Industrial Strategy Team
Department for Business, Energy and Industrial Strategy
1 Victoria Street
London
SW1H 0EQT

Uniper UK Limited
Compton House
2300 The Crescent
Birmingham Business Park
Birmingham B37 7YE
www.uniper.energy

Registered in
England and Wales
Company No 2796628

Registered Office:
Compton House
2300 The Crescent
Birmingham Business Park
Birmingham B37 7YE

Response to: Building Our Industrial Strategy Green Paper January 2017
13 April 2017

Uniper is an experienced international energy company focused on power generation, energy trading, transportation, and storage, as well as a provider of specialist power engineering services and training to industry through our Engineering Academy. In the UK we own seven power stations comprising over 6GW of flexible installed capacity, as well as Holford gas storage site. As such Uniper is the fifth largest generator in the UK. Our employees, our experience and our assets make us a well-established business that makes an important, tangible contribution to Britain's security of supply and contributes to a cost-effective transition to a low carbon society.

We welcome the opportunity to input to the Industrial Strategy Green Paper. Given the sector we operate in, our focus is on the developing skills and delivering affordable energy and clean growth pillars; we would highlight the following points:

Securing the energy transition – it is right to continue to focus on security of supply. The capacity market is the enduring market based mechanism together with the energy and flexibility markets to achieve this. The foundation provided by the capacity market to provide a stable and secure energy supply will ensure that the energy transition can proceed confidently at the desired pace. The growing importance of gas backing up renewables means that the capacity market, along with flexible gas storage assets, ensure a stable power supply to industry, business and for the electrification of the transport sector.

Competitive markets – are central to delivering the most efficient and lowest overall cost energy system; removing commercial and regulatory distortions which impact outcomes from the energy, capacity and flexibility markets is essential. These markets must be technology neutral, identify the requirement in advance and procure on a competitive basis. Participants should be able to access multiple revenue sources, but only compete in the same market where a comparable service can be delivered.

Engineering Skills – there are positive changes proposed to the technical skills landscape, but the skills needed to ensure delivery and operation of necessary infrastructure is difficult to source. It is essential that the education system delivers appropriate levels of education, and that awareness of options, the process to access those options and the attractiveness of critical industries are ensured. Failing to meet basic and STEM relevant education standards, or passing the costs to fill in the gap onto business, affects every aspect of the competitiveness of the UK in a global market.

Innovation; the comparative merits of different approaches should be explored through further research, development and demonstration including, for example, power to gas as a storage technology which has further potential such as the production of hydrogen.

Questions for Consultation

Developing Skills:

10. *What more can we do to improve basic skills? How can we make a success of the new transition year? Should we change the way that those resitting basic qualifications study, to focus more on basic skills excellence?*

The Industrial Strategy Green Paper and industry[1] recognise that there are not enough school leavers with Science, Technology, Engineering and Maths (STEM) based qualifications to meet the required demand in engineering sectors. Investment in schools and colleges needs to be sufficient to satisfy the predicted demand and achieve the required education standard for moving in to STEM related careers at all entry levels, especially apprenticeships. If government sees value in business meeting any shortfall in the standard of education, business should be supported to do so. Failing to meet basic education standards, or passing the responsibility onto business, affects every aspect of competitiveness of the UK in a global market.

Uniper sees the transition year as a positive step in order to raise minimum standards prior to employment. Ideally the transition year should not be seen as a permanent solution however and the objective should be to embed this within school years, to make the transition year unnecessary in time. To make the most of the transition year government should consult with industry on its setup. It can only work if providers work closely together with employers to ensure delivery of the relevant skills so that learners have a career path following the transition period. As part of this it is important to ensure that career advisors are equipped to focus on STEM career needs.

11. *Do you agree with the different elements of the vision for the new technical education system set out here? Are there further lessons from other countries' systems?*

There are positive changes outlined for the technical skills landscape and we agree that the main elements are captured in the five sub-points. These are, however, at too high a level to be able to make an assessment at this stage and we look forward to consultation on more detail.

In anticipation, we would emphasise that delivery of the five elements in a timely manner is critical to their collective success. In our view the engineering institutes need to be closely involved in development of standardising the technical education routes. Close interaction with industry for educational establishments is also important to ensuring up to date high quality teaching content.

We would advocate a review of best practice across other countries and that the technical education system meets comparable standards. To ensure stability and consistency over time, there is a need to move away from periodic revision of technical education in the UK, to a more incremental development basis.

[1] Engineering UK Report, State of Engineering, February 2017

12. *How can we make the application process for further education colleges and apprenticeships clearer and simpler, drawing lessons from the higher education sector?*

It is not clear that the same application process is appropriate for all routes. The audience and options differ and in particular a straight read across from the higher education application process may not necessarily provide the best solution for apprenticeships. A clearer and simpler process needs to be accompanied by guidance so that school leavers are fully aware of the options as well as having access to a straight-forward process.

13. *What skills shortages do we have or expect to have, in particular sectors or local areas, and how can we link the skills needs of industry to skills provision by educational institutions in local areas?*

High end technical skills are already difficult to source and likely to become even more scarce into the future[2]. Significant infrastructure investment (for example Heathrow, HS2, Hinkley Point C) and, in a similar time frame, replacement of aging generation plant, will draw on the same resource pool. Ensuring that there is sufficient skilled resource available to meet all these requirements will be essential if projects are to be delivered.

There is perhaps a lower level of awareness and understanding of STEM related careers amongst young people. Improving the visibility and attractiveness of STEM related routes and careers may help to increase the number of leavers choosing these options. This is particularly important as the energy industry is undergoing significant change, and perceptions and uncertainty may deter otherwise interested candidates. A clear direction for the energy sector under the Industrial Strategy, and communication and engagement, would provide stability and help to make the sector more attractive.

14. *How can we enable and encourage people to retrain and upskill throughout their working lives, particularly in places where industries are changing or declining? Are there particular sectors where this could be appropriate?*

The change to the Apprenticeship Levy is welcome as this will help provide a new route of funding to give former apprentices the flexibility to retrain and upskill. The path for many is never simple when moving through their careers and ease of retraining is critical to supporting an efficient and flexible labour market. Cross and upskilling in the energy sector, by enabling people to transition from declining technologies to support new technologies, is one example where this opportunity exists.

<u>Delivering affordable energy and clean growth</u>:

27. *What are the most important steps the Government should take to limit energy costs over the long term?*

Competitive markets should be central to delivering the most efficient and lowest overall cost energy system for business and consumers in the energy transition. There are a number of areas in the existing market arrangements that need to be considered further, which we have outlined in response to question 28. Here we would emphasise the role of the capacity market and gas infrastructure in delivering the energy transition.

[2] Engineering UK Report, State of Engineering, February 2017 table 10.9; Working Futures 2014-2024 and Engineering UK analysis.

The capacity market is the competitive market based mechanism to achieve security of supply; not just in peak periods, or under a stress event, but to secure the forecast demand alongside renewables throughout the year. It is one of the three pillars of the energy system that sits alongside the wholesale energy market and developing flexibility market of the future. Recognition that the capacity market forms part of the enduring energy landscape will provide stability and bolster investor confidence. The foundation provided by the capacity market to provide a stable and secure energy supply will ensure that the energy transition can proceed confidently at the desired pace; as it will ensure that sufficient capacity is procured on a competitive basis, therefore at the lowest possible cost, to be available to secure demand throughout the year for those times when the wind is not blowing nor the sun shining.

Gas fired power stations are expected to have an important, continued role to play in the energy transition through to 2050, albeit with an evolving role as levels of installed capacity remain but load factors continually decline[3]. In this context the economics of new build gas capacity over the full life of these assets remain challenging. Finding ways to use existing infrastructure would help to reduce the overall cost of the energy system over the long term. The re-use of suitable existing power station sites, with established infrastructure, grid and gas connections as well as established civil engineering and structures, through replanting of the generating assets could do this. Assessing ways to unlock this potential lower cost investment in suitable established power station sites could also lead to greater competition in the capacity market.

A further consideration is that the evolving role for existing generation is characterised by flexible operation, with frequent start-up and shut-down. To minimise the cost of mitigating accrued plant damage and the maintenance needed to ensure reliability, it is important to consider the benefit of supporting research and development programs into topics associated with plant component damage mechanisms and materials of construction, energy efficiency across the operating range and environmental performance.

Long term viability of gas storage in the UK is important because of its role in both gas and electricity security of supply and in dampening market volatility and shaving peak prices, which helps to deliver lower cost energy to business and consumers. The economic case for gas storage in the UK is under pressure, in part due to the effect of non-market reflective business rates liability, but also the absence of being able to monetise the capabilities that gas storage has to support the operation of the gas network and the potential to defer or provide a lower cost alternative to network investment. As with other forms of energy storage, these potential revenue sources could support the continued business case for gas storage in the UK, particularly with the growing importance of gas backing up renewables and as electrification of transport increases electricity demand. We would therefore support development of the market framework to one which recognises the full contribution of gas storage to the UK energy transition.

28. *How can we move towards a position in which energy is supplied by competitive markets without the requirement for ongoing subsidy?*

With all the different support mechanisms currently in place, with different lengths of support, it is difficult to envisage energy markets that will not be subject to the effects of

[3] Chart 6, An Analysis of Electricity System Flexibility for Great Britain, Carbon Trust and Imperial College London, November 2016

these arrangements for some time to come. We think existing markets are effective and competitive. In that context it may be better to focus on what can be done to make markets more transparent, fit-for-purpose and remove the potential for inefficient or unintended outcomes.

Removing market distortions is essential to ensuring the most economic and efficient outcomes. There are a number of issues under the existing market framework that need to be reviewed to secure the right outcomes for Great Britain. In this regard we would highlight carbon pricing, interconnectors, batteries, Demand Side Response, market transparency and environmental standards.

- Carbon pricing; there's a need to review the long term suitability of the Carbon Price Floor, which was a tax introduced essentially to fill the gap and then transition to a more robust EU ETS. We look forward to some clarity in the Autumn Budget but would also like to see how the UK can achieve international climate change leadership without disadvantaging UK generation, either in the EU ETS or a traded scheme linked to EU ETS and other emissions trading markets; the wider the system, the more cost-effective the decarbonisation.

- Interconnectors; interconnection will be an important part of ensuring diversity of energy sources and can offer flexibility. However sub-sea interconnectors are capital intensive, have long asset lives and with higher levels of installed interconnection, each additional interconnector erodes the contribution from the existing installed interconnectors[4].

  Interconnectors must be able to compete with other technologies on a consistent basis and only where they offer a comparable service. An interconnector does not provide generation capacity; it only provides transmission of the electricity from sources of generation. Electricity flows across interconnectors according to market signals, and not in response to capacity market obligations.

  Government should continue to review the contribution of interconnectors to ensure that they remain in the continued interest of the GB consumer; by ensuring convergence of connected market prices and whether it is appropriate that they continue to be able to participate in the capacity market, and if so ensuring that the de-rating factor for each interconnector is appropriate for the market to which it is connected.

  If GB generation is to compete with generation on the continent it should be able to do so on a consistent basis. It may be appropriate to review whether GB generation should continue to pay Balancing Services Use of System Charges, as interconnectors and non-GB generation do not.

- Batteries; this is an emerging technology with a role to play, but it is not yet clear how long they could sustain a response. It is also possible they might exacerbate a stress event, as they may be charging up at the time of a capacity market warning and will need to charge up again after they have discharged. We understand government and National Grid are assessing the capability of batteries and look forward to reviewing the outcome. The role of batteries needs to be considered in the regulatory framework to enable batteries to participate fully in markets or tenders for services recognising their specific characteristics.

[4] DECC independent panel of experts

- Demand Side Response (DSR); it is not known how much of a contribution will come from DSR in the event of a stress event and it will take months of analysis until we know whether individual sites actually contributed or not. DSR is currently benefitting from some latitude in the market arrangements as an emerging source. The regulatory framework needs to ensure that DSR provides equal confidence and transparency to the market once it is fully established in both the capacity market and flexibility markets. It is also important to distinguish between true demand reduction compared to on site generation behind the meter, which currently is subject to less stringent environmental standards than larger generation plant.

- Market transparency; distinction in the regulatory arrangements between large generation plant that is connected to the transmission system and smaller distribution connected plant is becoming increasingly artificial under the energy transition. Whilst it is important to retain cost reflective network charging arrangements, the ability to offer flexibility services to different buyers should rely on a consistent set of requirements in terms of information to the market. The price, volume and location of each instructed MW should be visible to all market participants irrespective of size, technology and network that they are connected to. It is therefore important to ensure that market rules are applied consistently going forward to deliver effective competition and achieve the lowest cost energy system.

- Emissions standards; air quality standards are extremely important and should apply to ensure that the country invests in the cleanest available technology first. The robust application of Industrial Emissions Directive and BREF[5] improves air quality.

  It is important that new, replacement generation is cleaner. However, current market distortions have led to the growth of small-scale reciprocating engines. The NO_X intensity of a reciprocating engine fuelled with diesel or biodiesel is almost three times that of a coal fired power station with SCR technology, and the CO_2 intensity of a CCGT is 40% less than that of a diesel reciprocating engine, yet small scale new build is not subject to an Emissions Performance Standard.

  Applying environmental standards consistently not only addresses air quality issues but also some of the current market distortions impacting the capacity auctions.

29. *How can the Government, business and researchers work together to develop the competitive opportunities from innovation in energy and our existing industrial strengths?*

Uniper supports the proposal to foster and support innovative technologies, both as a means to facilitate a clean, affordable energy transition, but also as an opportunity for industrial growth and to develop export potential. We would like to see the comparative merits of different approaches explored through further research, development and demonstration.

[5] The IED sets the framework for the regulation of emissions from industrial plant across Europe, requiring the use of Best Available Techniques (BAT) to minimise the impact on the environment and setting “backstop” emission limit values which should not be exceeded under any circumstance. BAT standards are set for plant in the European BAT Reference Document (known as the BREF).

The support of battery deployment is positive and this is a technology we are trialling ourselves, but support should also be extended to other promising storage technologies. The same goal of storing “wrong time” electricity generation from renewables for later use could be achieved using Power to gas technology such as that being demonstrated by Uniper at Falkenhagen. Further to simply being a store of energy, this Power to Gas technology has the potential to produce hydrogen, opening up a range of further uses for power, transport or heat as well as chemical feed stocks for the chemical industry to support an industrial strategy in the UK.

Other opportunities include the use of liquefied natural gas (LNG) in transport, where it offers the potential to greatly reduce emissions of particulate matter and NO_X beyond that of conventional diesel. This also has the advantage of making best use of existing investments in UK infrastructure such the Isle of Grain, Dragon, and Pembroke LNG terminals. LNG can also be a bridging fuel to hydrogen, should Power to Gas technology achieve broad deployment.

In general, to support demonstration and early phase deployment, funding needs to be made available to lower the barrier for entry of new techniques. As the process of taking a novel technology to deployment can be lengthy, the need for patient capital is high, especially for capital intensive activities – such as hydrogen networks, or LNG infrastructure.