Combined Heat & Power Association

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Bringing Energy Together

Gas Generation Strategy Call for Evidence

Summary

The consideration of the role of gas within the energy mix is a welcome development. The CHPA advocates the development of an integrated energy policy in which heat and electricity are considered collectively to deliver an optimal outcome for energy consumers.

In our response we set out key points which merit consideration within the development of the gas generation strategy:

- The role of gas generation should be considered within the context of the wider electricity market reform process and the Government's commitments to reducing emissions and meeting renewables targets.
- Combined heat and power (CHP) represents the optimal efficient use of fuel to meet heat and electricity demands. Gas fired CHP accounted for 14% of electricity generation from gas in 2010[1]. As such the role of CHP should be central to the gas generation strategy.
- CHP contributes to the three aims of energy policy (affordability, security of supply and emissions reductions) by:
  - Reducing gas imports by about 5% providing long term security of energy supply benefits;
  - Saving 13 million tones of CO_2 per annum at very low cost to government (compared to both demand and supply side abatement options);
  - Having the capacity to operate very flexibly and efficiently, facilitating the integration of renewable generation and maintenance of secure electricity supplies.
- Despite the benefits of CHP, output from existing CHP plant is expected to fall as a result of the removal of support for CHP plants at the Budget.
- CHP operation and new build is hampered by a series of market failures which must be addressed if the Government wishes to see new CHP build and operation of existing plant.
- The electricity market reform provides the appropriate mechanism to address the market failures hampering CHP.
- The absence of meaningful support for CHP will prevent Government projections for CHP from being met and will send a signal to industry that Government does not wish to see CHP development.

[1] Based on data from Chapters 5 and 6 of DUKES 2011, 175 TWh of gas generation and 35 TWh of Good Quality CHP generation.

Introduction

The CHPA welcomes the opportunity to provide input into the gas generation strategy call for evidence. Before proceeding to the questions, it is important to set out the context in which the CHPA considers the Gas Generation Strategy should be developed.

The context of the Electricity Market Reform (EMR)
There are substantial practical constraints facing the main technologies envisaged to drive the move to a low carbon electricity system: nuclear; carbon capture and storage and offshore wind. The constraints include timescales for delivery, demonstration of the engineering and uncertainty over costs. The risk of failing to achieve significant deployment across all these technologies within the next ten years is significant. Delays in new low carbon generation, combined with the retirement of a significant proportion of the existing generation fleet, have created an urgent need to re-orientate near-term policy around a suite of more immediately deliverable technology options to ensure continued emission reduction and security of supply. Gas generation is clearly going to have a role within this near-term challenge but should not, however, become the dominant facet of policy development in the near-term; it should sit alongside 'deliverable renewables' and energy efficiency as one of three core strands to this policy. Policy needs to take consideration of existing efficient gas plant as well as the role for new plant, as this may often prove more cost-effective.

The move to give renewed and full consideration to gas generation has been construed by some as a rejection of renewables. The reality is probably that the consideration of gas is a response to concerns over the timeliness and cost of new nuclear delivery. This perception of an abandonment of renewables sets up a dangerous tension for all parties creating an unnecessary pro-renewables versus pro-gas position which, in the current economic climate, may undermine progress on renewable deployment. The gas generation strategy should, therefore, be used to develop the widely accepted view that gas is a critical element of a secure electricity system with high levels of wind penetration. **There is a powerful, logical case to reconcile both gas and renewable generation within a coherent, comprehensive approach to a low-carbon energy system.**

New gas generation
Due to the scale, cost and novelty of Carbon Capture and Storage (CCS), gas with CCS is probably not a practical commercial proposition within a 10-year timeframe. For this reason, the Government needs to consider what can be done in the near term to prevent new gas generation undermining its emissions reduction commitments. Gas-fired Combined Heat and Power (CHP) can play a critical role in mitigating the emissions impacts of gas through the efficiency gains of co-generation of heat and power. This efficiency gain is particularly pronounced where gas CHP is providing baseload power. The DECC heat strategy estimates that there is the technical potential for at least 24 GWe of CHP capacity by 2020[2], much of this located on major industrial sites. Whilst CHP may not be able to provide the full extent of gas generation required there is considerable scope for it to play a key role in mitigating CO_2 emissions and addressing the security supply implications of increased gas dependency.

The relationship with heat decarbonisation
The Heat Strategy sets out a very strong policy steer that gas-fired CHP (and biomass CHP) will be a critical dimension to the decarbonisation of heat use in the industrial sector. Gas-fired CHP will, however, only feature as a facet of industrial decarbonisation if it is properly considered as an integral element of power sector strategy.

[2] *The future of heating: A strategic framework for low carbon heating in the UK*, DECC, April 2012, p83

As we have seen historically CHP can be developed and thrive under the right conditions in the UK market. But unless CHP is afforded an opportunity within the power market, a succession of market failures will inevitably thwart its renewed development.

As we set out in our response below, CHP can offer benefits on security of supply, affordability, emissions reduction and flexible generation. Currently, however, the costs and risks of building CHP are borne by the operator while the benefits accrue to the wider UK economy, creating a disincentive to invest. In addition, the structure of the electricity market creates a very substantial barrier to participation by independent distributed energy generators. These two sets of market failures ensure **that CHP development will be minimal until these barriers are addressed through Government policy.**

If the Government wishes to realise the benefits from existing and new CHP plant within the UK energy system, explicit policies are needed to correct the market failures currently hampering CHP development.

The longer term role for gas

The Gas Generation Strategy needs to consider both the immediate and longer term role for gas. It is important that development of gas generation is in line with the Government's legal obligations on emissions reductions. Gas generation will need to operate in a more flexible manner, responding to periods of high electricity demand when intermittent renewables are not generating sufficient power. Whilst this role can be fulfilled by simple OCGT stations, anticipated limited run hours will render them a costly part of the energy system. Existing and new CHP plant can (and do) operate in a highly flexible manner, meeting the host heat requirement whilst generating flexibly. As noted by the Government's heat strategy, there may be significant cost and efficiency benefits in exploiting existing CHP plant flexibility rather than investing heavily in peaking OCGT plant (see question a).

> *'There is also the potential for gas CHP to play a role beyond 2030 as a more efficient alternative to gas peaking plant, by providing the steam for industrial processes instead of electric boilers when a demand for electricity generation needs to be met.'*[3]

[3] *The future of heating: A strategic framework for low carbon heating in the UK*, DECC, April 2012, p84

Responses to questions

a) 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?

The gas call for evidence identifies the key role gas plays across energy system in electricity and heat generation. Approximately 34% of UK electricity generation came from Gas in 2011. At least 14% of total gas generation arises from CHP[4]. CHP capacity has stagnated over the past decade and recent changes announced at budgets 2011 and 2012 are expected to result in a further reduced output from the UK CHP fleet from April 2013 onwards[5]. Gas fired CHP is a proven and reliable technology which can be installed now and operating within three years from start of construction. CHP generally does not require upgrades to the transmission network providing value for consumers.

Government energy policy has the key aims to deliver affordable, secure, low carbon energy supplies. The answer below takes each of these aims and examines how gas, particularly gas fired CHP, contributes to each of these aims.

Security of electricity supply

Security of electricity supply divides into two areas: short term security, ensuring that there is no unmet electricity demand and long-term security, ensuring that the UK is not vulnerable in its ability to meet electricity demand due to unavailability of fuel or punitively high fuel prices.

Short term security of supply – ensuring that day-to-day demand is always met.

Ensuring short-term security of supply requires generation flexibility. Not only does there need to be generation flexibility but that flexibility must be reliable, delivering power when called upon. As Government projections for increased intermittent renewable and inflexible low carbon plant are realised, the need for such reliable flexible capacity will rise.

Gas power stations, especially OCGT, can operate very flexibly. Operating flexibly has, however, two related penalties, efficiency and, therefore, emissions. For example a baseload CCGT may operate with an efficiency of ca. 50%, but this will fall when modulating output. In a future scenario where plant are expected to run for only a short period of time (OCGTs), the operational efficiencies may fall considerably

Existing UK CHP plant can operate with very high levels of flexibility for example there is a CHP plant in the UK that can increase output by 120mw in 15 minutes with a ramp-up rate of 20 MW/minute at the fastest point. The CHP plant can offer such flexibility because it is meeting an existing heat demand and, therefore, is always 'warm', ready to increase output. The CHP is, therefore, rapid at responding but also efficient – with a baseload thermal efficiency of between 70 and 90%. Furthermore, as these CHP plant are meeting a critical heat load, for which reliability of heat supply is vital, the reliability in response to increased electrical output is very high. Smaller CHP engines can provide response very rapidly. For example a 2MW CHP engine (which may be installed as multiple units), start-up to full output takes 2 minutes with an overall efficiency of over 88%[6]. Connected to thermal stores, such CHP plant can provide efficient and responsive gas generation where heat generation can be stored in advance of demand. When aggregated, this generation could provide significant volumes of efficient flexible capacity.

[4] Based on data from Chapters 5 and 6 of DUKES 2011, 175 TWh of gas generation and 35 TWh of Good quality CHP generation.

[5] Budget 2012 confirmed the removal of CHP Levy exemption certificates from 2013, 10 years before the 2023 end date as set out in Budget 2009.

[6] The CHPA can provide the data behind these figures if required.

CHP can provide fast response, relatively low emissions, and highly flexible output for short term security of supply requirements.

Long-term security of supply – ensuring a diverse and efficient array of generation technologies

As noted in the IEA 'golden age of gas' report, gas is available from a wide array of existing sources and unconventional gas may improve this availability still further[7]. At the same time, however, the report also anticipates a major growth in gas demand. The widespread availability of gas is vital if gas generation in the UK is to meet longer term security of supply concerns.

Gas availability is, however, one part of the security of supply picture; the other is the efficient use of gas resources. In both electricity and heat generation, gas efficiency should be maximised to improve security of supply. Efficiency needs to be maximised both at the point of final energy consumption through measures such as insulation but there also needs to be a focus at improving the conversion efficiency of energy, so called primary energy demand. In the UK, the CCGT fleet has an average efficiency of 47.6%[8]. The UK CHP fleet has an average thermal efficiency of 67%[9] and, based on Government figures, CHP reduces UK gas imports by 5%[10]. If the DECC's projection of 11.3GW of CHP by 2020[11] were attainedthe security of supply benefit from reducing imports would almost double. Vitally, however, this improvement in security of supply is only achieved if CHP plant are operating. A CHP plant must be operating and displacing a less efficient power station to reduce energy demand. Current industry projections are for a decline in CHP operation as Government removes support for CHP power export from 2013.

CHP addresses long term security of supply goals through improving the efficiency with which gas is used.

Affordability

Achieving the UK's commitments to emissions reductions and security of supply must happen in the most cost effective way if energy bills are to be affordable.

In the UK market conditions, gas CCGTs represent the most cost effective plant to build and, outside of Government support mechanisms, it is predominantly these plant that are under consideration for new build. The capital costs and build times of new CCGT are relatively low but there is also an opportunity to ensure that existing assets are also utilised.

In the case of CHP, the 6 GW_e of existing assets have seen declining load factors as the market has become more challenging[12]. In addition, the removal of support for CHP from 1st April 2013 is expected to reduce CHP exports further. **A valuable aspect of ensuring affordability of electricity supply will be to maximise the utilisation of existing CHP assets** which will deliver both affordable and low carbon electricity.

For industrial users, operating in an international environment, high energy costs present a real threat to their competitiveness. The ability to generate electricity and heat efficiently using onsite CHP can drive industrial competitiveness. CHP generation also brings economy-wide emissions and security of supply benefits.

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[7] *Are we entering a golden age of gas? IEA special report.* International Energy Agency 2011
8 Chapter 5, Digest of UK Energy Statistics 2011, DECC, p126
9 ibid p166
10 In 2007, the Department for the Environment Food and Aural Affairs (DEFRA) estimated that with 10.5 Gigawatts of gas fired CHP plant installed in the UK (there are about 6 GW currently), the reduction in total gas consumption would be 57,000 Gigawatt hours (GWh). Based on the current installed capacity of 6GW, and using DEFRA's data, CHP saved 32,571 GWh of gas in 2010. Had those CHP plant not been in operation, the UK would have had to increase gas imports by over 5%.
11 Updated Emissions Projections, October 2011, DECC
12 Table 6E Chapter 6, Digest of UK Energy Statistics 2011, DECC, P166

A key component of energy affordability is driving energy efficiency. The Government seeks to drive energy efficiency in final energy demand through schemes such as the Climate Change Levy, Green Deal and the Energy Company Obligation. There is, however no substantive policy to drive primary energy efficiency in the UK. In the UK, the majority of energy contained in input fuels in the electricity generation market, is rejected into the atmosphere as low grade heat via power station cooling. **Wasting energy in this way costs the UK economy and reduces energy affordability for all users**. The Gas Generation Strategy presents an opportunity for the Government to consider where there are opportunities for driving efficiency as a mechanism for improving affordability and competitiveness. The Government's recent heat strategy identifies a substantial technical potential for 24 GW of CHP capacity by 2020[13]. **If the Government fails to consider CHP from the outset, it is very likely that new, power-only, capacity will be built to meet the UK electricity demand, sterilising the opportunity for new CHP build and operation.**

Emissions Reduction

Whilst building and operating new gas generation plant now will reduce the UK energy emissions, those reductions are limited. As noted above, increasing the flexibility of gas fired plant, reduces thermal efficiency leading to greater emissions. The Gas Generation Strategy risks being portrayed as an abandonment of the emissions reduction agenda. To prevent such a narrative from emerging, it is vital that the strategy sets out how new gas can be used to deliver emissions abatement and efficient use of gas.

The **UK CHP fleet delivers 13 million tonnes of CO_2 abatement annually**[14]. This emissions abatement only arises however, if the CHP fleet operates. To achieve emissions savings from CHP, the Government needs to ensure that CHP plant despatch power ahead of more polluting coal and gas plant.

As the most optimal form of gas use, the Gas Generation Strategy should recognise the value of CHP and the level of deployment that should be achieved. The CHPA is not suggesting that all new power stations should be CHP, but that the Government should seek to ensure that CHP opportunities are exploited before encouraging less efficient, higher emission CCGT and OCGT plant. The current policy framework for CHP is likely to lead to a fall in exports from existing plant alongside very limited new CHP build.

In the longer term, as gas generation is anticipated to move to a more peaking role, the use of flexible CHP plant will lead to a lower emission peaking system than if OCGT and CCGT were deployed. As the UK heat strategy envisages a growth in heat networks, the opportunity for using CHP plant to provide local generation at times of peak electricity demand whilst making efficient use of heat generation will create additional scope for a more efficient and lower emission energy system.

CHP meets security of supply, affordability and emissions reductions goals better than power only CCGT and OCGT plant. The current policy framework does not, however, award a proportion of these benefits to the CHP user which prevents the build and operation of CHP. An incentive in the electricity market arrangements to correct these market failures is vital if the Government wishes to see CHP built and operated. **Without a correction of the current market failures facing CHP, the Government is signalling to industry that it does not wish to see the operation of existing or construction of new CHP plant.**

13 The future of heating: A strategic framework for low carbon heating in the UK, DECC, April 2012, p83
[14] Chapter 6, *Digest of UK Energy Statistics 2011*, DECC.

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

Initially new gas plant is likely to operate as baseload generation. As the penetration of intermittent renewables on the grid increases, it is likely that gas plant (including CHP) will move to a more flexible role meeting the short term security of supply needs highlighted above. Given that Government is using market mechanisms to encourage the new generation it desires, it is not possible to state a desirable level of gas generation. Furthermore, uncertainty over the timescales for the delivery of Carbon Capture and Storage (CCS) renders the question over the level of gas generation needed even more difficult to answer. There needs to be sufficient gas generation (without CCS) to meet the UK energy needs but this should not be to the exclusion of lower carbon options.

When considering how gas generation may evolve, the Government should consider how it will ensure that a more flexible (and less efficient) gas fleet will facilitate wider emissions reductions. The best way to minimise the emissions from gas generation is to maximise its operational efficiency. For example an OCGT peaking plant will operate with a thermal efficiency of about 35-40%. If that same plant were connected to a thermal store, as part of an array of heat generation plant, serving a heat network it could operate with a thermal efficiency of up to 70%.

In the longer term, if CCS deployment were to occur at scale, maximising the thermal efficiency of the process should be a key concern for Government. Not only does this improved efficiency address the energy affordability issue, such decarbonisation of CHP would create low carbon heat for reducing industrial emissions.

Investment in gas fired CHP also provides wider market benefits. Developers of CHP are likely to be non-traditional energy investors and will introduce new competition into the market which will help drive liquidity. New investors will bring new balance sheets to bear on energy investment which may release traditional investors to develop larger scale low-carbon projects envisaged in the electricity market reform process.

Whilst the Government has left it to the market to determine what it will invest in, it is seeking to use policy to send signals to ensure that emissions reductions and security of supply are maintained. In the same way, the Government should assess how new and existing gas generation assets can be deployed to meet its policy goals in the most cost effective manner. Once such a comprehensive assessment has been undertaken, The Government needs to create market signals to encourage the type of investment it wishes to see.

The Government has identified significant potential for CHP and the evidence above indicates how CHP can contribute to energy policy goals. The CHP industry needs Government to place a value on the benefits offered by CHP and create the market signal that attributes some of that value to the CHP operator. **As noted earlier, current policy signals discourage investment in gas-fired CHP.**

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

As noted in the call for evidence, a fundamental driver for investment in new gas plant is the clean spark spread. The introduction of the new carbon price support from 2013 also needs to be included, creating a 'super-clean' spark spread (e.g. carbon price support price plus EUA price plus the cost of gas needed to generate electricity).

Another key driver for gas generation economics is anticipated load factors. The rate of penetration of new low carbon and renewable plant may have profound impacts on the predicted load factors for new plant. Furthermore, given that many renewables are intermittent, it is difficult to predict how the load factor will vary between years. A higher load factor in the initial years is more valuable for amortising a generation asset.

Investors will consider new gas investment compared to other options (the counterfactual) such as renewables, CHP or, in the case of industry, a boiler and electricity supply, and invest in the most attractive option.

The same factors apply to CHP investment. The spark-spread and anticipated load factors are vital. For CHP investors the counterfactual is likely to be either a boiler (for industrialists and heat network operators) or a CCGT for utility developers.

The Government has not had a clear policy on CHP for many years and the ongoing uncertainty is creating an atmosphere that discourages the contemplation of CHP projects in the UK. As noted earlier, CHP investment is stalled because the benefits of the CHP plant do not accrue to the CHP operator. This fundamental market failure has not been properly considered or costed by Government and has led to a policy environment that increasingly undermines CHP operation and investment.

Current market conditions for CHP.
Smaller CHP systems (typically sub-2 MWe) are generally cost-effective on sites where they are not exporting electricity as they can realise the full value of the avoided cost of electricity supply. The small CHP market is, however, constrained by the wider economic conditions where there is unwillingness to commit capital to non-core activities. Third party financed schemes also experience greater credit-risk as host sites strive to maintain competitiveness and output. Finally, a slowing of the new property development is limiting this compliance-driven CHP market.

Existing larger industrial schemes, typically in chemicals, refining, paper and the food sectors are under threat from a combination of weak spark spreads and the Treasury decision to remove the CCL exemption benefit on exported power from CHP plants; a premium of c.£5/MWh. The loss of export incentive is critical, as many of these schemes have a generation capacity that is far in excess of their on-site power demand. To maximise gas and carbon savings these plant export a significant proportion of their power generation. With the loss of the export incentive we anticipate that a major proportion of these existing plants will reduce output or even cease operation. With the exception of South Hook, which is a unique site, **the CHPA is not aware of any new plant of a major scale that is under development.** This removal of support for CHP and resulting reduction of output risks compounding concerns over capacity margins as well as increasing emissions and UK gas demand (when compared to if the CHP were operating a baseload).

It is very difficult to say how the investment economics in new gas generation will evolve over time as it depends largely on the EMR process and the effectiveness of the new market signals to bring on new low carbon generation. What can be said, however, is that new CHP plant will not be built unless Government creates a market signal to encourage it (see questioned for a discussion of the reasons why CHP is not built). The costs and risks associated with CHP investment which are borne by the developer are not mitigated by the benefits as these accrue to the UK economy. In other countries such as Belgium and Germany, the economy-wide value of CHP has been returned to the investor through a support mechanism. These relatively low cost policies have led to substantial increases in CHP penetration in these countries. For example, the revised German CHP law provides support for CHP at €21/MWh for the first 30,000 full load hours of operation. This support is already delivering substantial CHP growth and is designed to meet a target of 25% generation from CHP by 2020.

The CHP industry needs Government to place a value on the benefits offered by CHP and create the market signal that attributes some of that value to the CHP operator. In the absence of such a market signal, the Government is indicating that it does not wish to see substantive new investment in CHP.

The CHPA recommends that the simplest and most effective way to support CHP generation is through the electricity market reform process. For many CHP developers, the main risks

lie in the electricity market and support is needed to surmount this barriers. Furthermore, CHP when sized for maximum efficiency will generally generate more electricity than the host site requires. Encouraging CHP electricity sales in the market, therefore, drives maximum emissions savings and efficiency as well as increasing market competition. For the longer term, exporting CHP plant are capable of providing reliable capacity services (see question a) and it makes sense to encourage such exporting CHP to be built now.

d) 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?

The policy uncertainty that is present in almost all areas of current UK energy policy has created an investment hiatus from renewables to new gas and CCS. In particular for new gas plant, the announcement of a capacity mechanism has discouraged investment in new gas plant as the operation and value of the mechanism remains unknown. Whilst there may be a need for some uncertainty as new measures are developed, the Government should consider carefully the impacts of such ongoing uncertainty and the absence of sufficient interim policy to prevent such a hiatus.

In the case of CHP, the Government is yet to develop a clear policy on the technology. The heat and biomass strategies have indicated that CHP is considered to be of value to the Government but the last budget confirmed that the Government would remove the one substantive support for CHP ten years ahead of earlier commitments, undermining the economics of existing plant.

As noted in questions (a, b and c), CHP plant are not built because the costs and risks of development are borne by the developer but the benefits accrue to the UK economy as a whole. In the section below, we explore why CHP is not developed in the UK market.

Constraints on CHP development

As an energy efficiency technology that makes optimum use of expensive fuels, CHP might be expected to be the default choice for consumers with a heat and power demand; often reflected in the query 'if CHP is so efficient, why does it not get built?' Recent experience demonstrates that this truism is evidently not the case: heat users often preferentially choose simple boilers and the power industry routinely develops power-only generating stations. The case for policy support reflects the need to bridge this gap between opportunity and practice.

The principal reason for CHP remaining outside of the mainstream of energy investment lies in a combination of market failures and market distortions. The Government's Electricity Market Reform proposals introduce a complex set of changes that will add further layers of intervention and distortion onto a market which already suffers from a lack of transparency and liquidity. Any support for CHP must be targeted to address these market distortions and recompense the CHP operator or developer to ensure that CHP is a viable commercial proposition for investment and continuing operation. There are four key areas where the market today does not function effectively:

1. Existing sites for power generation have a competitive advantage over new sites. New power generation stations are generally proposed on existing or legacy sites where power stations have previously operated. These sites, generally in place before privatisation, have existing infrastructure in place (power lines, fuel supply routes etc) thereby minimising development costs. In addition, the existence of a power station ensures that the likelihood of planning barriers and costs being an issue are minimised. By contrast, new CHP plants are sited based on heat demand not electricity infrastructure. Sites of new CHP plant are often in areas where the electricity grid – configured to meet the needs of mid-C20th Britain - is limited in its ability to accommodate new generation assets, further increasing project complexity and costs. In addition, the prospect of a

new power station at an industrial site may be subject to greater planning challenges, adding both cost and risk to the development.

2. The balance of cost and risk is weighted against CHP developers. This cost and risk balance arises in two areas: electricity market interaction and heat off-take.

   2.1. Developers of new power plant do so purely to supply electricity to the market or sell bilaterally to energy suppliers. The electricity market and its regulations are central to their business model. Unlike the developer of a power station, a CHP plant primarily operates to meet the heat and power demand of manufacturing a product such as paper, soda ash, sugar or petrol. To ensure maximum CHP efficiency and emissions reductions, plant design will usually result in the export of excess power generation to the electricity grid: a major step that requires active engagement with the electricity market rather than simply passive consumption. For a CHP operator, therefore, electricity market interaction is a secondary activity and the electricity market viewed as inherently risky and 'foreign' to business-as-usual. By contrast, the electricity market is fundamental to the business of large-scale centralised plant and vertically integrated companies (with generation and supply businesses). The vast majority of smaller market operators are only present due the incentives such as the Renewables Obligation. Without incentives, smaller generators simply cannot compete in the market as structured currently.

   2.2. Where a CHP plant is developed by a 3rd party ESCO, heat supply represents a major revenue line. The credit risk of the industrial site, and ultimately the risk that the industrial consumer may cease operations, present costs and constraints for new projects.

   - The additional capital cost of investing in CHP and the substantial risk of selling a secondary product into an unknown, complex and illiquid market discourages many potential CHP operators from investing.

3. Emissions reductions benefits do not accrue to CHP operators. CHP reduces emissions compared to separate generation by at least 10% and commonly up to 30%. The practical effect of CHP operation is to displace the emissions from grid electricity – emissions which arise at a central power station, far away from the industrial site. Whilst UK net emissions fall as a result of CHP installation, gross emissions at the CHP site will rise as a new process (electricity generation) now occurs on-site. The emissions reductions of CHP are recorded in Government statistics but, without express support, the value of these reductions accrue to the wider UK economy not the CHP operator.

4. Security of supply benefit does not accrue to CHP operators. As with emissions reductions, the more efficient use of fuel to meet heat and power demand reduces primary energy demand. Reducing primary energy demand directly improves security of energy supply but, once again, the benefits accrue to the wider UK economy. CHP utilisation currently reduces gas demand by around 3.5bcm, equivalent to 5% of net imports. As noted above fuel consumption will rise at a site that installs CHP and, therefore, it is vital that the security of supply benefit is credited to the CHP operator to ensure a fair market.

There is now a pressing requirement to address these market failures. If these failures are not addressed then the pattern of generation that we can expect to see in the period of the next 10 years will compromise emission and security (efficient use of resources) goals; EMR presents the only timely opportunity to do this. Furthermore, gas CHP on industrial sites can, subject to design, offer highly flexible capacity services at far higher efficiencies than other peaking plant.

A simple incentive for both new and existing CHP today can also ensure efficient flexible generation for the future. Countries such as Germany and Belgium have substantive support in place for CHP and this is leading to a major deployment. In the case of Germany a time

limited feed in tariff for CHP is in place to achieve a target of 25% of total electricity generation by 2020. There has been a prolonged absence of a clear policy direction on CHP and a gradual undermining of CHP investments within a number of policy areas. The gas generation strategy creates the opportunity for the Government to send a clear signal to the industry about what level of CHP is desirable and how this is to be achieved. If the Government wishes to see CHP deployment, it is vital that the Government correct the existing market failures facing CHP. **Without addressing the market failures, the Government will be sending a signal to the industry that it does not wish to see new CHP build and operation**.

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

As noted in other questions, the Government does not have a coherent policy agenda for CHP. If the Government wishes to see new CHP plant developed, the Government needs to announce a policy that will address the market failures for CHP. The CHPA has suggested, through the decentralised energy contact group, that the most cost effective form of support for CHP would be in the form of a premium Feed in Tariff.

Recent statements from Government have indicated that DECC is examining the case for support for CHP and how this is best delivered. The CHPA would welcome an understanding of that process and the timeline on which it is to be delivered.

f) 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?

The CHPA in not aware of any issues regarding the capacity of the UK gas infrastructure to meet changes in gas demand.

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