InterGen response to a call for evidence on the role of gas in the electricity market

1 Executive Summary

1.1 InterGen is committed to investing in the UK. InterGen is planning to add 1.8GW of carbon capture ready gas-fired generation (CCGTs) to the UK during this decade, reducing the UK's carbon emissions significantly and providing essential generation flexibility, representing a further £1.4 billion of investment. InterGen's planned investments will create around 1,200 direct jobs over a three year period and then long term skilled jobs thereafter.

1.2 However, there are barriers that make investment in these CCGT projects unattractive compared with other markets. Many of these are captured by DECC in the consultation document.

1.3 In our view the key barriers are as follows:

1.3.1 Slow delivery of policy encouraging investment in new CCGTs. The current investment climate is challenging given the long recession and introduction of new capacity onto the system. But InterGen believes a capacity crunch is emerging by the middle of this decade, driven by closure of older generation facilities as demand recovers. Closure of older facilities – driven by environmental regulation – should be matched by regulation which encourages new investment. Given timescales to put new facilities onto the system, such regulation should be implemented without delay.

1.3.2 Historically, CCGTs have operated maximum capacity (baseload). Going forward, stations will increasingly operate intermittently as a backup to wind generation and will therefore have to rely on higher prices when they operate in order to cover fixed costs. Such higher prices are by no means certain and the shorter running periods make generation income riskier. The current outlook makes investment a lottery. We need some certainty on returns and hope that the Capacity Payment Mechanism will achieve this.

1.3.3 As a result of increased vertical integration, there is lack of long term price visibility and liquidity in forward power products. Given the likely reducing load factors and more volatile operating regime and prices, the investment rate of return is uncertain. When we look elsewhere we see low load factors in Spain (average about 40%) and many brand new CCGT plants mothballed in the Netherlands. We hope that the Capacity Payment Mechanism will help address this.

1.3.4 Investors would expect market economics to provide these longer term price signals either through the traded markets or through long term supply contract or a Power Purchase Agreement (PPA). However, existing market interventions to encourage renewable investment, compounded by self-supply by large utilities, means that the necessary price transparency will not emerge until it is too late to address the shortfall in generation capacity in our view.

1.3.5 We must have a long term toll or PPA contract with off takers to underpin both equity investment by our shareholders, Ontario Teachers and China Huaneng Group, and also the lending of debt by banks. We note that this is highlighted by UK Government in the draft Energy Bill. InterGen supports some form of regulatory intervention / legislation requiring larger energy companies to source a proportion of their medium to long term power needs from independent generators for renewable and gas generation.

1.3.6 Based on discussions with funders (banks and investment banks), raising a significant amount of debt without a PPA or toll and the lack of a Capacity Market is highly challenging / unlikely to succeed. Funding may be possible if a toll is in place with a well rated company but the current message from the banks is that fund raising is highly challenging, mainly owing to the Euro crisis and Basle III, and there is little appetite for risk (including Government policy and regulatory risk).

2 About InterGen

2.1 InterGen is owned by Ontario Teachers Pension Fund (one of the world's largest pension fund investors in infrastructure projects) and China Huaneng Group (the world's second largest power generator). Both of these companies are entities which the UK recognises as being highly attractive to bring much needed foreign investment to the UK and to its energy sector.

2.2 InterGen is one of the UK's largest independent generators, operating a portfolio of high efficiency gas-fired power stations (totalling 2,490MW; an investment of some £2.1bn in today's money) and actively trades in the prompt and forward wholesale power, carbon and gas markets.

2.3 InterGen's shareholders are very keen to invest in the UK and, through InterGen, have invested substantial sums since 2008 developing the Spalding Energy Expansion and Gateway Energy Centre 900MW CCGT projects in the UK. Both projects are designed to be carbon-capture ready.

2.4 These projects, as well as assisting with lowering carbon emissions and providing electricity will create much needed construction jobs in the UK – some 1,200 over both projects.

2.5 Both of these projects are two of the optimal CCGT development opportunities in the UK owing to their locations. For example, Gateway Energy Centre is on the site of the UK's strategically important London Gateway Port and Business Park project and we will once built provide them with up to 150MW of power and rental income – providing them with financial benefits.

2.6 Each project will cost around £700m including interest over their three year build programme – a total of some £1.4bn in today's money.

2.7 This investment hinges on the gas fired generation sector being attractive for our owners. Principally, they seek adequate stable long term returns commensurate with an appropriate degree of risk.

2.8 InterGen's existing and planned gas fired power stations are vital to the long term sustainability of the UK's security of supply.

3 InterGen answers to DECC call for evidence questions on the role of gas

3.1 What are the main strengths and weaknesses of gas generation in helping deliver a secure, affordable route to decarbonisation through to 2020 and then by 2050?

3.1.1 Strengths

- Carbon emissions from gas generation are some 50% lower than traditional coal plant and gas generation has been the single greatest reducer of carbon emissions since 1990 onwards;
- It has no odour and (other than carbon) no materially harmful emissions to the environment. Gas also has much lower NOx emissions than coal and negligible SOx emissions. NOx reduction techniques for gas are well proven and less expensive compared to coal;
- Gas delivers flexible generation to provide a foil to the intermittency of wind generation – vital with ever reducing flexible coal generation. Currently, there is no large scale alternative to gas;
- Existing gas plant offers economical and efficient generation to help meet peak power demand;
- Gas generation is a mature technology and as such can be constructed extremely cost effectively – at a fifth of the cost of new nuclear and one tenth of the cost of offshore wind;
- New gas plant offers a low capital cost solution and a rapid construction timescale - some three years from when a construction contract is placed. Furthermore, gas is a source of generation with a strong and safe track record of delivery;
- Diverse sources of gas internationally/geographically and ample gas globally;
- Gas is mainly provided by large and stable energy companies such as Shell, Statoil, and BP i.e. the perception that gas comes from unreliable regimes holding the UK to ransom is misplaced;
- Capable of being retrofitted with CCS to eliminate up to 90% of its carbon emissions when this technology is proven technically and commercially on a large scale; and
- Gas generation has minimal impact locally on the environment due to relatively small site size, compared to nuclear, coal and onshore wind, as well as an underground fuel supply negating the need for fuel storage, and dedicated road and rail networks.

3.1.2 Weaknesses

- Poor public perception: a) rising consumer bills being attributed to gas (where as gas had been one of the main reasons for prices being low for so long compared to other countries); and b) security of supply – not borne out by recent estimates of global gas reserves;
- Lack of proven flexibility of gas plant with CCS attached. This technical hurdle will need to be overcome and the solution proven on a large commercial scale before it is implemented (note – the same applies to coal);
- Gas, even indigenously produced gas, will be sold by upstream parties in the global gas market. Hence, UK power prices from CCGTs will be driven by global gas prices (may eventually be a strength as we move from regional models, for example, oil linkage in Europe);
- Linkage to oil prices – though this will decrease as gas becomes a more global commodity; and
- UK has limited gas storage capability compared to other geographies.

3.2 What role can gas fired generation play in the future and what level of gas generation capacity is desirable?

3.2.1 Gas plant will provide flexible, reliable and efficient capacity which is needed to be able to react to drops in wind generation. Without gas generation, the lights will go out especially once significant volumes of wind are in the UK system.

3.2.2 Existing gas plant offers economical and efficient generation to help meet peak power demand.

3.2.3 New gas plant, which can also help meet peak power demand, offers a low capital cost solution and a rapid construction timescale - some three years from when a construction contract is placed. Such plants can plug the supply gap that is likely to be created with the slower build of new nuclear and off shore wind farms than is envisaged in DECC's Central Scenario as set out in its December 2011 technical update.

3.2.4 With CCS, gas offers the potential for low carbon generation that is flexible. Such technology still needs to be developed and then proven on a large scale. Government should be focusing on developing flexible CCGT with CCS to be a global leader (and not just CCGT with CCS that is inflexible).

3.2.5 Gas generation can help lower carbon intensity in the short to medium term as it replaces the coal plant that closes (with its 50% lower carbon emissions).

3.2.6 Gas generation provides back up to nuclear in the event of that fleet closing and new or very limited new nuclear plants being built.

3.2.7 The UK should continue to pursue a portfolio of generation types to maximise security of supply. We believe that a mix of up to around 40% of gas generation capacity by 2030 is appropriate and that this should decrease gradually thereafter as technology and demand side measures progress.

3.3 What are the key factors driving the economics of investing in new gas-fired power generation and how are these factors likely to change?

3.3.1 There is an interplay between gas-fired and coal-fired generation - key to gas plant economics is which of coal and gas is "on the margin" i.e. sets the marginal price for the market. Marginal plant is the first to be exposed to fluctuations in levels of demand and power prices. At the moment, gas is more expensive than coal and so sits on the margin, with cheaper coal sheltering under gas. Currently, income for coal stations (via the dark spread) is higher than gas (via the spark spread), as highlighted in DECC's Call for Evidence document. Coal moving to the margin will improve spark spreads (gas) at the expense of dark spreads (coal). The Carbon Price Floor (CPF) should encourage this transition.

3.3.2 Initially the CPF will benefit gas as it will push coal to the margin owing to coal's higher carbon intensity. However, as the carbon floor rises it will make gas generation more expensive relative to renewable sources of generation. This scenario raises the possibility that gas plant, from an investor's perspective, is at higher risk of not making returns in the medium to longer term which increases investor risk.

3.3.3 Change from base load to intermittent generation (income) – historically, investment decisions were on CCGTs operating with a high load factor (baseload). As increasingly significant amounts of intermittent generation come online, gas plant will operate less frequently and will have to rely on prices being significantly higher when the station is operating, which is not certain. From an investment perspective, there will be no track record of this impact in the UK, which raises risk. Hopefully, the Capacity Payment Mechanism will bridge this gap and support investment. To support investment, the mechanism will need to allow for gas plant's load factors to decrease over time (i.e. a plant running 80% of the time should not need support compared to one running 40% of the time, all other factors such as price being equal).

3.3.4 Change from base load to intermittent generation (costs) – with intermittent generation comes the potential to be operating at lower loads (i.e. not full station output capability) which lowers efficiency and increases the amount of starts and stops the plant will have to do. The former increases costs to consumers / means the generator gets a lower margin and the latter means that the costs of operating the plant rise significantly through a combination of higher maintenance costs and the possibility that stations become less reliable through such a regime which raises the spectre of greater imbalance charges. Furthermore, the cost of generating per MWh will rise as the station's fixed costs are recovered through fewer operating hours. Subsidies are currently provided to renewable generation. Gas generation receives no subsidies. The introduction of a Capacity Mechanism will help ensure that the right generation mix is built to ensure that the Gorvernment's 'trilemma' is addressed optimally. Without such a mechanism, investment in gas plant may not happen and will certainly not happen in time.

3.3.5 The independent generation sector accounts for around 30% of UK power production and is a key source of competition to the vertically integrated companies (VIs). But InterGen and other independent generators need routes to market to sell their power. In particular, PPAs or tolling agreements (whereby a counterparty provides the gas and then receives the electricity in return for a fee) are required to secure and underpin funding for projects. Without such a contract, no financing is available. Tolls/PPAs pass a substantial amount of the risk of market fluctuations to the offtaker, enabling cheaper finance to be raised. The market for PPAs / tolling agreements for gas fired generation is currently very challenging with most large power companies focusing on self-build. InterGen believes that the independent sector often secures cheaper solutions which ultimately benefits consumers. InterGen estimates that over 40% of gas-fired plant constructed in the UK during the last 20 years has been done so by independents. Historically, the project finance required by independents has been sourced from very diverse regions, giving access to highly competitive WACC rates which ultimately lowers capital costs over the project lifetime. In addition, in our experience, EPC contractors report that gas plant developed in the independent sector traditionally negotiate the most cost efficient construction packages in order to secure attractive revenues for banks and investors, ultimately delivering savings for consumers. Currently, the toll/PPA market is being impacted by poor long term market liquidity and the increasingly vertically integrated structure of the Big 6 energy suppliers (who are becoming more balanced in terms of consumer demand vs. supply from their own generation). InterGen urges the Government to address / force firms to sell longer term products in the market so as to improve liquidity further out. InterGen supports some form of regulatory intervention or legislation requiring larger energy companies to source a proportion of their power from independent generators via PPAs and will continue to engage with DECC and Ofgem on this matter.

3.3.6 Rising capital costs – capital costs for new CCGTs are currently attractive mainly as a result of the downturn in demand in Europe. However, as these geographies recover and demand rises across Europe, capital costs will rise sharply as will supply chain lead times. This will result in project economics becoming tighter and normal build periods of around 36 months increasing.

3.3.7 Debt cost and availability of debt – we normally use project finance for new projects with shareholders injecting around 25% of the project's capital. With the introduction of Basle III and the seemingly ever reducing number of banks, the costs of this form of funding are rising with no alternatives yet in place e.g. over the last few years there have been discussions on the likes of a Eurobond that would cover the construction of infrastructure projects but this has yet to materialise. The upshot is that: a) There is potential for there to be insufficient banks to raise around £500m (the debt element of a new 900MW CCGT); b) Remaining banks may push up margins to unsustainable levels; c) banks will only entertain a hard mini-perm model which means that the project must refinance or risk being in breach of its funding conditions / have to hand the station back; d) Debt is being sized over 10 years and not 18 years – which means more debt has to be paid back sooner which all but eliminates the equity return; e) Equity investors need to build in a refinancing to their base case investment model which carries significant risk – as this is at the mercy of the funding markets.

3.3.8 Regulatory uncertainty – there has been and continues to be significant uncertainty which means that investor confidence is low. In particular, Project TransmiT has meant that the actual locational benefits of InterGen's development projects when the projects were conceived (based on encouraging generation mainly near where it was needed to reduce transmission losses) have been reduced. While there are indications that this risk has lowered, it still remains and the potential swing in grid charges has a material impact on our projects. Additionally, it remains unclear as to whether any project that has commenced construction or commercial operations will receive the same Capacity Payment Mechanism as a plant that has not reached that phase yet. This results in equity not wishing to invest until such time as it is clear that it will not be prejudiced.

3.4 **What barriers do investors face in building new gas generation plants in the UK? What are the key regulatory uncertainties that may prevent debt and equity investors making a final investment decision in gas generation and supply infrastructure?**

3.4.1 <u>Barriers to entry:</u>

- Lack of long term toll / PPA appetite with large power companies building themselves and stifling competition and consumers ultimately not getting value for money;
- Lack of forward pricing / poor market liquidity;
- Lack of available credit support alternatives;
- Potential lack of funding liquidity in banks owing to Basle III restrictions and risk aversion;
- Rising generation intermittency make economics highly challenging;
- Lack of a Capacity Mechanism to off-set the changing market dynamics; and
- Slow delivery of policy and lack of stable regulatory environment.

3.4.2 Key regulatory uncertainties:

- Project TransmiT – impacts economics materially, particularly for projects sited near to centres of demand which were financed on the basis of reduced transmission charging relative to more remote generation. Additionally and on a similar subject, there is the European legislation that could be in place by 2018 that could impact electricity and gas charging.

- Capacity Payment Mechanism – whether this will give material support / who is backing the payments / whether an auction based approach means that we are likely or not to succeed / whether some parties and not others buy the capacity / concern over not receiving it if a station is built before the mechanism is operable.

- PPA / toll market – the difficulty of building a 35 year asset when market signals beyond 12-18 months out are limited requires independent companies to have a PPA / tolling route to market to secure funding for projects.

- Market liquidity – the need for a robust (liquid) forward market in power (such that if the toller falls away during the life of the project, there must be an alternative route to market or the station could be a stranded asset). In addition a liquid forward market sends out more accurate investment signals to banks and overseas shareholders to the viability of a project – signals that are currently hidden from the market. The current deemed improvement in liquidity does not address market shape or prices beyond the immediate short term. This matter, which is a difficult issue to resolve, has been languishing for some time.

- Carbon Price Floor – the raising of this price too quickly will make gas plant uneconomic unless consumer bills / Capacity Mechanism compensates. For an independent generator that does not have a retail arm it raises significant risk that prices cannot be passed on.

- Time taken to deliver policy and the increasing risk of further changes to the Energy Bill.

3.5 **Are there any other policy issues that need to be addressed beyond the Government's proposals for the capacity mechanism and the EPS?**

3.5.1 The Government has recognised in its draft Energy Bill that there needs to be a market for PPAs as these underpin investments in energy projects for independent parties. This does need to be addressed for gas plant as well as renewable projects and should be expanded to include tolls (for gas plant and even biomass).

3.5.2 Consideration needs to be given to expanding the funding routes available for new projects. Project finance is becoming much harder to secure and new long term debt is hard to procure. Potentially, some form of credit support on a pooling arrangement by key market participants could provide an "emergency fund" and could be used to support new projects (similar to captive insurance). This would be funded by all power companies, governed by Ofgem, and encourage new investment without Government's balance sheet involvement.

3.6 **Given a continuing role for gas and the potential for increased volatility in gas demand, to what extent is gas supply and related infrastructure a barrier to investment in gas fired generation? What impact will unconventional gas have on the case for investing in gas generation and the supporting infrastructure?**

3.6.1 Currently, gas supply is robust but UK gas supplies will increasingly come from the likes of LNG. A rise in the need for gas generation during the winter, which could arise as coal plant shuts, increases the need for gas storage to ensure consistent affordable supplies during periods of high gas demand.

As for unconventional gas, as noted above, it could be sold in the international gas markets or used in the UK. As in the US where gas was retained (at least initially) for domestic use, such supplies could lower the price of gas and electricity prices, make returns on gas plant less challenging and hence increase investment appetite, and increase security of supply. Additionally, it could mean that less supporting infrastructure like gas storage is needed which is an additional benefit to consumers.