Arthur D Little

February '09

PESD
STANFORD

A Keynote Speech Delivered to Stanford University's
Program on Energy and Sustainable Development.

The Burning Question

Is Natural Gas the Default Climate Change Option?

Contents

Keynote speaker

Peter Hughes

Director, Global Energy & Utilities Practice
hughes.peter@adlittle.com

The Risks of Allowing Gas to Become the Default Climate Change Option

As an international gas man, my perspectives on global energy policy generally, and gas markets specifically, are both firmly rooted in my experience within the European energy sector. When I was originally asked to share my views on how European energy policy might provide some "lessons learnt" as the US contemplates the prospect of a sustained growth in natural gas demand as a function of a significant new build of power generating capacity, I must admit that my immediate reaction was to ask the question "what energy policy"?

Rather than a policy framework, what has been most identifiable in Europe has been a policy vacuum, in other words a consistent lack of clarity about what, if anything, policy makers are going to do to confront the implications of, amongst other things, a steady growth in the demand for gas and a sustained decline in domestic production of such gas.

Whilst your research agenda aims to explore the full range of global policy implications of, among other things, a growing reliance on natural gas, my own observations will focus on two particular aspects, and in so doing hopefully provide a modest contribution to the larger debate.

First, I will offer an assessment of what I call "gas as the default option," or the reasons behind Europe's growing reliance on imported natural gas, a path that the United States might be setting itself to follow, albeit with a significant time lag.

Second, I would like to comment on what is happening now as we face a critical moment in the development of global energy policy and regulation. At both national and international levels, three powerful, and completely aligned policy drivers are exerting increasing influence on decision making in all the major energy consuming areas. Pressures caused by the global climate change agenda, extreme volatility in the pricing of fossil fuels, and growing threats to energy security have all converged – and are set to drive a larger paradigm shift in global energy policy.

In the context of these broader policy changes, I will conclude by suggesting that careful consideration of the medium- and longer-term implications of growing national and global gas demand is now needed to inform the energy policy making process in the USA and elsewhere. And I think that it is exciting, if rather overdue, that such a process is now genuinely in prospect!

Is Gas Becoming the Developed World's 'Default' Energy Source?

While global natural gas demand has grown steadily over the last decade, the picture has been much patchier in both Europe and the US, with demand growth in the States having only just resumed after a prolonged hiatus. The overall stagnation of demand in the USA has, of course, disguised a significant shift in the structure of that demand. An increased demand from the power generation sector has compensated for demand erosion in the industrial sector. Europe has also seen a substantial increase in the share of overall gas demand deriving from the power sector. Over the last few years, high gas prices, due to supply-side tightness in the US and oil indexation in Europe, have constrained the build of new gas-fired facilities.

Looking forward, however, the prospects for sustained demand increases appear strong, driven in particular by gas's renewed status as the feedstock of choice for new electricity generating capacity. According to the EIA's 2009 Annual Energy Review, gas-fired power generation will constitute the largest share of new capacity in the States, a trend set to continue through until 2025. A similar outlook prevails in Europe, despite apparent determination on the part of the Germans to build lots of new coal-fired capacity…

"According to the EIA's 2009 Annual Energy Review, gas-fired power generation will constitute the largest share of new capacity in the States, a trend set to continue through until 2025."

In the medium term, gas is attractive to both the European and American markets because it boasts relatively low CO_2 emissions and is perceived as a lower risk solution for new power generation capacity. But is this the outcome of a well defined and coherent policy framework? In Europe at least the answer to this question has to be no.

On the contrary, we have witnessed something of a policy vacuum, where gas has essentially become a default option in the context of a regulatory uncertainty that handicaps its alternatives. At this point I should perhaps make it clear that, for the purposes of this discussion, I do not consider renewables as one of those alternatives. While I do believe that authorities everywhere will do their utmost to enable the development of renewable energy, the main constraints on its growth will be more to do with industry capacity and the physical ability to build the infrastructure.

In the absence, then, of a suitably encouraging policy framework and, in particular, a greater degree of certainty regarding the carbon regime that will eventually emerge, investors will find it extremely hard to commit to new nuclear build, and much the same applies to coal even if the belief is there that full commercial scale carbon capture and storage (CCS) is within reach. Against this background, the attributes of the combined cycle gas turbine – its short lead times, its lesser capital intensity, and its perceived environmental advantages – make it a patently attractive proposition.

And the issue of timescale is an important one. As the need for new generating capacity draws closer, the failure to create an "enabling" framework for nuclear and CCS ready coal, with their much longer lead times, means that gas-fired capacity could become the only option. The knowledge that new gas-fired capacity can be brought on in such a relatively short timeframe seems to give policy-makers and politicians a degree of comfort that the lights will not go off, enabling them to put off further the big, and admittedly difficult, decisions regarding carbon regimes, nuclear and the like. Unfortunately, there are tough decisions to be made about gas as well, and at some point policy-makers will also have to consider the consequences of defaulting to natural gas for power generation.

The issue, of course, is security of supply, and the implications in Europe are clear. The combination of rising demand for gas at a time of declining domestic production hardly need to be spelt out. It is rapidly dawning on policy-makers that security of supply cannot be guaranteed – an inconveniently irritating fact that was brought home to us once again, when a second Russian-Ukrainian stand-off in the space of a few years made international headlines. Unlike the last time, however, Russia's actions early this year left parts of Eastern Europe without heat during a particularly cold spell – and seem to have inspired a move toward a stronger EU resolve to develop a unified position in terms of how to address the continent's growing energy import dependency. Member States' unwillingness to agree a common energy policy up until this point has allowed Russia, over the years, to play effective "divide-and-rule" politics within Europe. Thus, as is so often the case, realpolitik is at the root of many of the individual pressures that have been driving European energy policy, or the lack thereof. And while the signs are promising, any move toward more support for the European Commission's common energy policy has yet to be proved by anything more than rhetoric.

I will return to this subject later, but just wanted briefly to provide a bit of context in terms of the global gas scene. As regards the world's proved natural gas reserves, just three countries, Russia, Iran and Qatar, hold more than 50% between them. By way of comparison, the US, while being the world's largest consumer of gas, holds just under 3.5% of these reserves, and Europe's two largest producers – Norway and the UK – hold a combined total of less than 2% of worldwide reserves. While the infrastructure exists in both Europe and the U.S. to increase imported supply, the questions are whether there will be gas available to put through that infrastructure, and on what terms will it be accessible?

"Who is to say that in 10 years time, the US won't be faced with rising demand for gas from a new generation of CCGTs at a time when domestic production has started to decline?"

While these are increasingly pertinent issues for Europe today, in the US the spectacular and somewhat unexpected surge in production of domestic gas from unconventional sources has postponed the urgency of these issues by a number of years. The temptation therefore perhaps exists to defer consideration of longer-term gas supply issues, but I question the ceding to such temptation. Who is to say that in 10 years time, the US won't be faced with rising demand for gas from a new generation of CCGTs at a time when domestic production has started to decline? Furthermore, any such need for imports will have to be met primarily by LNG, and while LNG supplies are likely to be plentiful for the next year or two – when the US does not need them – the situation may look very different in 10, or whenever, years' time. There may be intense competition, from the UK and Europe in addition to the Asian markets, for potentially limited natural gas supplies. At the very least, this will have major implications in terms of price volatility.

Global Energy Policy Drivers

At this point I would like to take a step back and note the importance of "The Obama Effect" – given he provided his own assessment of these very issues on the steps of the Capitol Building. Obama summed up current US energy policy as one that: "strengthens our adversaries and threatens our planet" – his words, not mine! Such rhetoric, while deriving from the current situation of oil import dependency, suggests that the issues involved are going to be addressed with great vigour, and that US energy policy is going to be a major preoccupation.

However, it has not just been the new US administration acknowledging the fact that growing reliance on imported hydrocarbons has become a major policy concern as the dual threats of supply security and price volatility come into ever-sharper focus. In the coming years governments in both the developed and developing economies will come under increased pressure to re-think their energy policies as three powerful policy drivers force a fundamental re-calculation of how energy is supplied and consumed in the drive towards a post-carbon economy.

First, the volatility of oil and gas prices is politically undesirable – a lesson both UK and US governments will not soon forget after last summer saw thousands of lorry drivers converge on both London and Washington to demonstrate growing public outrage over record oil prices. While there is all likelihood they were dragged, kicking and screaming, to this point, it is clear that to varying degrees leaders across the globe have now begun more seriously to consider the need to look beyond imported hydrocarbons to ensure cost-efficient (or at least with more predictable cost) energy options will be available to fuel future growth.

Second, supply shortages and threats to supply security make hydrocarbons unattractive long-term options from both a foreign and public policy perspective. In Europe, and perhaps later in the US as discussed earlier, it is gas which is increasingly in the spotlight in this respect. In both regions, oil demand has probably already entered an era of long-term decline, whereas each new build gas-fired power plant will drive a steady increase in gas demand, with the associated issue of the sourcing of such supply.

Finally, in order to fulfill commitments to the global climate change agenda, the G8 and global policy makers must drastically reduce worldwide reliance on fossil fuels in order to guarantee environmentally-safe levels of current and future CO_2 emissions. The regulatory frameworks and incentivization structures necessary to encourage the required investment for a greener energy future are still in the early stages in Europe and the USA. Elsewhere, in the emerging markets, there may be less of a social imperative or policy obligation to drive down CO_2 emissions. However, the combined effect of these three policy drivers is both real and immediate, and almost certain to have a major effect on future energy policy in all the major consuming regions.

It is worth looking at how Chinese energy policy is developing in response to these three policy drivers. China – with a characteristically long-term perspective – has clearly identified the risks to economic growth associated with growing reliance on Russia and the Middle East for its imported natural gas and oil. And while its commitment to climate change per se may appear less clear, the evidence points to a government actively involved in promoting new energy sources and seeking to mitigate its exposure to hydrocarbons through energy efficiency and investment in clean technology.

In my mind, it is not at all farfetched to suggest that China may be the source of significant innovation in terms of CCS, electric vehicles, and other clean technology breakthroughs. While much of the developed world is still coming to terms with the implications of contemporary energy usage, China, I would suggest, is demonstrating a clear sense of purpose and urgency. At the same time, acknowledging that nothing will happen overnight, it is taking concrete action to build a bridge to the new energy future in which it is investing so heavily: for example, by acquiring hydrocarbon resources in Africa and elsewhere.

Implications for the European and American Gas Markets

I would now like to return to the issue of the security of gas supply, from a European perspective. While Europe currently has a reasonably diverse supply portfolio, the question is whether that diversity can be maintained as the import requirement increases. In this respect, there are question marks as to how much more gas can be expected from Europe's two other principal suppliers, Norway and Algeria, as well as the degree to which LNG supply availability will grow. Much may therefore hinge on the ability and/or willingness of Russia, which today accounts for 40% of Europe's gas imports and about a quarter of total consumption, to supply increasing quantities, and this is a matter of increasing concern.

It is fair to say that, in Russia's campaign to reassert itself economically and geopolitically, oil and gas are the key levers it has to pull. Until the recent events in the Ukraine, Russia had maintained an exemplary track record in terms of respecting its contractual commitments to its European customers. However, after supply was cut, there are worrying signs that history cannot be relied upon as a guide to future behavior, and that Russia's willingness to flex this particular geopolitical muscle is increasing.

Eastern Europe is acutely aware of Russia's power, and to coincide with the re-opening of the Ukrainian pipeline, the EU's Eastern bloc almost immediately called upon the European Union to agree a coherent policy framework across the continent. However, achieving Member States' support for the European Commission's Energy Security and Solidarity Action Plan will require much more than public calls to action from Bulgaria and the Czech Republic. There will need to be a shift in position from two countries in particular, namely Italy and Germany, away from the current focus on bi-lateral relationships with Gazprom which has, up to this point, essentially thwarted attempts by Europe to present a single face in its dealings with Russia.

Probably the best example of an opportunity to enhance inter-connectivity and to promote diversity of import supply into Europe is through the project known as Nabucco, to create a new corridor to bring gas by pipeline from Central Asia and potentially the Middle East into south eastern Europe and on to Austria. This project has struggled for many years to make progress in the face of determined opposition from Gazprom, which has aggressively promoted its own alternative pipeline, called the South Stream project, with the active support of their Italian partner, ENI. Post-Ukraine, however, Nabucco already seems to be enjoying a new groundswell of support, with the European Commission just having announced significant new financial support for the project.

"While Europe currently has a reasonably diverse supply portfolio, the question is whether that diversity can be maintained as the import requirement increases."

In addition to supply source diversification, there is also a strong case for Europe putting in place the regulatory and incentivization structures that will encourage a diversification of energy source. Probably the most pressing need in this respect is to create greater certainty around the future carbon regime, in order to provide power companies with the macro framework they need to make the long term investment decisions that will mitigate the growing reliance on imported gas.

Having said that, opinion about nuclear energy remains sharply divided in many of the Member States. The EU's recent French Presidency lobbied hard for major investment in nuclear power plants, and EDF, having recently completed the acquisition of British Energy, the British nuclear company, has launched an aggressive public outreach campaign to develop wider support for developing a new fleet of nuclear reactors in the UK. In contrast Germany's official policy still requires the gradual phasing out of nuclear energy. This policy is looking increasingly unsustainable, and I personally have no doubt that within the next few years, Germany will completely reverse its position on nuclear energy and come to accept it as a key component of sustainable, low-carbon domestic energy supply in Europe.

"The EU's recent French Presidency lobbied hard for major investment in nuclear power plants, and EDF, having recently completed the acquisition of British Energy, the British nuclear company, has launched an aggressive public outreach campaign to develop wider support for developing a new fleet of nuclear reactors in the UK."

Similar choices, of course, face policy makers in the States. It is obvious that, with the USA holding the world's largest reserves, coal has a potentially huge role to play. It is equally obvious that, as the fossil fuel that emits the most carbon dioxide, coal's future is inextricably linked to the successful development of effective CCS technology. Such success will depend in part on the speed with which policy makers put in place consistent, coherent regulatory and fiscal frameworks to encourage CCS demonstration and commercialization projects.

As the country with the world's third largest coal reserves, I might add that China will be equally reliant on the success of CCS to boost domestic energy sources and, perhaps as a secondary but nonetheless important goal, promote the move to a low-carbon economy. While China's exact commitment is unknown, certainly to me, it is safe to assume that it is an active participant in the race to develop cost-efficient and reliable CCS technology. Perhaps one impact of the Obama administration will be to improve the chances of US success in this race, in the context of increasing levels of investment in low-carbon alternatives in the United States, within the framework of a well regulated emissions market.

Conclusion

To conclude, I would like to return to my theme of gas as a default option. I have dealt mainly with the situation that has arisen in Europe. And while the parallels are not exact, Europe's current situation illustrates the consequences of power generation decisions made in a policy vacuum, and I hope may be mildly instructive in terms of the policy debate here in the USA. If I have appeared at all negative about the possible role that gas has to play in the future energy balance, then it was certainly not my intent to be so. On the contrary, I firmly believe that natural gas has a very important role to play in the transition to a new and different energy era. The point I have tried to make is that the role of gas should be by design and not by default, with eyes wide open to the longer-term implications of decisions taken in what may appear to be a very comfortable context today.

Contacts

Peter Hughes
Director,
Global Energy & Utilities Practice
hughes.peter@adlittle.com

Possible demand for LNG

According to Peter Hughes's address, liquefied natural gas (LNG) export terminals such as these may be under huge demand pressure in 10 years time, if the US is not able to meet rising demand for gas from a new generation of CCGTs with domestic production alone. Because any need for imports from the States will have to be met primarily by LNG, while LNG supplies are likely to be plentiful for the next year or two (when the US does not need them), the situation may look very different in 10, 15, or 20, years' time. We may face a situation of intense competition, from the UK and Europe in addition to the Asian markets, for potentially limited natural gas supplies.

Arthur D. Little

Arthur D. Little, founded in 1886, is a global leader in management consultancy, linking strategy, innovation and technology with deep industry knowledge. We offer our clients sustainable solutions to their most complex business problems. Arthur D. Little has a collaborative client engagement style, exceptional people and a firm-wide commitment to quality and integrity. The firm has over 30 offices worldwide. With its partner Altran Technologies, Arthur D. Little has access to a network of over 16,000 professionals. Arthur D. Little is proud to serve many of the Fortune 100 companies globally, in addition to many other leading firms and public sector organizations. For further information please visit www.adl.com

This is a reproduction of Peter Hughes' keynote address to Stanford University's Program on Energy and Sustainable Development. The speech was originally delivered on 10 February, 2009 at a forum entitled, "How will global warming affect the world's fossil fuel markets?"

www.adl.com/naturalgas