OFGEM

Project Discovery Energy Market Scenarios

GrowHow Consultation Response

Executive Summary

GrowHow UK Limited is the largest industrial consumer of gas in the UK (used as feedstock for manufacture of ammonia and fertilisers) and a major consumer of electricity.

Overall, OFGEM's Project Discovery Consultation Report is welcomed by GrowHow, as it confirms our oft-stated view of the problems the UK faces with current energy policy, particularly the lack of certainty that secure and competitively priced energy supplies will be available to industrial users like GrowHow in the future.

Gas is a critical feedstock within the chemical industry. Within fertiliser production for example, there is no economic alternative to the use of gas as feedstock within our process. There are a wide number of means by which electricity can be generated; gas should be production processes where no viable alternative feedstock is available. 48% of the world's population are dependent on mineral fertiliser for their food. According to the government's Chief Scientist, John Beddington, food security, like energy security is an huge issue for the future. As a very strategic level, a decision should be reached about where valuable raw materials like gas should be utilised in the future.

Key Points

In this context, the study emphasises a number of key issues that we believe are critical with regard to the provision of a secure and balanced future electricity generation supply as follows:

1. The requirement for a substantial volume of new nuclear capacity to be developed as quickly as possible.

2. The growing dependence on gas CCGT for electricity generation is a key concern for GrowHow. This will both create
a) an imbalanced generation mix and
b) an excessive reliance on gas-fired generation rather than utilising as a valuable feedstock for which no viable alternatives exist.
3. The need for a more balanced generation mix to be developed into the longer term that includes coal and is not excessively dependant on intermittent wind generation.

Implicit within the report is the acknowledgment that government renewable targets will be both prohibitively expensive and, in reality, unachievable.

In the context of gas supply, the study would indicate that there is a clear and compelling case for

1. a substantial increase in gas storage.

2. renewed vigour to be put into achieving equitable and consistent market liberalisation across Europe.

3. the formulation of firm supply contracts for LNG.

Industry and the provision of a ‘Demand Side Response’

Where we believe the conclusions are flawed are where the emphasis seems to be placed on industry to provide a demand response and balance inadequate supplies. It is imperative that there is equality of effort across all sectors in focusing on energy efficiency measures, including domestic households, coupled with a need to be honest with all consumers. Industry cannot be relied upon to shoulder the burden unilaterally.

The assumptions being made on how much demand response that industry can provide is unrealistic. Evidence has shown that much less is available
If demand response is required there is a need for a fundamentally different way of providing this by many more sectors including the domestic sector. Evidence is that the broad-brush assumptions outlined in the OFGEM report are unrealistic and inadequately thought through.

We know what a very severe ‘demand side response’ looks like from periods where gas and electricity prices have spiked and energy intensive industries have been forced to shut down. Evidence suggests this would be much lower around 1 GW.

The scale and opportunity to increase a demand side response from the industrial sector has been and continues to be seriously overestimated by both OFGEM and DECC.

GrowHow’s Ability to Provide a Demand Side Response

GrowHow is the last remaining fertiliser manufacturer in the UK and has a substantial industrial process chemical’s business. Across our two sites, we use 1% of the gas consumed each day in the UK.

There is no untapped demand flexibility within our business; we shed some load where we are able to maximise cost efficiency but this has to discretionary to ensure that our assets continue to function effectively and we are able to fulfil our downstream customer requirements.

Our plants run 24 hours a day, 365 days a year. The ammonia plant, the most energy intensive part of our operation, (upon which all our production activity is centred) is shut down biennially for maintenance. Our business model (and that of all fertiliser manufacturers across the globe) is predicated on maximising production throughout the year. It is not compatible with providing flexibility over electricity usage, nor is there a way of adapting our operations or equipment to provide such flexibility.

Our business is gas rather than electro-intensive. Although electricity is our second greatest cost, it is simply dwarfed by our expenditure on gas. We are, therefore, simply unable to run an economic business if we have to modify operations in response to electricity availability. Having looked at the matter internally, in reality there is nothing that government could do to address the barriers or reduce costs and risks for us.

Global Insight in their recent report estimated it at 3-4 GW; this is simply the difference between summer and winter demand. Evidently, this is an excessively simplistic. For DECC to have confidence in the scale of any greater demand side response than exists at present we would strongly recommend that a robust, sectoral assessment is carried out in collaboration with EIUG and CIA to ascertain what opportunities exist and the incentives that would be required.

Summary

Whilst energy intensive industry is included as a source of demand side response, the severe damage to the UK's standing as a credible manufacturing location and place to do business as a consequence of this have been completely neglected.

In addition to a catastrophic effect on production, operating efficiency coupled with an inability to maintain delivery schedules that would result from this, the effect of a "tighter" UK market will push up forward prices, forcing industry to rely on highly volatile spot prices.

Chapter 2

Question 1: Please provide comments on our approach of using scenarios and stress tests to explore future uncertainty, and as a basis for evaluating policy responses.

a) Whilst the scenarios have the advantage of considering manageable number of possible circumstances, no probabilities are given, although some key assumptions in the Green Stimulus/Transition scenarios on the penetration of "green" technologies look highly improbable.
b) It doesn't seem feasible that energy demand could be reduced so much in the two "Green" scenarios in such a short time frame from available technologies.
c) It is also counterintuitive that scenarios requiring double the investment level (an extra £100bn) have no major impact on bills for customers.
d) There is a lack of supporting evidence to back up the investment cost assumptions utilised. Greater transparency on the model or access to it, would help to lend more credence to the costs.
e) Whilst the unwelcome events which are the subject of the stress tests are chosen sensibly, history suggests that, in reality, it is likely to be the culmulative impact of a number of situations arising that the biggest problems.

Question 3: Do you agree with how we measure the impacts of our scenarios and stress tests?

See 1e above. As static calculations, assuming the market behaves rationally, they are no doubt a reasonable estimate of what could happen, but the dynamic impact of extended infrastructure problems and interactions when other parts of the system do not behave as expected is less well articulated given the market does not always behave rationally. Indeed, further complications could include "irrational" market behaviour such as the extended periods in past winters when Continental gas has not flowed to the UK, despite UK prices being markedly higher being one such example..

The full economic impact on the UK is not captured either, in that the "consumer" impact considered – as implied by the tables in the Appendix – is almost always for **retail** consumers rather than large industrials such as GrowHow. Whilst it is anticipated that we will play a major role in providing demand side response, the economic impact on us is not addressed. If Ofgem doesn't properly understand and assess the impact for energy intensive industry, it will simply cease to exist when faced with the challenges that are being outlined in this study.

Negative factors include the effect of a "tighter" UK market in pushing up UK spot and especially forward prices, the disruptive effect on production and plant operating efficiency, inability to maintain customer delivery schedules and long term loss of reputation with customers. There would be cumulative severe damage to the UK's standing as a credible manufacturing location and place to do business. We should like to see this more explicitly dealt with, and quoting wholesale energy prices rather than aggregate consumer energy bills.

Question 4: Do you agree with our key scenario drivers and choice of scenarios?

I can appreciate there is a need to keep keep the number of scenarios to a manageable number and the two dimensions certainly reflecting the key preoccupations of the time. I think the idea of looking at culmulative incidents as stress tests on top of this would be sensible.

Question 5: Do you believe our scenarios sufficiently cover the range of uncertainty facing the market, and hence cover the areas where future policy responses may be required?

Given scenarios where unreliable and unpredictable renewables have a large nominal share of capacity, and industrial consumers are assumed to provide much of the balancing of the system through demand side response, the impact on the "insurance premium" in forward market prices needs to be more thoroughly researched.

Uncertainty also arises from assumptions about the fate of the coal fired power stations under LCPD. As long as uncertainty persists about the fate of the old stations, potential investors in new capacity are understandably reluctant to commit funds because they think the older plants may indeed be allowed to continue. With too little new capacity built, this risks becoming a self-fulfilling expectation. We could have an inadequate generating capacity margin, and be forced to rely on older, less reliable plants which we can only assume have not had much money spent on them in recent years, and may not be capable of reliable operation anyway. The uncertainty needs resolving.

Question 6: Do you have any specific comments on scenario assumptions, and their internal consistency?

The assumptions appear more determined by arbitrary political targets than rational probabilities. Specifically, the assumption (para 2.66) that "In the Green scenarios, little additional investment is required beyond renewables, CCS and nuclear" is unrealistic. Given that neither CCS nor nuclear is likely to make a significant impact before well into the 2020s and renewables need back-up of almost 1:1 in conventional nominal capacity in order to provide adequate security. There would be a large increase in Gas CCGT to fill this gap, but it doesn't appear to have been accounted for.

Question 7: Do you agree with our methodology for modelling gas and electricity supply/demand balances?

The statements in paragraphs 2.68 and 2.69 grossly underestimate the practical difficulties of finding alternatives at times of stress. Often the same stress factors will affect markets beyond the UK and complicate our position.

The phrase "curtailment of demand (voluntary and involuntary)" betrays a lack of understanding of the UK's fundamental competitive position. To improve our trade performance, we must be able to provide a business environment conducive to producing goods economically and reliably. Uncertain power supplies complicate scheduling, increase stock holding costs, increase prices for assured energy supplies and divert managerial resource to playing in energy markets. Businesses like GrowHow cannot survive and thrive if they are expected to provide a demand side response, or pay an even greater for a stable supply as was suggested at a recent Large User Group Meeting.

Question 8: Do you agree that LNG is the likely medium-long term source of "swing gas" for the European market?

Yes, although new pipelines are also being constructed. However, global flows are realistically only possible as LNG. There is clearly a case for firm supply contracts for LNG to the UK

Chapter 3

Question 1: Do you have any observations or comments on the scenario results?

The results for gas emphasise the reliance placed on having adequate gas storage – quite clearly this is not the case at present. You highlight the greater danger being the ability to sustain gas supplies through a long winter rather than on any one day. This implies total storage capacity is inadequate, while the maximum rate of withdrawal is less of a problem. "Dash for Energy" suggests that by 2020 we have managed to double the rate of access to stored gas, despite the present market based regime having so far conspicuously failed to deliver adequate storage.

On electricity, the most worrying feature is the heavy reliance on wind in the Green scenarios. Footnote 35 explains that only 15% of nominal wind capacity, shown as 30+ GW, can be relied upon when calculating capacity margins. Of the aggregate 100 GW including 30 GW of wind, only 75GW is reliably available –assuming everything else has 100% availability! Alternatively, to give 100GW effective capacity, an additional 25 GW of conventional capacity – almost certainly CCGT - needs to be available as back-up. The only way that figure 3.9 is able to show any positive capacity margin is by the optimistic assumption that aggregate demand will have fallen markedly.

It is also a worrying feature that such a high proportion of generation in the non-green scenarios is gas fired, and that nuclear's share dwindles and is not replaced. The proportion of "reliable" generation from gas reaches 75% or more. Evidently this would increase the price of gas in the UK. For a gas-intensive business such as GrowHow, overdependence on gas to generate electricity will mean gas prices increase in the UK and mean that we are unable to compete.

Overall one would have to conclude that reliance on simple market forces, coupled with a drive for unrealistic renewables targets and LCPD will not deliver stable and secure future. Generation has to be diversified as quickly as possible.

Question 2: Do you agree with our assessment of what the key messages of the scenario analysis are?

Green Transition says "the EU renewables target and the Government's carbon budgets are met, but at a cost to consumers in the near term who would be required to fund the investment." This higher cost to consumers would be our expectation too, yet the chart in Figure 3.21 shows consumer costs virtually identical to Slow Growth. Nor can we agree with the Green Transition conclusion that "This scenario is generally favourable to security of supply".

The Project Discovery conclusions taken together indicate the influence of what the rest of the world does. They also depend too much on the attainment of some unrealistic UK targets on both energy efficiency, reduced demand, as well as renewables penetration, and skate over extremely thin capacity margins. Renewable output could not only fall to 15% of the nominal output, but on occasions to virtually zero when the wind stops blowing.

Question 3: Are there other issues relating to secure and sustainable energy supplies that our scenarios are not showing?

Our main concern is that the impact on industrial consumers like GrowHow, and the likely damage to the manufacturing economy overall, is inadequately considered.

Question 4: To what extent do you believe that innovations on the demand side could increase the scope for voluntary demand side response in the future?

Not in GrowHow's case. Innovations on this scale would mean completely re-engineering our ammonia plant. This is not possible practically or economically. (A new ammonia plant costs approximately £1 billion. In the future, investments on this kind of scale will only made in areas where there is a stable source of low cost gas. (Locations such as Egypt or Russia where gas for fertiliser manufacture is subsidised by government). Shutdowns, even with weeks to prepare, can be extremely expensive as well as potentially hazardous if done in haste. Our plants take 3- 4 days to start-up and consume substantial quantities of gas during this process. Given the scale of our operation and the fact that gas provides both the most efficient feedstock and energy by a considerable margin to generate the chemical reaction required, there are no ready alternative sources of energy.

Chapter 4

Question 1: Do you agree that our stress tests are representative of the types of risks facing the GB energy sector over the next decade?

They cover most of the individual types of risks we may encounter. Damage to the Langeled connection would be similar to, but of greater magnitude than, a long-term 40% LNG diversion, or a Bacton outage.

Question 2: Are there further stress tests that you think should be considered?

Combinations of two or more simultaneous adverse events, including a Langeled/Bacton outage and/or zero wind extending over longer periods seem plausible and worth adding.

Question 3: Do you agree with the assumptions behind our stress tests?

The assumption "storage provides the 'swing' supply to attempt to meet winter demand" in paragraph 4.6 illustrates just how vulnerable the UK could be. For much of last year's cold but unexceptional winter gas was being drawn from storage at close to maximum rate just to satisfy "normal" demand. It is unlikely that there would be very much 'swing' capacity left . It demonstrates clearly that storage capacity must be expanded by very much more than is assumed for the basic scenarios.

The amount of "demand side response" , projected from I&C customers in Figs 4.2 and 4.4 implies massive industrial disruption and long term damage to the economy. The effect on GrowHow would be disastrous; uneconomic and uncompetitive, the business would be unable to survive.

In the electricity oriented stress tests (no wind) it would have been useful to see the related impact on gas markets as CCGTs were switched in – although as we observed above in our answer to Question 6 of Chapter 2, the scenarios appear to have underprovided back-up reliable power generation capacity, presumably because wind's unpredictability makes CCGT use irregular, and investment in such

capacity therefore unattractive. Instead “load curtailments” – another euphemism, this time for blackouts – are foreseen. This is really an admission of failure to provide secure energy, and will again have very negative consequences for the UK’s reputation as a place to do business.

Question 4: Do you have any views on the probabilities of these stress tests occurring?

Recent past experience (Rough, Langeled, Interconnector, Grain LNG) suggests that at least one major supply option is likely to fail or behave perversely at least once every other year.

Question 5: Do you agree with how we have modelled demand curtailment in response to constrained supply?

The option that has been chosen is disastrous for industrial customers such as GrowHow. Once again, we are being asked to bear the costs of the past failure of the liberalised market based system to provide adequate energy supply infrastructure or long term supply contracts, and a future architecture inspired by an unrealistic political target that will incorporate excessive amounts of inherently unreliable wind capacity. Sensible long-term diversification of primary energy sources is also thwarted by LCPD and a political unwillingness to countenance new coal capacity.

Question 6: Do you have any other comments on our stress tests?

No.