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Dear Sirs

National Grid Response to the European Commission's Consultative Communication on the Future of Carbon Capture and Storage in Europe

This consultation response is from National Grid's European Business Development division ("National Grid") which is actively engaged in the demonstration and commercial deployment of CCS.

National Grid's interests in CCS have focused to date on, in particular, the development of a multi-user, carbon dioxide transportation and storage system located in the Humber region of the North-East of England and the southern sector of the North Sea. We are a partner in the Don Valley Power Project which is based in the Humber region and which has benefited from the allocation of funding from the European Energy Programme for Recovery ('EEPR'). Industry and power generation in the Humber region emits approximately 60 million tonnes of CO₂ per year, and the proposed pipeline has been designed to capture significant economies of scale, thereby reducing both the cost and risk of incrementally connecting additional emitters. We are keen to encourage and work with other potential users.

The Conclusions of the European Council meeting of 22nd May 2013 state that it remains crucial to further intensify the diversification of Europe's energy supply and develop indigenous energy resources. Over 50% of the EEA's gas is produced domestically, as is almost 75% of the coal used in the EU. The EU has also set itself a greenhouse gas emission reduction target of 80% by 2050. Currently, CCS is the only available technology with the potential to enable the EU to continue to enjoy the energy security and industrial and economic benefits provided by using and developing its indigenous fossil fuels whilst also significantly reducing the carbon dioxide emissions from their use.

Therefore, if the EU is to continue to benefit from its own fossil resources, enabling it to retain and develop those industries which depend upon fossil fuels, and maintain affordable, secure electricity supplies whilst still progressing towards its greenhouse gas emission reduction targets, it is essential that support for the development, demonstration and deployment of commercial-scale CCS continues and, if necessary, is increased.

The EU has already demonstrated a high degree of commitment to, and support for, CCS which has been vital in nurturing its development to date. Nevertheless, as is observed in the Communication, CCS has not taken off in Europe in the manner in which it had been hoped and, going forward, "no action" is not an option. We hope that our responses to the consultation questions below will assist the EU in continuing and developing its support for this vital technology.

Executive Summary:

Blockers to CCS development include: uncertainty around funding arrangements, technological and commercial risks, revenue streams, storage liability, project-on-project risks, and public acceptance.

Measures such as MS decarbonisation "road maps", and a 2030 policy framework would be helpful in developing a policy and regulatory environment conducive to the development and deployment of CCS.

The EU ETS should remain the mechanism for driving industrial and electricity decarbonisation in the EU. However, until the EU ETS has been restructured to deliver a more investable carbon price for the medium/long term, a CCS-specific augmentation or a supplementary system focused on supporting CCS should be introduced.

Such a system to support CCS would need to fulfil a number of criteria, not least of which would be to reduce the considerable complexity in the policy and regulatory environment both for CCS and energy in general.

Funding could also be provided to help emitters gain access to the information they require regarding installation and operation of CO₂ disposal to reduce risks related to financial investment decision-making regarding CCS.

Better communication, information sharing and public engagement could help to engender public acceptance of the technology.

Responses to Consultation Questions:

- 1) *Should Member States that currently have a high share of coal and gas in their energy mix as well as in industrial processes, and that have not yet done so, be required to:*
 - a. *develop a clear roadmap on how to restructure their electricity generation sector towards non-carbon emitting fuels (nuclear or renewables) by 2050,*
 - b. *develop a national strategy to prepare for the deployment of CCS technology.*

It is our view that all Member States (MSs) should be required to develop decarbonisation roadmaps, not just those deemed to have a "high share of coal and gas". The roadmaps should include, as well as details of intentions with regard to the restructuring of electricity generation towards non-carbon emitting sources, details of intentions with regard to the demonstration and deployment of CCS. In particular, details of the location, scale and programmes of potential CCS projects as well as an indication of the price at which a service to take and dispose of CO₂ in another MS would make investment in the particular CCS project viable.

Asking MSs to undertake this decarbonisation analysis will respect their right to determine their own energy mix but will enable them to understand the relevance of CCS (and any other technologies) to their specific circumstances. The collation of these national plans will then present a view of decarbonisation in the EU as a whole, and better enable the understanding of the requirements for cross-European CCS infrastructure development.

It would be useful if plans were not "generic" and highlighted the ease (or difficulty) of implementing CCS in a given MS, so that other MSs could understand the relative applicability of CCS in their system. This would enable policymakers and the industry to assess where best to allocate development time and capital. For example, the Humber Estuary is a huge "cluster" close to the Southern North Sea, as is Rotterdam. MS plans should highlight such regional/EU opportunities, enabling greater objectivity at EU level.

Furthermore, to enable more evolutionary policy-making for the period post-2020, the 2050 target needs to be supplemented with nearer-term frameworks and milestones e.g. policy measures for 2030.

It should be recognised that the development of working CCS demonstration plants, even if that is initially in just one or two MSs, is likely to be of significant benefit in understanding and further developing the support and incentive mechanisms likely to enable wider-scale European CCS deployment.

2) *How should the ETS be re-structured, so that it could also provide meaningful incentives for CCS deployment? Should this be complemented by using instruments based on auctioning revenues, similar to NER300?*

We support the cap-and-trade approach and think that the EU ETS should remain the mechanism for electricity and industrial decarbonisation in the EU.

However, the current low price of EUAs is clearly insufficient to drive investment in low-carbon plant and technology, so reform is urgently needed. Nevertheless, the recent lengthy discussions on even a relatively minor "back-loading" amendment to the scheme suggest that significant reform which affects all ETS participants, in order to engender a carbon price which is sufficient and robust enough to drive investment in CCS in the short term, will not be forthcoming in the near future.

We believe that a more CCS-targeted proposition, underpinning and operating within the existing ETS scheme, would be viable and may prove to be more successful. Suggestions with regard to the potential structure of such a scheme are given in our answer to question 3 below.

Since, to date, no NER300 funds have been awarded to CCS projects, this could be cause for significant doubts as to the ability of a similar mechanism to deliver sufficient funding for CCS. The NER300 approach is one which provides a fixed maximum quantum of funding, the receipt of which is contingent upon operational performance. As such, it leaves the project developer with all construction and availability risk but does not provide sufficient confidence that the revenue stream required will be available for the period necessary to make their project commercially viable. This means that the investment case for the project is not improved by as much as might at first appear to be the case. Capital grants (e.g. if NER money was payable at the point of Financial Investment Decision (FID)) would be more beneficial in enabling schemes to achieve sanction.

It would be preferable if EU financial support and policy measures could ensure that the most economic CCS schemes were pursued. In the short term this may be the least cost per unit, but in the longer term it would involve the ability to deploy CCS more extensively and cheaply via shared pipelines and stores. A pan-European trading/ticket/certificate system could ensure that the best schemes receive investment but the abatement credits go to the investing MS/player that committed (first). To isolate investment in each MS would restrict the speed and efficiency of deployment which will lead to a) higher bills to consumers, and b) fewer tonnes of CO₂ abatement per Euro of subsidy.

Any policy mechanism to promote CCS deployment in Europe (and beyond) will need to deliver a number of outcomes, which will be covered further in Question 3 below.

3) *Should the Commission propose other means of support or consider other policy measures to pave the road towards early deployment, by:*

- a. *support through auctioning recycling or other funding approaches*
- b. *an Emission Performance Standard*
- c. *a CCS certificate system*
- d. *another type of policy measure*

The consultative communication rightly notes that "business-as-usual" is not an option, and so we would welcome the Commission producing a new policy instrument to incentivise the development of CCS projects.

Any new mechanism to support CCS would need to achieve the following:

- Create a robust and predictable revenue stream ensuring that the developer(s) can recover capital and operating expenditure and achieve an appropriate rate of return which reflects the commercial and technical risks associated with new technology (or scaling up existing technology)
- Recognises the right of individual MSs to determine their own energy mix, but encourages development of a supportive regulatory and incentive environment for CCS where it meets national circumstances
- Should begin to move away from resource-intensive "competitions" which have been helpful in "kick-starting" the industry but which are costly to participate in and do not provide the enduring investment environment necessary to attract further investors and a competitive supply chain; these schemes seem to have been more focused on competition policy and less on ensuring speedy adoption of CCS (which would in itself enable more competition in the near/mid term)
- Policy should recognise and appropriately reward early investors in CCS to reflect the larger commercial and technical risks of these projects
- State Aid should be granted with a bias for approval rather than rejection until the industry reaches a pre-determined level of maturity (e.g. a certain MW capacity installed)
- Early projects could be developed on a "no regrets" or "least regrets" basis i.e. developers should not be penalised for being the first mover in the event that the technology underperforms.
- The support should not detract from (and if possible should augment) the EU ETS, which we regard as the best instrument to drive long-term decarbonisation in the EU
- Collaboration should be encouraged as it helps risk-sharing and knowledge sharing
- It should seek to incentivise investment rather than punish non-investment

There are a number of policy reviews and initiatives, both ongoing and planned, in the areas of energy and climate change in the EU. These include the EC's proposed guidance package on renewable energy support schemes, capacity mechanisms and barriers to intergovernmental agreements; the ongoing discussions over the future of the EU ETS; the own-initiative report on CCS by the European Parliament's ENVI Committee; discussions on the post-2020 framework; and the forthcoming review of the CCS Directive.

A major barrier to the development of CCS (or any large infrastructure project) is complexity (real or perceived) in the regulatory and legislative environment. Early projects need to be protected from later changes – this will avoid first-movers hesitating over investment decisions if they fear ex-post economic regulatory impositions.

Such a large amount of policy activity raises the risk of creating further complexity, but also presents opportunities for simplification and rationalisation.

It is our view that, of the policies presented in the Communication, the concepts behind the CCS certificate system may prove suitable to meet the specified aims. Alternatively, an augmentation of the EU ETS targeted specifically towards CCS may prove a possible option. A short précis of how two such schemes might work is given below.

Low Carbon Certificates

In order to reduce complexity by rationalising the number of support/trading mechanisms, a combined "low carbon" market for tradeable certificates, similar to the Renewable Obligation Certificate (ROC) system which have been introduced in a number of MSs, could be developed. CCS, Renewable

Energy Source (RES) and other low-carbon generators would issue certificates for the energy they produce, and energy suppliers (or MSs) would be able to trade these where they were unable to develop generation capacity in their own country. As the number of "low carbon" certificates increased, the number of EU ETS certificates would need to be proportionately reduced in order to push the EUA price towards "investable" levels, creating a bias to invest in low carbon technologies.

This proposal would, of course, have a number of issues which would need consideration. For example, any proposed future framework for RES targets would need to be extended to become "Low Carbon Energy" targets. There would also need to be an age limit for eligible participating plant to ensure that the scheme incentivised investment in new infrastructure, rather than providing windfalls for older plants.

However, the advantages of a pan-EU tradeable obligation ensures that only those MSs that wish to deploy CCS or RES (or any other low carbon technology) would need to, leaving those MSs without the resources or wish to deploy a particular technology with the ability to choose other decarbonisation approaches, thus ensuring MS sovereignty in the determination of its energy mix. Furthermore it will also help to incentivise MSs who have not considered CCS to reconsider this as an option.

ETS Augmentation

Alternatively, the aims of the suggested Low Carbon Certificate scheme could be achieved at lower cost by including a targeted CCS support mechanism within the existing EU ETS scheme. This could involve, for example, applying a multiplication factor (say, 110%) to selected emitters' EUA submission requirements (the "CCS multiplication factor"). The emitter would then be required to submit 1.1 EUAs (instead of the usual 1) per tonne of CO₂ emitted. The additional revenue from the CCS multiplication factor would then be used to establish a CCS support fund to finance CCS projects. This scheme would have the advantage of being cheaper to set up and administer than a dedicated, stand-alone scheme, and the additional demand for EUAs would bolster the carbon price generally. This, *inter alia*, should minimise any potential loss of revenue to MSs associated with the transfer of revenues to the CCS support fund.

When considering other policy measures generally, a useful practical step to assist CCS developers and MSs that wish to support CCS, by providing certainty with regard to what methods are legitimate, would be to clarify the community guidance on the use of State aid for CCS projects.

Finally, it is our view that EU policy measures aimed at supporting the development of CCS would be more effective if some funding were targeted differently. Such measures have, to date, generally been aimed at supporting the development of isolated, full-chain, CCS projects with the funding support revenue stream being fed into the chain via the emitter. This has led to a low propensity on the part of developers of nascent projects (who are also emitters) to seek to work collaboratively with other emitters in their region in order to capture the economies of scale associated with the sharing of CO₂ transportation and storage infrastructure. This state of affairs militates against both the success of the primary project as well as the potential for other projects to stem from it by sharing infrastructure. To see wide-scale deployment we need stimuli to be open to a wider range of parties, including, for example, "part-chain" projects.

Funding provided via a transportation and storage infrastructure developer, which was used to subsidise the cost of multi-user CO₂ disposal and secure economies of scale in the developed infrastructure, (coupled with a reduction in the uncertainty of capture plant Capex and Opex (as mentioned above)) would greatly increase the likelihood of the relevant CCS project receiving final investment decision.

- 4) *Should energy utilities henceforth be required to install CCS-ready equipment for all new investments (coal and potentially also gas) in order to facilitate the necessary CCS retrofit?*

Whilst forcing utilities to install CCS-ready equipment might be a possibility, it is our view that it is better to incentivise investment rather than punish non-investment. Mandatory inclusion of CCS-ready equipment might lead to power-plant investors looking outside the EU for less costly investment options (which, in turn, could lead to more MSs introducing generation capacity mechanisms as a response to concerns about security of supply).

A stable, long-term policy environment in which investors can see the benefit that investing in CCS (and other forms of low carbon technology), with minimal need to force mandatory requirements upon them, would be the preferable method to ensure that investment is brought forward whilst MS discretion over the ultimate energy mix is retained.

If this policy measure were to be adopted, it would be necessary for "CCS-Ready" measures to be meaningful. For example, new projects should be sited within a reasonable distance of appraised storage – to locate them at the "wrong" end of the MS (say 600km from storage) would mean that "CCS Ready" results in no actual implementation.

5) Should fossil fuel providers contribute to CCS demonstration and deployment through specific measures that ensure additional financing?

The development of CCS has wide-reaching benefits, and so support should come from a broader base as has been the case with energy from renewable sources through various support mechanisms.

There are substantial benefits to retaining fossil fuels in the EU energy mix, even as far out as 2050, and the contribution that they make to affordable and secure energy supplies is recognised, inter alia, in the consultative communication and in the conclusions of the Energy Council of 22nd May. Therefore there could be significant risk in pursuing a policy which could lead fossil-fuel providers to regard Europe as a market in which they were uncompetitive. An alternative might be a tax on certain categories of imported goods in order to avoid "carbon leakage".

6) What are the main obstacles to ensuring sufficient demonstration of CCS in the EU?

Generally, the obstacles are ones of uncertainty. Some, such as fuel price, carbon price and policy and regulatory change uncertainty are difficult to address. However, uncertainty with regard to the capital and operational expenditure associated with CCS could be more easily reduced. This area of uncertainty leads to high levels of contingency and risk premium being included in the business cases for CCS projects and this can only reduce the probability of those projects receiving investment sanction. The application of funding to provide ETS participants who might install CCS on their emitting plants with data regarding the cost of doing so should reduce the level of the contingencies and risk premiums applied.

Whilst emitters generally understand the cost to their business of emitting CO₂, both now and into the future, they do not have sufficiently accurate knowledge regarding the cost of installing and operating CO₂ capture equipment and procuring CO₂ disposal services which meets the requirements of the ETS scheme. Obtaining this data is prohibitively expensive for an emitter acting alone, but a scheme to pool funding from interested emitters across Europe and augment that capital with EU funding could help provide emitters with the generic information they require to make financial investment decisions with regard to CCS.

Transport and storage developers suffer from uncertainty surrounding their long-term revenue stream and the risk/liability regime surrounding storage. Also, onshore storage in particular faces a lack of public acceptance and support.

Another significant factor in early projects has been "project-on-project" risk – because no investor covers the whole CCS chain (capture – transport – storage), each project requires a number of investing parties. Each investor may be prepared to take on the risk of their own part of the project,

but they are unlikely to indemnify/underwrite other parts. Thus if one project member withdraws, the entire project is likely to fail and/or lose funding support. Allowing/incentivising "part-chain" projects would reduce this risk.

7) *How can public acceptance for CCS be increased?*

Ensuring that we have reliable, smart, modern infrastructure fit for 21st century is vital for the prosperity of Europe, national economies and for local communities.

It is important that there is a joined up approach, across the energy industry, across MS governments and across Europe, to communicate a clear, compelling, consistent energy strategy and narrative on the need for and benefits of investment in energy infrastructure, including CCS. This narrative needs to appeal to the public, consumers, energy industry and investors. It needs to better explain why significant investment is needed and the trade-offs that will need to be made in order to achieve a safe, secure, affordable and sustainable energy future.

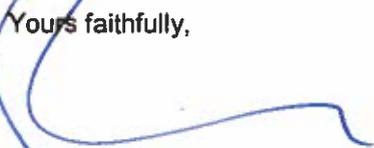
There is a tangible link between retention of existing industries, reindustrialisation, employment, global competitiveness, and continued use of indigenous fossil fuels in a low-carbon manner. A study carried out on behalf of the UK Government's Department for Energy and Climate Change by AEA Technology in 2010 estimated that CCS activity would sustain 70,000 - 100,000 jobs in the UK alone by 2030. These jobs will be distributed throughout the economy: including within the engineering and manufacturing sectors; chemical and process engineering; equipment manufacturing; pipeline design and construction; offshore exploration and many other specialist roles. The similar potential benefits for the EU as a whole have not been fully and clearly communicated.

National Grid has had good results to date with our public engagement programme on CCS. Our consenting work in the Humber region has seen us host 50+ public meetings (with more scheduled in the Autumn), and over 100,000 letters to local residents. The result has been similar to, or more positive than, other pipeline developments, so CCS does not necessarily need to be seen as having a public acceptance "problem" given a committed programme of public engagement. More promotion from public figures, along with a coordinated programme of information and communication of the benefits of the technology, the amount of R&D being undertaken, the safe, permanent nature of storage, and the progress of successful would go a long way to repairing the negative perception created by the current backdrop of failing/stalled projects.

Much of the negative perception of CCS relates to the storage element of the technology. The offshore storage site we are appraising in the Southern North Sea is reasonably close to emitters in other MS, meaning that cross-border projects could be a reality if EU support existed. Ratification of changes to the London Protocol, to allow cross-border transportation of CO₂, should be progressed as soon as possible.

Once again we thank the Commission for the opportunity to respond to this consultation and trust that it will assist in the continued development of this vital technology. If you would like to discuss this response, or any other aspect of our involvement in CCS, please contact my colleague, John Prime, in our Brussels office: john.prime@nationalgrid.com

Yours faithfully,



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