Executive Summary

EIUG represents energy intensive industries that depend on access to secure, internationally competitive energy supplies to remain in business.

We welcome the publication of Ofgem's Project Discovery Consultation Report which appears to endorse our long stated concerns about risks to energy security that will arise as a result of current energy policy.

Ofgem's analysis shows that, absent policy reform, UK energy supplies are set to become significantly less secure and correspondingly more expensive over the decade ahead and beyond. This development will be to the detriment of all consumers, but particularly those in industry who are most exposed to wholesale market price volatility and, in constrained conditions, to the threat of involuntary cuts in energy demand in order to preserve supplies to the domestic sector.

The report highlights a number of key issues on which EIUG has lobbied:

Electricity

- The urgent need to develop a substantial volume of new nuclear capacity
- The unrealistic and expensive nature of government renewable targets
- The need to maintain a balanced generation mix, including nuclear, gas and coal, avoiding excessive reliance on insecure / intermittent renewables such as wind
- The case for greater equality of effort on energy efficiency across all sectors of the economy, including domestic households; industry cannot be relied upon alone to balance inadequate supplies in the event of a shortfall in supply.

Gas

- The risks arising from excessive dependence on gas for electricity generation over the medium term
- The necessity for a substantial increase in gas storage, funded primarily by the domestic sector
- The case for EU market liberalisation and risks to UK import security in its absence
- The need for firm supply contracts for LNG imports

Demand Response

- Unrealistic assumptions about the nature and scale of potential industrial demand response

- The need to encourage greater demand response in the domestic sector

EIUG believes that both Ofgem and DECC have significantly overestimated the scale of potential demand side response from the industrial sector. Evidence available on demand response during winter 2005-06 (when UK gas and electricity prices spiked to record levels, forcing some energy intensive industries to shut down altogether) suggests 1GW might be a realistic estimate.

Energy intensive industries have a long history of engagement in commercial demand side response where specific manufacturing processes render this a practical and economic option and the affect on production, delivery schedules, etc. does not endanger the reputation of the business. The provision of demand side services, however, will never be a core business activity; the prime purpose of such businesses is the manufacture of goods and materials, not energy trading or the selling of energy supplies or capacity back to the market.

We strongly recommend that Ofgem (or DECC) carries out a robust sectoral assessment to confirm the potential scale of industrial demand response and identify the incentives required to ensure maximum use can be procured, if required, on an economically sustainable basis without precipitating permanent demand destruction.

General

Ofgem's analysis confirms that concerns about UK energy security in the medium term (due to retirement of coal and nuclear plant and increased reliance on gas in the absence of adequate storage) and in the long term (from over-reliance on insecure wind energy and unprecedented levels of 'demand response') are far from misplaced.

As demonstrated a few years ago in California, prolonged exposure to uncompetitive energy prices does not simply result in greater levels of industrial demand response – it results in the closure of entire industries and permanent damage to the wider economy.

EIUG remains concerned that the increasing likelihood of disruption to industrial energy supplies, whether 'voluntarily' in response to uncompetitive prices or otherwise, is already damaging the UK's standing as a credible manufacturing location in particular and a place to do business generally. We therefore hope that the implications of this analysis are fully appreciated by DECC and BIS so that steps can be taken to place UK energy policy on a more economically sustainable footing.

Detailed responses to questions posed in the Consultation Report follow

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) We also find it hard to believe 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 counterintuitive that scenarios requiring double the investment level (an extra £100bn) have no major impact on bills for customers. Who is to pay for the investment? In an assumed continuing market driven framework, which investors will be persuaded to make these investments? Or will the incentives be in subsidies which are charged to general taxation? Looking at the table in the Appendix ("Gas consumer bills", printed page 83) the sharply higher 2015 bills in the "Dash for energy" scenario suggests that UK bills are influenced more by what the rest of the world does than our own domestic investment plans. This should be made clearer in the text.

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) could help lend more credence to the costs.

e) Whilst the unwelcome events which are the subject of the stress tests are chosen sensibly, in reality it is likely to be the cumulative impact of a number of situations arising that the biggest problems.

Question 2: Are there other techniques for analysing uncertainty that we should consider?

Computer simulation methods, repeated many times (hundreds or thousands), can begin to reveal the likelihood of outcomes dependent on a range of factors with independent or linked probability of occurrence. A simulation model which moved forward a day at a time could "roll the dice" according to appropriate statistically based parameters to determine firstly the temperature-related demand for both electricity and gas, whether or not each supply infrastructure component failed or not, and how demand might then be met. Rules can be built in to say how long such interruptions might last – anything from days to weeks or months to repair a fault at Rough, or a damaged pipeline or part of LNG import infrastructure, possibly much longer periods if an earthquake were again to knock out Japanese nuclear generating capacity and cause diversion of LNG flows. A period of still weather and low wind generation can last several days – not least when high pressure brings colder weather, so these are linked probabilities.

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

See general comments 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 displayed. Such further complications could include "irrational" market behaviour – there have, for example, been extended periods in past winters when Continental gas did not flow to the UK despite UK prices being markedly higher.

The proper 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. While they are assumed to play a major role in providing demand side response, the economic impact on industrial consumers is barely touched upon. 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?

Given the need to keep the number of scenarios to a manageable number, the 2x2 combination is sensible, with the two dimensions certainly reflecting the key preoccupations of the time.

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?

No. We have already alluded to the plight of industrial consumers not being adequately considered. 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 which have not been fitted with flue gas scrubbers to make them compliant with the LCPD (let alone the IED!) Most actors – suppliers, customers and politicians in private, even occasionally in public – assume that the stations will be kept in service if the only alternative is widespread power shortages. At the same time DECC officials maintain that this could not possibly happen because we would be breaking Brussels' rules and would be hauled before the authorities and risk large fines. Those who have invested in FGD equipment might seek redress in the courts, too. 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?

Some general observations are made in the answer to Question 1. 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 hardly realistic. Neither CCS nor nuclear is likely to make a significant impact before well into the 2020s, while the renewables need back-up of almost 1:1 in conventional nominal capacity in order to provide adequate security. This must imply a large addition to gas fired capacity. Why is it not there?

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

In broad terms, yes, although the bland statements in paragraphs 2.68 and 2.69 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 casual reference to "curtailment of demand (voluntary and involuntary)" betrays a lack of understanding of the UK's fundamental competitive position. We are failing to pay our way in the world, the deficit being further aggravated by our need to import an increasing proportion of our primary energy requirements. If we are 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 "gaming" in energy markets.

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.

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 – which 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 – and a large part of CHP is likely to depend on gas, too.

Overall one would have to conclude that reliance on simple market forces (outside the renewables area, that is!), coupled with a drive for unrealistic renewables targets and the negative impact of directives such as the IED, is not going to deliver a stable and secure future. Generation needs to be diversified much more.

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

The conclusions in the panel in paragraph 3.66/Table 3.1 are at variance with other statements. For example 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 GT conclusion that "This scenario is generally favourable to security of supply" – see comments under Chapter 3, Question 1 above. It is also at variance with a recent German study by the Rheinisch-Westfälisches Institut für Wirtschaft sforschung (www.rwi-essen.de), published in October 2009 entitled "*Economic impacts from the promotion of renewable energies: The German experience*". It has relevance to the UK position. For example, one paragraph in the executive summary says:

"*Due to their backup energy requirements, it turns out that any increased energysecurity possibly afforded by installing large PV and wind capacity is undermined by reliance on fuel sources – principally gas – that must be imported to meet domestic demand. That much of this gas is imported from unreliable suppliers calls energy security claims further into question*."

The Project Discovery conclusions taken together indicate the influence of what the rest of the world does – as we noted in our response to Question 1 of Chapter 2. They also depend too much on the attainment of some unrealistic UK targets on both energy efficiency, and therefore reduced demand, as well as renewables penetration, and skate over very thin capacity margins. There is a very real possibility that renewables output could not only fall to 15% of the nominal output, but on occasions to virtually zero.

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, 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?

We see a very low likelihood of innovations around continuous process plant. Shutdowns, even with weeks to prepare, can be extremely expensive as well as potentially hazardous if done in haste. Other "batch" processes can more easily offer some response, but here too adequate notice is required since individual production stages can take several hours for completion. Provision for alternative sources of heat can be built in to plants at design/construction stage, but at a cost. Moreover, the alternatives, most likely oil or electricity for gas, offer either limited duration back-up in the case of oil, or simply put a strain on another part of an interlinked national energy supply grid.

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?

Yes, insofar as 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.

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 – unless storage capacity can be expanded by very much more than is assumed for the basic scenarios. The amount of "demand side response", as the euphemism has it, projected from I&C customers in Figs 4.2 and 4.4 implies massive industrial disruption and long term damage to the economy.

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.

We would not place much faith in the expectation (paragraph 4.18) of a meaningful contribution from smart grids and meters. This would require large numbers of consumer appliances to be capable of responding to signals from the grid. Little if any of the present stock is capable of such response. Moreover, smart grids and

appliances can only defer electricity demand for a limited period, not reduce it. Householders can hardly wait days to run a dishwasher or washing machine - and the cycle will run at some time. A freezer may cope for 12-24 hours without power, but will later require to use more to regain its optimum working temperature.

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. The Met Office must have the data on how often extended windless periods occur.

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

There do not seem to be many options. Those chosen appear disastrous for industrial customers, who 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 a political imperative to incorporate excessive amounts of inherently unreliable wind capacity. Sensible long-term diversification of primary energy sources is also thwarted by the projected IED and political unwillingness, reflected in the models, to countenance new coal capacity.

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

No further comments.