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**Response to: Coal generation in Great Britain. The pathway to a low-carbon future: consultation document**  
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## Uniper

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. 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.

### Ratcliffe-on-Soar

Our generation assets include Ratcliffe-on-Soar, the only coal-fired power station in the country equipped with Selective Catalytic Reduction (SCR) technology - able to reduce the emissions of oxides of nitrogen (NO<sub>x</sub>) by 80% compared to 2008 levels.

Our £750m investment made over the period 2008 to 2014 means that Ratcliffe power station is flexible, reliable and capable of operating into the late 2020s compliant with current environmental standards. It has a capacity of 2,000MW and can power over 2 million homes.

Our investment at Ratcliffe was made within a policy of maintaining security of supply at a competitive cost to allow a managed transition to a low carbon economy. It was made against the backdrop of closures under the Large Combustion Plant Directive and a belief that investment to extend the life and comply with the Industrial Emissions Directive make it best placed to continue to play an important role in meeting the energy challenge.

### **We are pleased to take part in the consultation process. Our views in summary:**

Existing unabated coal is already closing and the proposals in this consultation

- may, unintentionally, slow down the phase out, increase emissions and create a cliff edge;
- may unduly interfere with the legitimate commercial choices available to generation owners, ultimately causing avoidable loss to those owners; and
- fail to differentiate plant on environmental quality and service as well as cost.

We make an alternative proposal to apply existing environmental legislation, which

- can deliver progressive closure of coal plant by 2025;
- reduces emissions of NO<sub>x</sub> and CO<sub>2</sub> in the transition period via a mechanism based on existing policy levers; and



- provides a dependable insurance policy for security of supply.

#### Market context

Uniper supports the transition to a low carbon economy and the development of a regulatory framework to improve air quality standards.

Uniper agrees that the transition can only be delivered along with continued security of supply. Investor certainty for new build is bolstered by the ability to secure 15 year agreements in the four year ahead capacity market (CM) auctions.

CM outcomes (see figure 1) indicate that phased closure of coal across the 2020s is already underway and we believe it is highly likely to continue due to economics driving decisions on investment.

There is only 5.7GW (de-rated) of coal capacity with CM agreements beyond the 2019/20 delivery year, and as can be seen in figure 1, small-scale reciprocating engines will replace coal to some extent.

It is therefore important that environmental standards are applied consistently to these plants as well as coal. This will not only address air quality issues, but also some of the current market distortions impacting the capacity auctions, which would improve investor confidence in securing a 15 year capacity market agreement.

#### Assessment of government's options

Option 1 would be effective in closing existing coal units, but without other measures could inadvertently create a cliff edge effect and worsen emissions, by allowing the continued operation of remaining coal plant without having to meet additional Best Available Techniques (BAT) standards. This is because the application of a defined closure date provides sites with the opportunity to apply for further derogation from the Industrial Emissions Directive (IED) and BREF<sup>1</sup> standards, using a cost-benefit justification<sup>2</sup>; the expenditure required to meet these requirements with a shortened payback period, is likely to result in the cost being disproportionate to the environmental benefits. With that opportunity they are likely to operate all the way to 2025. This, similarly, applies to Option 2.

Option 2 redefines the Emissions Performance Standard (EPS) as an immediate performance standard so that it is not related to the long term nature of the environmental impact as a result of CO<sub>2</sub>. This would introduce a new measure for carbon emissions that would be technically difficult to achieve with regard to both monitoring and reporting, and applicable uniquely to only a small subset of coal plant – that existing today and remaining beyond 2025. It would also be incompatible with other standard systems such as the EU Emissions Trading System (EU ETS).

#### Uniper's proposal

Our proposal is that the measures for phasing out coal should draw a clear distinction between plants that have invested in SCR and those that have not. Coal plants that have invested in SCR are capable of delivering significantly better environmental performance, and the accompanying plant investment will mean that such plant are more reliable and flexible - therefore better placed to support the evolving energy market.

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<sup>1</sup> BAT standards are set for plant in the European BAT Reference Document (known as the BREF)

<sup>2</sup> Article 15.4 Directive 2010/75/EU on Industrial Emissions (Integrated Pollution Prevention and Control), Environment Agency Industrial Emissions Directive derogation cost-benefit analysis tool V6.12



This can be achieved via a robust application of existing IED and BREF mechanisms, to ensure progressive closure of coal, improve air quality and still provide a predictable back-stop to the operation of CO<sub>2</sub> unabated coal. Further details follow.

For plants taking the Limited Hours Derogation, our proposal is that they should be limited to no more than 1500 hours operation in any year. The Government should also refuse any application for derogations from BAT for such plant on the cost-benefit grounds set out above. The NO<sub>x</sub> limit for 1500 hour plant is specified in the BREF as a range (daily average NO<sub>x</sub> limit of 85-340 mg/Nm<sup>3</sup>), and the emission limit could be progressively reduced over time within the range to finally close out any remaining coal. Our proposal is detailed in the Appendix and we would be happy to discuss further.

Using these air quality emissions standards and the IED as a tool to progressively close coal would ensure that NO<sub>x</sub> emissions are reduced over the transition period. The closure of those plants would also necessarily reduce CO<sub>2</sub> emissions from coal plant over that period.

It is important that environmental standards are applied consistently across technologies e.g. equivalent environmental standards ought to be applied to the small scale reciprocating engines (recips) that will replace coal to some extent. This will ensure coal is replaced with cleaner generation and facilitates investment in new build plant which delivers a reduction in UK emissions and would therefore also contribute to meeting international agreements, such as the Gothenburg Protocol<sup>3</sup> and the National Emissions Ceiling Directive (NECD).

#### Ensuring security of supply

In the consultation document, government notes that the CM to date has not brought forward any significant base load new build capacity. Ensuring that capacity is available via the CM will not be achieved by mandating closure of existing base load capable plants. Unless market distortions favouring peaking plant are addressed, mandated closure over the the period where a number of base load generating plant (gas and nuclear as well as coal) are reaching the end of their technical life is more likely to add to any security of supply risk.

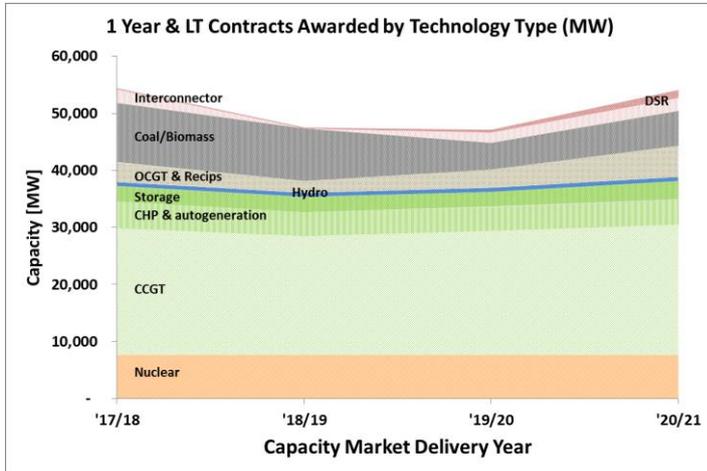
Government needs to be confident that less polluting and adequate new build will be in place so that security of supply is maintained. Keeping an option to have some coal plant available if it is needed provides an insurance policy should new build not be operational as quickly as envisaged.

Allowing temporary suspension of the coal closure date would be consistent with the provisions in the Energy Act 2013, which includes powers for the Secretary of State to suspend the EPS requirements if there is an electricity shortfall or significant risk of an electricity shortfall. A suspension decision would need to be taken with sufficient notice to ensure that existing coal plant is still available should it be needed. It may be appropriate for the Secretary of State to have the ability to call an extraordinary capacity market (CM) auction in the event that a capacity shortfall is foreseen.

In the case that it is needed, only coal that can be relied upon to deliver whilst also meeting existing environmental standards should be able to temporarily fill the gap. Our £750m investment means Ratcliffe is reliable, flexible and is able to meet high environmental standards.

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<sup>3</sup> <http://www.unece.org/environmental-policy/conventions/envlrapwelcome/guidance-documents-and-other-methodological-materials/gothenburg-protocol.html>



	'17/18	'18/19	'19/20	'20/21
CCGT	41%	43%	46%	42%
CHP & autogeneration	8%	9%	9%	8%
Coal/Biomass	19%	19%	10%	11%
DSR	0%	0%	1%	3%
Hydro	1%	1%	1%	1%
Nuclear	14%	17%	16%	15%
OCGT & Recips	6%	4%	7%	10%
Storage	5%	6%	6%	6%
Interconnector	4%	0%	4%	4%
Energy from Waste	0%	0%	0%	0%
Total	100%	100%	100%	100%

Figure 1: Capacity market outcomes indicate that a phased closure of coal is already underway, and that it is being replaced by peaking plant (OCGT & Recips)

## Response to Consultation Questions

1. Do you have any views and evidence on the options outlined above, including on relative benefits and risks? Are the principles above a sound basis for designing a regulatory approach?

*With reference to the Impact Assessment published alongside this consultation, do you have any views and evidence on the impact of these proposals? Are there alternative approaches that meet the objectives of closing unabated coal generation?*

*Under option 1, do you have any views on the proportion of generation capacity on which CCS demonstration should be mandated?*

*Do you have any evidence or analysis on the impact of these proposals on the likelihood of generators moving to higher levels of biomass co-firing?*

*Might there be any unintended consequences for other forms of generation? Are there better alternatives, and if so, why? If so, do you have any evidence to support your suggestions?*

*Do you have any views or suggestions on the date in 2025 from which the proposed obligations should take effect?*

### Option 1

It should be noted that, the UK government's own Electricity Market Reform consultation<sup>4</sup> concluded (paragraph 89) that retrospective application of the EPS to existing plant would have 'a significant negative impact on the attractiveness of the UK as a place for investment in the electricity sector', and application to existing plant was rejected. Option 1 reverses that decision.

<sup>4</sup> Electricity Market Reform Consultation, December 2010.  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/42636/1041-electricity-market-reform-condoc.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/42636/1041-electricity-market-reform-condoc.pdf)



It is widely understood that it is not economically viable to install technology to enable Carbon Capture and Storage without government support, and that social acceptance of carbon transport and storage would require that government indicates consistently its support at national and local level. The need for transport and storage infrastructure prohibits option 1 for some generators due to geographical location; whereas for new build the requirement for CCS becomes a consideration in the project development phase. More to the point, the lack of support for CCS infrastructure prohibits option 1 even where geographical location is suitable.

For these reasons, option 1 would be effective in closing existing coal units in 2025 but could be seen as disproportionate and expropriation, given the long-standing legislative and policy context under the LCPD and the IED, based on which generators like Uniper have made significant strategic investment decisions.

Nevertheless, we support the aim to phase out unabated coal as part of the transition to a cleaner energy system, and provided that existing environmental standards are applied consistently, a progressive close of coal, as set out in our proposal.

#### Option 2

Option 2 redefines the EPS so that it is no longer related to the nature of the environmental impact from CO<sub>2</sub>. The annual approach specified in the Energy Act 2013 reflects the long-term nature of the related environmental impact (global warming and climate change), and aligns with current regulation of CO<sub>2</sub> emissions under the EU ETS. In contrast, short-term emission limits are only applied when there are immediate impacts on local air quality. Option 2 reverses the decision not to apply EPS to existing plant, and goes further than Option 1 by changing an already established EPS measurement.

The proposal to apply EPS as a concentration-based limit on emissions per unit of generated electricity at any point in time creates a new and challenging way of measuring and verifying emissions. The proposal would introduce a new measure for carbon emissions that would be technically difficult to achieve with regards to both monitoring and reporting, and would be applicable uniquely to only a small subset of coal plant – that existing today and remaining beyond 2025. Such a deviation from existing standards and measurement that can only be met with significant infrastructure changes (e.g. biomass or gas co-firing), if at all, could also be considered expropriation.

We have serious reservations about whether it would be technically feasible for regulatory authorities to robustly enforce Option 2. The modified EPS is proposed as an instantaneous concentration-based emission intensity in gCO<sub>2</sub>/kWh. This would require monitoring of an instantaneous emission rate of CO<sub>2</sub>, in g/s, in addition to instantaneous power output. Operators would have to install additional instrumentation, which would also require calibration using third party accredited test laboratories.

This monitoring approach would be completely different than the approach currently mandated by the EU Emissions Trading Scheme (EU ETS) which uses a long-term mass balance approach, as it provides a more accurate and reliable quantification of coal plant CO<sub>2</sub> emissions than continuous emission monitoring.

Periods of start-up and shut-down would have to be excluded from compliance with the modified EPS, as there is no exported electricity during these periods. During low load operation, the plant output would be very low relative to the fuel consumption, so the CO<sub>2</sub> intensity would be very high. If plants were unable to achieve compliance at low load, this would provide a perverse incentive to operate coal plant at higher load.

Operators might seek to achieve compliance by co-firing a mixture of biomass and coal in the same boiler, since biomass is considered to be zero-rated with respect to CO<sub>2</sub> emissions. In reality,

combustion of biomass physically results in CO<sub>2</sub> emissions which are indistinguishable by any continuous emissions monitoring equipment from the CO<sub>2</sub> emissions arising from coal combustion. The CO<sub>2</sub> emissions from biomass would somehow need to be subtracted from the total CO<sub>2</sub> measured emission. It is difficult to imagine how this could be done in a rigorous and legally enforceable manner.

In addition, implementation of Option 2 may be incompatible with Article 9.1 of the IED which states: “where emissions of a greenhouse gas from an installation are specified in Annex I to Directive 2003/87/EC (the EU ETS Directive) in relation to an activity carried out in that installation, the permit shall not include an emission limit value for direct emissions of that gas...”. The intent of this clause is to prevent double regulation of CO<sub>2</sub> emissions from an installation covered by both IED and EU ETS. As a minimum, BEIS should lay out how it considers the imposition of an instantaneous EPS to be legally compatible with this clause.

If an instantaneous EPS were to be implemented and resulted in the reduced emissions of CO<sub>2</sub>, this could impact on the efficient functioning of the EU ETS. In this scenario, the correct course of action would be for UK government to purchase a matching number of emissions allowances (EUAs) from the emissions trading market and cancel them.

#### Why option 1 or 2 will not meet government’s objectives

Options 1 and 2 proposed in the consultation document give a fixed end to unabated coal generation in the UK, but without other measures could inadvertently create a cliff edge effect and worsen emissions.

Introducing either of the two options could potentially increase emissions by giving coal generators the ability to apply for further derogation from the IED and BREF standards, using the cost-benefit justification<sup>5</sup>; the expenditure required to meet these requirements with a shortened payback period, is likely to result in the cost being disproportionate to the environmental benefits. If plant is granted further derogations from IED and BREF then they are more likely to operate all the way through to 2025 – increasing the NO<sub>x</sub> and CO<sub>2</sub> emitted overall, and creating a cliff edge of closures in late 2025. This risks the UK’s ability to meet the mandatory emission ceiling set in the Gothenburg Protocol and NECD for 2020 and beyond.

In achieving the policy aim, it is important to treat all coal burn consistently, whether burnt in a dedicated unit or co-fired with other lower carbon fuels. Any EPS must be applied on a “unit by unit” basis in order to deliver the government’s intended outcome of eliminating emissions of CO<sub>2</sub> from unabated coal-fired power stations. Existing coal-fired power stations all operate multiple generating units which vent their exhaust gases through individual flues which are routed through a common concrete windshield or stack. A “common stack” approach would allow for the emissions from some units to be higher if they are balanced by lower emissions from others, provided overall compliance with the emission limit value at is achieved at the common point of discharge into the environment (i.e. the top of the stack). If the “common stack” approach were allowed, then a plant which has an equal number of dedicated biomass and coal-fired units would be able to continue to operate the coal-fired units indefinitely undermining the policy intent.

Option 2 may promote biomass and co-firing. It should be noted that this provides its own challenges for air quality beyond 2025. Biomass plant, converted from coal, has over three times the NO<sub>x</sub> intensity than CCGT plant and the NO<sub>x</sub> intensity of a coal to biomass conversion is greater than that of Ratcliffe coal fired power station with SCR technology (see figure 2).

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<sup>5</sup> Industrial Emissions Directive derogation Cost-benefit analysis tool V6.12

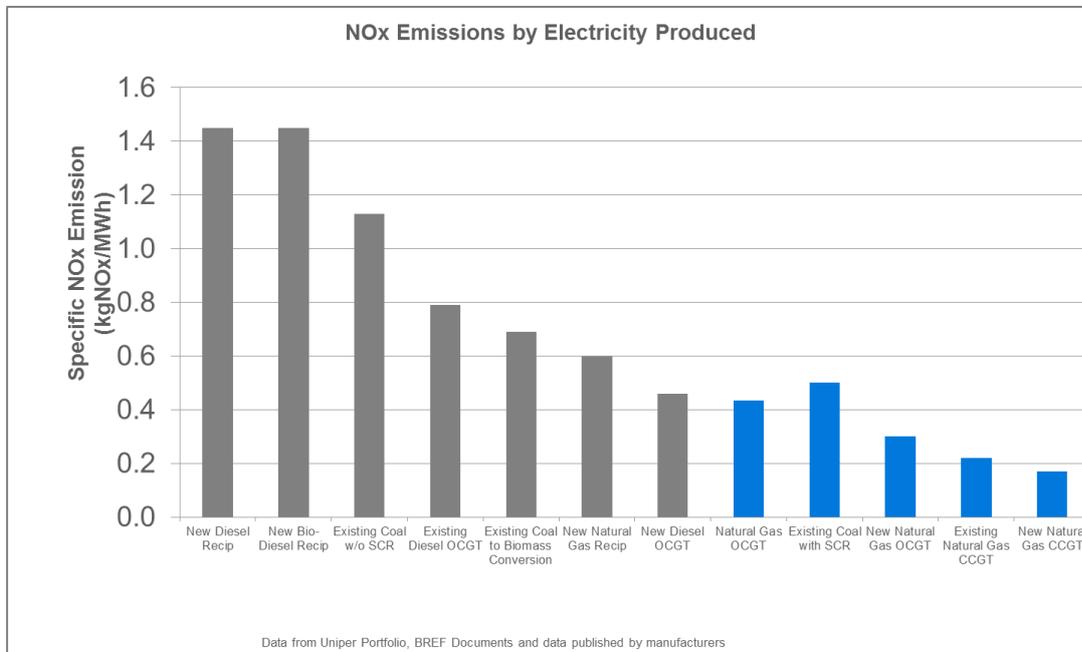


Figure 2: The NO<sub>x</sub> intensity of Ratcliffe is much lower than the diesel technologies which are replacing coal to some extent

Alternative approach

We support the aim to phase out CO<sub>2</sub> unabated coal as part of the transition to a cleaner energy system, and provided existing environmental standards are applied consistently a progressive close of coal can be achieved.

Our proposal is to achieve this via the robust application of existing IED and BREF mechanisms. This will ensure progressive closure of coal, improves air quality and provide a predictable back-stop to the operation of unabated coal. Our proposal would ensure that NO<sub>x</sub> and CO<sub>2</sub> emissions are reduced during the energy transition period, and that the current pace of phase out continues. Further detail on our proposal is set out in the Appendix.

As well as phasing out coal, it is equally important that replacement generation is cleaner. However, current market distortions have led to the growth of small-scale reciprocating engines. The NO<sub>x</sub> intensity of a reciprocating engine fuelled with diesel or biodiesel is almost three times that of a coal fired power station with SCR technology, as can be seen in figure 2. Setting aside the NO<sub>x</sub> intensity differences, the CO<sub>2</sub> intensity of a CCGT is 40% less than that of a diesel reciprocating engine, yet small scale new build is not subject to an EPS.

Applying environmental standards consistently to these plants as well as coal will not only address air quality issues but also some of the current market distortions impacting the capacity auctions, which would improve investor confidence in securing a 15 year capacity market agreement.

Our proposal is:

- plants taking the Limited Hours Derogation are limited to no more than 1500 hours operation in any calendar year;
- any application for derogations from BAT for such plant to be refused; and



- progressive reduction of the daily average NO<sub>x</sub> limit for 1500 hour plant (within the permitted range of 85-340 mg/Nm<sup>3</sup>) to bring about closure of all coal plant.

Our proposal is detailed in the Appendix and we would be happy to discuss further.

#### Specific close date

In terms of a specific date within 2025, if the proposal is to be taken forward, we would support implementation from 31 December 2025. This allows companies to take a decision based on the specific economics of their plant. Considerations will include: the commitment to fulfil a capacity market agreement out to the end September 2025; the Transmission Entry Capacity (TEC) year starting 1 April and cancellation notice periods; and the disconnection notice period under the CUSC rules (currently 6 months).

2. *Do you agree with the principle of establishing a constraint on coal generation in the years ahead of 2025?*

*Have you any views on how a constraint might be implemented, including on whether a constraint should be applied uniformly to each plant or across the fleet of generators, and any supporting evidence?*

*We would welcome views and supporting evidence on the level of constraint and time from which might it apply, including the impact on Capacity Market commitments.*

*Have you any views on the extent to which a constraint might affect coal plants' ability to participate in the Capacity Market?*

*Are there alternative ways of delivering the objective of phasing out coal generation by 2025 without negative impacts on the security of supply?*

#### Constraints in the interim years

Uniper does not believe that additional constraints are necessary or helpful in the interim years particularly as coal load factors are already low.

The issue of closure of aging plant is not unique to coal or to the period up to 2025. Around 19 GW has closed since the end of 2010 (as at end May 2016), across a number of technologies - oil, coal, CCGT and nuclear. A further 19 GW of plant is likely to close by the end of 2025, assuming no additional nuclear life-extensions, all coal closing, and gas plant reaching the end of its life.

The introduction of the capacity mechanism and the success of the first three T-4 auctions have given more certainty to investors than previously, with the December 2016 auction attracting the most new build to compete for 15 year agreements.

#### Capacity market outcomes

Uniper is of the view that there will be no impact on coal plant in the capacity market from application of further constraints. The more significant issue is with respect to new capacity coming forward to replace coal. There are a number of factors which are likely to have a much greater impact on the success for new build gas CCGT in securing a CM agreement, than constraining coal generation in the years ahead of 2025.



In the 2016 four year ahead capacity auctions, 15.3GW of new build participated of which 9.5GW is new build gas CCGT. This suggests that the CM as a technology neutral market mechanism is providing adequate notice to new build investors of probable plant closures and a phase out across technologies based on economics, without any need for further regulatory interventions to achieve a 'phase out'.

The outcome of the 2016 CM auction indicates that new batteries, Demand Side Response (DSR), reciprocating engines and OCGT plant all have a higher success than CCGT plant. This is due to a combination of factors including lower specific capital cost, and differences in income per unit due to derating factors (for instance peaking plant benefit from 5-7% higher CM income).

The CM auctions have been highly competitive which keeps the financial cost to consumers in check. However, market distortions, inconsistent environmental standards and market design (e.g. grid charging and procurement of ancillary services) potentially brings forward technology that is more polluting (diesel reciprocating engines) or provides non-comparable service (e.g. batteries and interconnectors versus gas CCGTs). We note the action underway to review embedded benefits (Ofgem) and proposals on reducing emissions from medium combustion plants and generators to improve air quality (Defra).

#### Progressive closure of coal

Our proposal, detailed in the Appendix, is the robust application of the requirements of IED and BREF - reducing the impact from coal fired generation.

As described in our answer to question 1, introducing either of the two options could potentially increase emissions by giving coal generators the ability to apply for further derogation from the IED and BREF standards, using the cost-benefit justification.

A constraint on coal, in addition to those imposed by application of existing environmental standards, in the years ahead of 2025 is not necessary.

3. *We would welcome comment on our proposals. What are the positive and negative aspects of the Secretary of State retaining powers to be able to temporarily suspend the closure date or constraint in previous years if he believes this is justified?*

*If such a measure were introduced how might it be best designed to minimise the impact on the investment climate for new capacity?*

*Does the assessment of future build rates summarised above and in the Impact Assessment published alongside this consultation represent a reasonable benchmark against which the closure of coal can be assessed?*

*With reference to the analysis set out in the Impact Assessment, what additional factors and evidence might we need to take account of to measure the impact on investment in replacement capacity?*

#### Powers to temporarily suspend the closure date

Allowing temporary suspension of the closure date would be consistent with the provisions in the Energy Act 2013, which includes powers for the Secretary of State to suspend the EPS requirements if there is an electricity shortfall or significant risk of an electricity shortfall.



Government, business and industry, need to be confident that adequate new build will be in place so that electricity supplies and system stability are maintained. Whilst we support the Capacity Market, where new build capacity agreements can be secured four years ahead, retaining an option to continue to have some coal available if it is needed provides an insurance policy. New build projects can suffer delays and set-backs; unexpected failures of existing assets of all technologies can happen; and forecasts can be far away from the outturn (for instance as a result of changes in demand, weather, economic growth).

The CM design acknowledges these factors. By retaining the option to purchase capacity one year ahead of delivery the CM design allows for refinement of demand forecasts and the need to purchase additional capacity where plant has defaulted on its agreement. Secondary trading allows for obligations to be met by available market participants rather than only the unit specified in the CM agreement.

Developers of new build are less exposed to penalties than existing plant, allowing for delays and delivery of less capacity than planned. CM rules allow new build to be delivered up to 2 years late (18 months plus 6 months appeal time) without having to pay a penalty; and if a new build project delivers a minimum 50% of capacity it loses income but does not have to pay a penalty. Treatment of unproven DSR is more generous with DSR CMUs able to reduce minimum delivery requirements to only 2MW up to 1 month before the start of the delivery year.

It is therefore important that the Secretary of State retains powers to ensure existing plant are able to mitigate non-delivery risks associated with replacement capacity.

#### Investor climate

We agree that intervention from government, particularly to reverse decisions already taken, increases the risk seen by investors from the regulatory framework. This consultation already proposes a significant intervention to mandate the closure of a specific technology which will add to the risk seen by investors in new build CCGT given the long term nature of the commitment. This risk, however, is to some extent mitigated by the ability to secure 15 year CM agreements.

Retaining suspension powers in the case of an electricity shortfall or significant risk of an electricity shortfall would be consistent with the approach taken in the Energy Act 2013 and would have negligible impact on investor confidence. Market certainty can be maintained by having defined, transparent criteria and a backstop date for the decision to be announced.

#### Criteria and timeframe for suspension

There needs to be defined and transparent criteria against which such a decision would be taken and a backstop date for the decision to be announced. The criteria should be linked to National Grid demand forecasts and margin assessments and should take into account any short-term capacity concerns beyond the T-4 CM auction period.

The timescale of any announcement would need to take account of lead times to ensure maintenance and outage schedules can be met and the necessary investment approved and made. It should also take account of TEC cancellation periods, and statutory employee consultation periods.

It should be noted that suspending the obligations would not guarantee that coal is still available to operate.

A review of the obligation could take place as part of the process to set parameters for the four year ahead capacity auction early in 2021 for delivery year 2025/26 – at this stage an assessment of the required new build against construction pipeline limitations would give an indication of risk.



The year ahead auction for the 2025/26 delivery year would take place approximately 8 months before the delivery year with pre-qualification late summer 2024 alongside pre-qualification for the four year ahead auction. This may prove too late if there is a capacity shortfall; the lead-time means that only existing mothballed plant or new demand side technology could be available to provide this service.

It is unlikely that any coal plant operator coming to the end of their capacity market obligations would choose to bear the costs of mothballing on the basis of a potential opportunity in a future T-1 auction or a change in the 2025 closure policy. Mothballing incurs significant capital and site management costs as well as ongoing business rates liability. Without a high degree of certainty that these costs could be recovered a decision to close would be the only rational outcome. In addition to the costs and risks of returning to service, successful return to service is dependent on the ability to recruit staff into highly skilled jobs for a defined or uncertain period, and the availability of coal infrastructure to provide fuel.

The above suggests that contingency factored into the four year ahead auction – buying more – could mitigate security of supply risk during the period where a number of base-load and flexible generating plant (gas and nuclear as well as coal) are reaching the end of their technical life.

Consideration should also be given to the Secretary of State, alongside a temporary suspension of the closure date, having the powers to announce an extraordinary CM auction to take place two years ahead of the 2025/26 delivery year, or earlier year if a potential shortfall is identified sooner. The advantage of the additional year would give a longer period of notice and government may be more likely to be able to procure the capacity needed. It may be prudent for National Grid's capacity assessment to consider a two year time horizon in the event that the risk of a capacity shortfall is perceived.

*4. We would welcome views and supporting evidence on the wider impacts of regulating the closure of unabated coal by 2025, particularly where these are additional to what might be expected without this measure.*

Introducing either of the two options proposed could potentially increase emissions as it would enable operators to clear virtually any cost-benefit hurdles necessary to obtain derogations from BAT limits. Without this measure being introduced, the central projections in this consultation point to most coal plant closing in 2021-22. By introducing this measure, we believe the Government would be increasing the likelihood of this plant remaining open until 2025.

The infrastructure that supports coal generation (coal import terminals and rail/road capacity plus associated skilled labour) will naturally decline. It will be challenging to ensure that it does not decline more rapidly than the natural demand given the regular need for investment and the payback period. Once skills and infrastructure to deliver coal has been lost the UK would not be able to respond quickly to significant shocks such as a gas supply curtailment or a nuclear generation type fault, where base load capability is needed.

It should also be noted that as supply infrastructure is less heavily utilised, the marginal costs per tonne of coal delivered in the UK would also be expected to rise, this in turn will impact energy market or capacity prices. A consequence of this is that coal stations may close quicker than anticipated.

Given the current outlook for coal generation, the costs of stockpiling, and risks of coal being stranded, generators are unlikely to carry large stocks to manage extreme scenarios, such as disruption to gas supplies or unexpected nuclear type faults.



Larger licensed generating plant are obliged to have certain capability for frequency response and reactive power, to support stable operation of the electricity network. It will be essential that replacement and alternative providers can continue to reliably and cost effectively provide this capability.

## **Appendix: alternative proposal – robust application of IED**

Uniper believes that the government’s objectives of limiting the contribution of unabated coal plants to climate change can be achieved without introducing new legislation, as existing powers under the Industrial Emissions Directive (IED) provide sufficient controls to effectively deliver this outcome.

### Background

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 LCP BREF). A review of the BAT for LCP<sup>6</sup> has been in progress since 2011, with formal publication expected to take place this year.

The IED provides a number of flexibilities for combustion plant which the UK has widely adopted, in contrast to many other EU member states. This includes a UK Transitional National Plan (TNP), which allows for a managed transition from earlier emission limits set under the Large Combustion Plant Directive (LCPD) to the tighter backstop standards set in IED across the period 1<sup>st</sup> January 2016 to 30<sup>th</sup> June 2020. The UK has generally taken advantage of the points of interpretation in such a way as to maximise the flexibility available to operators.

At the end of the TNP period in June 2020, coal plants will have to:<sup>7</sup>

- Close if continued compliance with IED is not commercially viable;
- Achieve full compliance with the IED requirements in order to maintain the option of operating without restriction; or
- Limit operation to no more than 1500 hours per annum if full compliance with emissions performance requirements cannot be achieved.

The emissions performance benchmarks have been set on the basis that Selective Catalytic Reduction is BAT for limiting emissions of Oxides of Nitrogen (NO<sub>x</sub>) from coal plant. Only one coal plant in the UK, Uniper’s Ratcliffe-on-Soar power station, has invested in SCR technology to date so it is anticipated that all other remaining coal plant are most likely to adopt the 1500 hr Limited Hours Derogation (LHD).

This Limited Hours Derogation allows plants to continue to operate without making the significant investment in SCR, and while their income from the Energy Market would be limited by the number of operational hours available to generate, they are able to compete on the same basis as fully compliant coal plant in the Capacity Market. The capacity market framework therefore does not reward or penalise environmental performance. Given the anticipated load factors of coal plants by 2020 onwards, the CM is likely to deliver the majority of the income for these plants.

The BREF process that produces the BAT standards for large combustion plant has not yet been formally completed. Although there are no changes expected to BAT standards, there is an opportunity for the UK government to choose to apply the more challenging end of the BAT range.

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<sup>6</sup> Best Available Techniques (BAT) Reference Document for Large Combustion Plants, Final Draft June 2016

<sup>7</sup> Eggborough Power Station has taken the Limited Life Derogation available in IED and could theoretically continue operation until the end of 2023. Given that this is prior to the Government’s proposed closure date of 2025, it is not considered further in this analysis.

Air pollution is linked to the early deaths of around 40,000 people a year in the UK<sup>8</sup>. It also causes health problems, including heart and lung diseases and asthma. The UK currently exceeds the annual mean NO<sub>2</sub> objective across the majority (37 out of 43) of designated zones<sup>9</sup> and that recent government projections<sup>10</sup> submitted under the Gothenburg Protocol suggest that compliance with the 2020 NO<sub>x</sub> ceiling mandated under the recent National Emissions Ceiling Directive (NECD) revision, currently looks marginal. It is therefore important to prevent further upward pressure on NO<sub>x</sub> emissions.

### Proposal

Uniper believes that the government should draw a clear distinction between those coal plants that have invested in SCR and those that have not when formulating the mechanisms for delivering coal closure and implementing BAT into the UK. Coal plants that have invested in SCR are not only capable of delivering significantly better environmental performance, the accompanying plant investment will mean that such plants are more reliable and flexible, and therefore better placed to support the evolving energy market.

The controls which could be deployed to limit emissions from 1500 hour coal plant are as follows:

- 1) The 1500 hour constraint for existing coal plant in IED is shown below:

*Combustion plants using solid or liquid fuels with a total rated thermal input not exceeding 500 MW which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003, and which do not operate more than 1 500 operating hours per year as a rolling average over a period of 5 years, shall be subject to an emission limit value<sup>11</sup> for NO<sub>x</sub> of 450 mg/Nm<sup>3</sup>.*

We believe a strict interpretation of the 5-year rolling average provision ought to be taken to limit operation under this derogation, to the effect that until a 5 year period has elapsed, a rolling average has not been established and there could be no more than 1500 hrs operation by such plant in any year. We are aware that an interpretation document currently being used by Regulators allows for operation up to 2250 hrs in any 12 month period and therefore a change of approach would be required. However, a more significant change of approach is already being considered under Options 1 and 2. Also this approach may already be required by the BREF as detailed in point 3 below.

- 2) BAT standards require to be set set for both fully compliant and 1500 hour plant. However, Article 15(4) of the IED allows that “the competent authority may, in specific circumstances, set less strict emission values” including under the cost-benefit derogation referred to above. In order to deliver the policy objectives, we believe that no derogations from BAT standards should be allowed for 1500 hour coal plant.
- 3) The BREF establishes a range of expected emissions performance as BAT which allows regulators further flexibility in implementation. For existing (pre 2014) coal plant >300 MWth input not operating under the 1500 hour rule, BAT Associated Emission Limit (BAT-AELs) for NO<sub>x</sub> emissions to air from the combustion of coal are 65 – 150 mg / Nm<sup>3</sup> as a yearly average, and <85-200 mg / Nm<sup>3</sup> as a daily average.

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<sup>8</sup> Every breath we take: the life-long impact of air pollution. Report of a working party, February 2016, Royal College of Physicians.

<sup>9</sup> Air Pollution in the UK – 2015 compliance assessment summary. Defra, September 2016

<sup>10</sup> UK informative inventory report (1990-2014). Final version, March 2016. Wakeling et al, 2016 for Defra

<sup>11</sup> Annex V, part 1 (4), Directive 2010/75/EU on Industrial Emissions (integrated pollution prevention and control)

However for plants operating <1500 hour / year, the yearly limits do not apply and “for (plants) which SCR and / or SNCR is not applicable, the higher end of the daily range is 340 mg/Nm<sup>3</sup>”. A strict interpretation of the BREF by UK authorities provides a number of potential controls which can be deployed to limit the operation of coal plant that cannot achieve full compliance with IED and BAT limits, including:

- For any coal plant operating more than 1500 hour per year, the yearly average emission limits of 65-150 mg/Nm<sup>3</sup> should apply. This would effectively provide a hard limit of 1500 hours per year rather than the 5-year rolling average approach in IED. This instance, the ‘per year’ could be interpreted as meaning any given calendar year.
- That any operators unable to comply with the daily average emission limits should demonstrate that SCR and / or SNCR is not applicable to their plant (note the difference in wording between “applicable” and available”) before being allowed to request BAT being set at the higher end of the daily emission limit range at 340 mg / Nm<sup>3</sup>. The interpretation of “applicable” should reflect whether it is technically possible to install the technique and it should not be acceptable that cost-benefit calculations are used to argue against such improvements when, in reality, such arguments reflect a conscious decision by Operators not to invest in these techniques during the TNP period. SCR is widely installed across European coal plant and can therefore clearly be considered an applicable technique.

In addition to these initial tests, further restrictions on emissions limits could be set over time. Member States have the power to set BAT emission limits for particular plants or technology types within the BAT range. These powers are widely used in other EU member states to deliver overarching environmental obligations such as compliance with the NECD and the Gothenburg Protocol. For coal plants taking the 1500 hour Limited Hours Derogation, there is a wide range of NO<sub>x</sub> performance that could be determined as BAT (daily average NO<sub>x</sub> of 85 – 340 mg / Nm<sup>3</sup>). Regulators could either require a change in performance at a specific point of time (e.g. 2025) that has been clearly signalled in advance or implement a staged reduction in the permitted emission limit within this range over a period of time.

As long as the government sets out a clear framework, the NO<sub>x</sub> emission limits could then be applied to the point where all coal plant closes.

This proposal gives government the control over the pace of closure, considering mitigation of security of supply risks, and keeps the cleanest and reliable coal units available longest.