitting of flue gas desulphurisation (FGD) reducing emissions, but the EU's large combustion plant directive emissions restrictions limits the number of hours coal plants can now be run. Substantially increased wind power capacity

does not ease the situation as it can only provide an unpredictable load factor of 35% during peak winter months and is therefore of peripheral value. Some gas-fired power plants can run on distillate (gas-oil), but that would only occur at very high gas prices and then only a few days supply of distillate is held at each plant and generators are then confronted with economic constraints to re-stocking distillate at potentially high spot prices. At the start of winter National Grid had 75.4 GW of generation capacity available with about 25% surplus plant margin, and downplayed any concerns it had over either the need for gas or its availability.

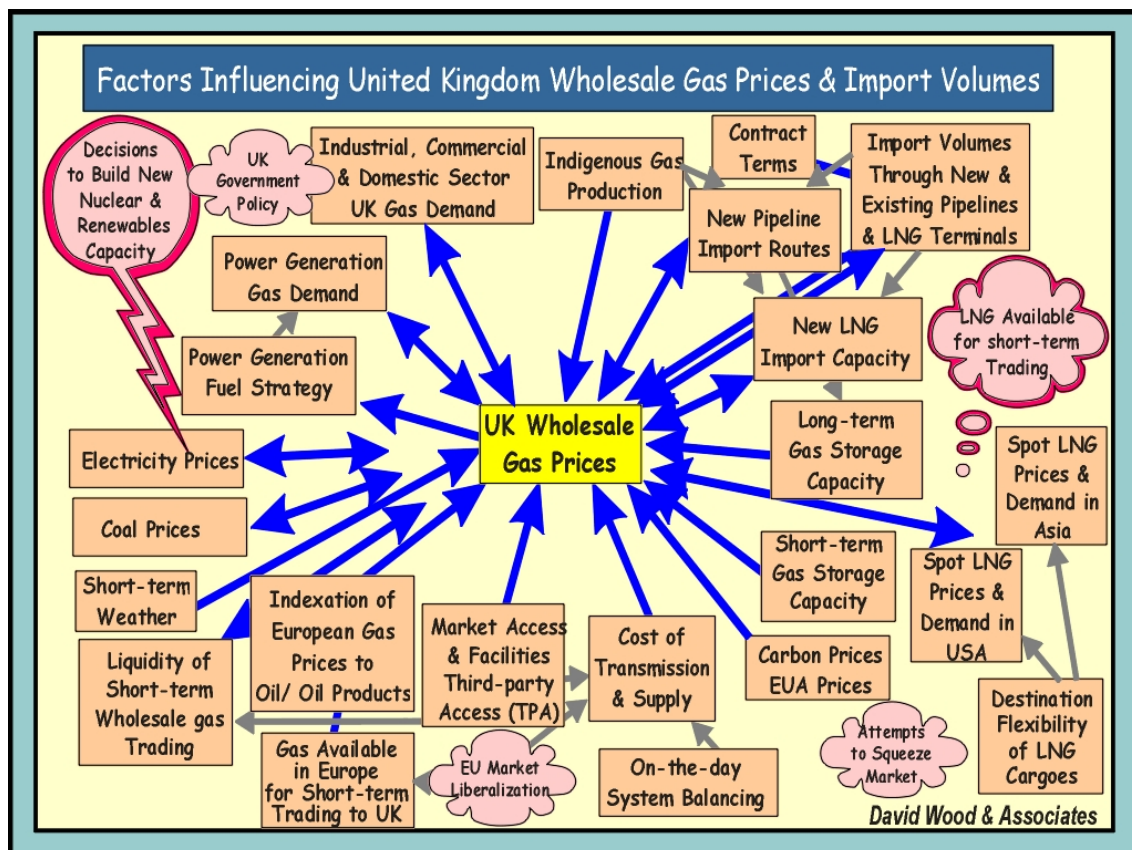


Figure 1 Influence diagram of the many factors and complex interactions contributing to UK wholesale gas prices, illustrating why those prices are hard to predict in winter periods.

Gas supplies from indigenous UK fields are forecast to decrease by some 10% from last winter, following a now well-established decline trend and widening the supply gap and need for an increase in gas imports. In 2008 the UK imported some 40% of its gas and this is expected to rise to 50% by 2010 with imports reaching 150mcm/d in 2015 versus domestic supply of just 70 mcm/day. The questions are, or should be: from where will those imports come? and, at what price can it be secured? Options are through existing pipelines from Norway (Langeled, Westerled and Tampen), Belgium (IUK interconnector) and Holland (BBL interconnector) and by LNG through existing terminals (Grain and Teesside) and, perhaps two new terminals (South Hook and Dragon) and the Grain phase II expansion, all substantially delayed in their commissioning (now expected before year-end 2008). This amounts to plenty of import capacity, some 120 bcm by year-end 2008. The challenge is to secure supply through it.

Langeled, the world's longest undersea pipeline, links the UK with Norway's giant Ormen Lange gas field. However with the leaking Kvitebjorn pipeline in Norway shutdown until 2009 for repairs, Norway's production is operating at less than full capacity and has to meet contract demand of its larger continental European customers.

LNG imports remain uncertain, new facility operators remain very quiet about when their commissioning dates will be. Delays in these new LNG terminals are only part of the problem. There is also the uncertainty as to whether the UK will attract LNG from higher-priced competing markets in Asia. National Grid is not expecting much LNG to arrive in its latest forecast, nor should it based on deliveries received over the past two years. In the face of these gas supply uncertainties National Grid has forecast a modest range of 323 – 376 mcm/d of gas demand in UK for winter 2008/9.

The extra infrastructure capacity commissioned in recent years has been operating at low load factors. For example, for 2007 estimates of utilization are: Grain LNG 17% ; IUK Interconnector 3%; BBL Interconnector 49%; Langeled 52%; Vesterled 42%; and Tampen 17%. Low LNG imports through the Grain Terminal are an ongoing embarrassment for the industry and Government. Many failed to realise that infrastructure will only secure import gas if prices are competitive with other international buyers capable of taking delivery of (i.e. diverting) the gas available.

Gas suppliers and utilities prefer to store gas in Europe rather than in the UK because there is more storage capacity and gas situated in Europe has more flexibility in terms of its ultimate destination and transaction value. Suppliers to the UK gas market respond to price signals, whereas continental European prices are driven by long-term contracts and indexation mainly to crude oil and oil products. In order to secure or divert gas supply from Europe the UK wholesale gas price has become oil-indexed by its connection and association with the European gas market. UK gas supply and demand fundamentals therefore only partially impact UK wholesale gas prices.

Some analysts have blamed poor progression of European gas market liberalization for the UK's high gas prices, but naïve politicians and utility executives are also to blame for believing that the building of gas infrastructure capacity alone would solve the underlying supply, contract and market issues. Nor does it help the image being sought by the UK gas and power industry of being open and competitive that market share is still highly concentrated among six major utilities (Centrica, EDF Energy, E.ON UK, RWE npower, Scottish Power and Scottish & Southern Energy). Ofgem, the UK energy regulator, quotes the Herfindahl-Hirschman Indices (HHI), which measure competition in the marketplace, for the UK industry of 3137 (power) and 3356 (gas) (HHI<1000 is a competitive market; HHI >1800 is highly concentrated market) to support that claim. Such a situation leaves the UK potentially vulnerable to market manipulation.

Symbolic Gestures do not Guarantee Sustained Supply

The 1st October marks the beginning of the UK gas year and winter contract, and the higher contract prices usually attract a surge in physical delivery. Indeed this occurred, initiated by Langeled with flows up about one-third and followed by increased flows though BBL and into Bacton from the UK North Sea. This caused a dip in prices, but few believe that this will

be sustained as the gas is being supplied at a time when continental Europe's gas demand is relatively low. The surge of new gas from Langeled and BBL pipelines overwhelmed the market two years ago (Figure 2), but supply was not sustained. It is now rather viewed as suppliers signalling to customers that their short-term gas is available, if the price is right. Similar gestures may well occur before the end of 2008 if commissioning LNG cargoes are able to reach any of the LNG terminals awaiting them. These cargoes may have a significant short-term downward impact on the prevailing gas price when they arrive. However, it is how many cargoes that are landed over the winter period that will determine whether LNG can meet UK peak winter demand at a commercially viable price for power generators to stabilize UK gas and power prices. Many doubt this will happen.

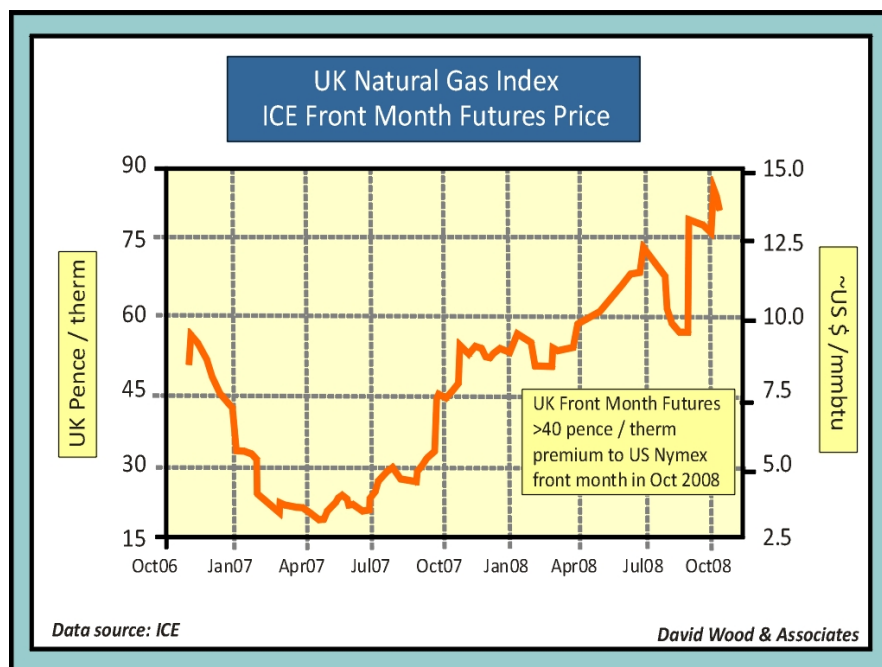


Figure 2. Volatile UK gas prices. The UK Natural Gas Index is an un-weighted rolling average of the front month settlement price.

More Gas Storage Capacity & Balanced Contracting Required

The UK has the lowest level of gas storage capacity of all major EU economies (~5% of its annual demand) and most of the current capacity is held by one company (Centrica) in the offshore Rough field (3500 mcm). Nine leached salt storage caverns are under construction at the Aldbrough facility (420 mcm – to be the UK's largest onshore facility) with the first expected to be commissioned before the end of 2008 by owners SSE and Statoil. Other projects are progressing, but many would say "too little too late". Centrica plans to convert its Bains field (Irish Sea) into a 567mcm capacity storage reservoir and also the onshore Caythorpe field (212 mcm capacity) and forecasts them to be online by winter 2011/2.

Two other gas storage projects planned to be developed in stages are worthy of mention. Gateway has approval for a salt cavern storage facility (up to 36 leached caverns with total capacity of 2000 mcm) and pipeline in the near shore Irish Sea with a start-up schedule of 2012, subject to finance. Portland gas storage have just begun site construction and first

phase engineering of a storage facility with up to 14 leached salt cavern (~1000 mcm capacity), on UK south coast, which subject to financing and equity agreements with identified utilities, is scheduled to be available for winter 2015.

However, expanded storage (and pipeline and LNG receiving facilities) capacity alone will probably not guarantee sustainable long term supplies of winter gas at stable prices for the UK based upon short-term gas trading among a small group of suppliers and utilities alone. It needs to be accompanied by a combination of long, short, and medium-term contracts between a range of pipeline /LNG suppliers and a more diversified group of gas shippers and physical traders, with access to the additional storage, LNG and pipeline capacity. This would encourage physical gas to be committed to the UK in advance of winter rather than hovering somewhere in Europe to only arrive in the UK when lack of it has pushed prices up to a point that makes it attractive for suppliers and / or utilities. However, securing gas under that more sustainable contractual framework, at commercially viable prices for utilities and consumers, remains the challenge.

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David Wood is an international energy consultant specializing in the integration of technical, fiscal, economic, risk and strategic information to aid portfolio evaluation and management decisions. He holds a PhD from Imperial College, London. Research and training concerning a wide range of energy related topics, including project contracts, economics, gas / LNG / GTL, portfolio and risk analysis are key parts of his work. He is based in Lincoln, UK and operates worldwide. Please visit his web site www.dwasolutions.com or contact him by e-mail at dw@dwasolutions.com

David Wood has produced a number of similar detailed reports covering a range of themes relevant to the oil, gas and energy industries, e.g. project planning simulation, strategic portfolio modelling, fiscal, risk and economics analysis, oil, gas and energy asset valuation.