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European Commission's CCS Communication "The Future of Carbon Capture and Storage in Europe" Statoil's response to the Communication

CCS is an integrated part of the EU 2030 Energy and Climate Policy framework

Statoil believes that EU energy and climate policies must strike a balance between sustainability, competiveness and security of supply, taking into account the current economic situation, as well as the policies of Europe's major trading partners. It is therefore essential that CCS is fully integrated into a holistic Energy and Climate Policy framework for 2030.

Policy recommendations summary. A structural reform is required to improve the business case for CCS in Europe. Statoil recommends following actions be taken:

- Creation of a long-term financial incentive for low-carbon technologies via a structural reform of the EU ETS.
- Provision of interim measure(s) supporting CCS development that would not undermine the EU ETS and the European electricity market, and that would exist only until the EU ETS can provide the principal incentive.
- Revision of the regulatory framework in order to provide confidence for investments in CCS value chains.

CCS and Europe

Statoil welcomes the CCS Communication as an opportunity to reflect on the status of CCS in Europe and the measures required to safeguard CCS deployment. Statoil is

regarded as a front runner and a pioneer within CCS from gas well-streams. Our leading position has been developed mainly due to our operatorship of the Sleipner and Snøhvit gas fields in Norway and our engagement in the In Salah project in Algeria. The development of the Technology Centre Mongstad (TCM) and the on-going work on Carbon Capture Mongstad (CCM) has further confirmed Statoil's position within CCS.

We welcome the opportunity to assist with our experience and expertise. We would like to iterate that CCS is important for Europe because:

- CCS can provide and preserve jobs and improve economic growth through developing a European competitive advantage in low-carbon technologies and by minimising the risk of carbon leakage through applying CCS to industrial sectors.
- Fossil fuels are expected to be a leading energy source in many decades to come and therefore it is crucial that CCS is developed to reconcile this demand with the need to reduce greenhouse gas emissions.
- Without CCS in the carbon abatement toolkit the cost of reaching the 2050 ambitions will be higher.
- CCS would strengthen the security and diversity of European energy supply in the long term.

General comments to the CCS Communication

Before answering the specific questions raised in the Communication we would like to give feedback to the overall content of the document.

Cost competitiveness of CCS. Cost competitiveness for CCS is generally presented simplistically in terms of €/t of CO_2 avoided. This can be misleading in the comparison between different applications. The cost €/unit of production is often a better metric (e.g. €/MWh of low-carbon power delivered to the grid, when looking at the power sector, and €/ton of steel produced for the steel industry) and incentives should be redesigned accordingly. Compared on such a basis, figures indicate that CCS on gas power plants is competitive to CCS on coal power plants[1]. It should also be noted that

[1] The European Turbine Network produced a briefing Paper: The Potential of Gas and Carbon Capture and Storage in Meeting the EU's 2050 Energy Goals, which gives a detailed analysis for comparison of the cost of CCS on a gas fired power station vs. CCS on a coal fired power station based on the same power delivered to the grid. Based on this analysis both technologies are competitive to each other.

http://www.etn-gasturbine.eu/fileadmin/04_PUBLICATIONS/ETN_publications/The_Potential_of_Gas_and_CCS_-_December_2012.pdf

only half the amount of CO_2 per MWh from CCS gas power plants needs to be transported and stored, this will further decreasing costs and represents a great advantage when access to storage remains a scarce resource.

Europe cannot be decarbonised cost-effectively without CCS. CCS will complement the large-scale deployment of intermittent renewable energy sources (RES) and CCS has also several advantages when compared to RES when full costs and benefits are considered, including the value of reliability, and the impact on overall system costs of different technologies. In particular, commonly used figures on levelised costs of electricity from RES do not take into account the costs some of these energy sources impose on the system, e.g. costs for grid connection and back-up capacity. These costs are expected to increase as the share of RES in the energy mix grows. Unlike RES, the operation of fossil fuel power with CCS can also be adjusted according to demand, with no need for back-up.

The role of CCS in a competitive Europe. CCS is applicable to all combustion technologies used for power generation (gas, coal and biomass) and to a wide range of industrial processes. According to IEA studies, almost half of the CO_2 emission reductions available from CCS are from sources outside the power sector, and this should be reflected in CCS development policies. A large part of industrial emissions are directly related to the production process and cannot be mitigated by fuel switching, making CCS the only technical solution to reduce their emissions while keeping industry in Europe. Policies for the development of CCS (infrastructure) should be holistic and target all potential CCS applications, allowing development where it benefits economically the most. CCS on industrial emissions would preserve, and potentially even create, jobs and growth in this sector.

Projects combining CCS with EOR may represent an additional approach to help kick-start a wider deployment of CCS, but the potential for these projects in Europe is limited as they lack a strong economic case due to their cost/benefit ratio which differs significantly to the on-shore EOR projects outside Europe.

The way forward

Statoil agrees with the Commission's analysis of the development of CCS in Europe. Despite the progress in the regulatory framework and funding support for demonstration projects, not a single project has passed final investment decision in Europe. While several elements have led to this situation, three key points need to be emphasised:

1. **A long-term predictable financial incentive is necessary**. Statoil believes that the EU ETS should be the long-term driver of electricity and industrial sector decarbonisation. However, the current low carbon price fails to drive the necessary investment in low-carbon technology, necessitating additional funding

support for low-carbon technologies and a structural reform of the EU ETS. Because CCS is a fairly new technology, its large scale deployment will require the development of a whole new cluster of technology suppliers, infrastructure developers, technical service suppliers, storage suppliers, etc. Without a long-term predictable financial incentive this industrial cluster will not develop in Europe, costs will not be reduced and the few demonstration projects that might be realised might become stranded assets.

2. **Short-term measures for demonstration and early deployment are required**. Any reform of the EU ETS will take time to take effect and drive investment in CCS. Delivering CCS in Europe within the necessary timeframes requires the adoption of complementary short-term measures that can support this technology in the meantime.

   Such a support measures should be designed to limit any adverse impacts on the EU ETS and the European and Member States' electricity market. In addition the support that drives investment in all low-carbon technologies should be designed so that over time the principal incentive for investment transitions from the interim supporting measures and back to the EU ETS.

3. **The regulatory framework should be re-designed in order to create investor confidence**. The transposition of the CCS Directive has caused problems for projects in several Member States. The time schedules for a number of projects had to be adjusted due to delays in the transposition. These delays themselves have not led to cancellation of individual projects. However, the outcome of the transposition has led to cancellation of project(s) as individual Member States have introduced additional hurdles and show-stoppers which for all practical purposes paralyse CCS deployment.

   In addition, several legal concepts in the CCS Directive itself perceive CCS as a high-risk activity, and as a result, it imposes unreasonable and unnecessary burdens, uncertainties and risks on storage providers. Statoil believes a review of the CCS Directive should start as soon as possible.

There is strong interdependency between these three factors and they all need to be addressed if CCS is to be demonstrated and deployed at large scale in Europe.

Statoil's response to the 7 questions raised in the CCS Communication.

Question 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.**

A solid roadmap developed by Member States showing how they will reform their overall energy and climate policy by 2050 would improve the understanding of how to decarbonise their electricity and industrial sectors with a mixture of complementary low-carbon technologies, and the subsequent relevance of CCS to their national circumstances. We support roadmaps that are in principle technology neutral, as having a strategy for a specific low-carbon technology would indicate "winners and losers" prematurely. We believe winners should be determined by market principles. After all, the goal of the roadmap is to achieve a competitive low-carbon economy, not to develop CCS as such. For example fuel switching from coal to gas prior to CCS deployment may be a preferred pathway.

This exercise should, however, not be limited to Member States with a high share of coal and gas in their energy mix, but include all Member States. More and more Member States have highly interconnected energy markets and this should be reflected in the roadmaps. This is especially important where a Member State depends on balancing its energy production/demand via import or export.

The roadmap should not only focus on the overall balance between demand and supply, the technology mix must be flexible enough to cope with intraday swings.

The overall long term main driver should be the EU ETS set by a single GHG target but technologies need sufficient support to mature, therefore for the roadmap to have a signalling function there is need for additional national policies to be implemented by Member States in order to drive investment in the appropriate technology mix. Therefore the Member State must also outline the national strategy, policies and incentive structures that will deliver against the roadmap.

There is inevitable uncertainty over the mix of technologies that will most efficiently meet CO_2 reduction goals whilst retaining security of supply and cost-competitiveness in 2050 and the roadmaps will need to be indicative to some extent. To aid policy

decisions the 2050 ambitions need to be accompanied by nearer term milestone dates, e.g. 2030.

Question 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?

A robust and well-functioning EU ETS should be the central tool of the EU's climate policy. Action is needed to tackle the current structural oversupply and make the framework robust enough to minimise future political intervention. To this end, Statoil supports:

- Revision of emission cap and linear reduction factor. The EU ETS should be recalibrated to deliver a 40% overall GHG emission reduction in 2030, in line with the EU ambition to reduce emissions by 80-95% by 2050 and the trajectory identified in the Roadmap to a Low-Carbon Economy and the Energy Roadmap 2050.

- Supply side flexibility. Rigid supply of allowances under the EU ETS has prevented meaningful responses to demand shifts triggered by the economic crisis. Structural shifts are likely to occur in the future and therefore a mechanism to make supply of allowances more flexible is needed. Such a mechanism should have clear and transparent rules for its deployment so as to ensure low intervention frequency and undue political interference.

- Expansion to new sectors. The EU ETS should cover all sectors where its application is not excessively complex or where it is impractical for the emitter to be the regulated party. Statoil is favourable to an inclusion of road transport in the EU ETS conditional upon a review or repeal of existing regulations, such as the Fuel Quality Directive, biofuel targets and vehicle emission performance standards. Existing policy measures covering emissions in this sector would need careful review and amendment to avoid double regulation or additional costs, which could damage the economy.

- A robust EU ETS would generate significant revenues at disposal of Member States for fiscal consolidation, targeted spending or tax relief to boost competitiveness and growth, and/or support to the development of CCS and other immature low-carbon technologies.

In theory complementary instruments based on auctioning revenues could help to support CCS alongside a restructured EU ETS over the near to medium term. However, adopting an instrument that is "similar to the NER300" is not appropriate

given that this programme has not delivered what was originally intended. If any auctioning based instrument is to be successful then the implementing arrangements would need to be fundamentally restructured and not merely copy those of the NER300 programme. As an example, a new program should not select projects/assign funds on the basis of cost per CO_2 avoided but on the basis of cost of CO_2 per unit production (for power MWh).

Question 3)

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

a) **a support through auctioning recycle or other funding approaches**

b) **an Emission Performance Standard**

c) **a CCS certificate system**

d) **another type of policy measure**

Stimulating a European CCS supply chain must be an important deliverable of a European industry policy, in order to maximise the contribution that CCS can make to the green growth agenda, reducing the cost of CCS technology through the stimulation of supply chain competition and securing a European stake in the international CCS industry.

The design of any policy measure must ensure that the operator of a CCS plant has a high and certain level of dispatch into the grid.

Any interim measure supporting the deployment of CCS must adhere to the following criteria:

- An impact assessment should be carried out to, among other things, analyse the costs of the measures, the time it will take to “master it”, its impact on the EU ETS and other policies, its impact on the relevant stakeholders.
- It should not undermine the EU ETS and the European electricity market.
- Its existence should be limited in time and should be removed once the EU ETS can act as the principal incentive for investment in CCS and the technology has matured sufficient in order to compete on its own merits.
- Given its existence will be limited in time; it should not be a complex measure and should be relatively easy and quick to be established.

Auction based funding

Statoil would like to see the continuation of a scheme where the proceeds from the sale of the EU ETS allowances are used for funding of CCS demonstration plants. This scheme should be developed with the lessons learned from the NER300 first and second phase in mind, including:

- Redefinition of the reward criteria. Projects should be rewarded on their low-carbon production and not merely on the amount CO_2 avoided.
- Different distribution of the funding: the scheme should give a sufficient funding to fewer projects rather than a thin layer of funding too many projects.

An inherent and fundamental challenge to the use of auction revenues to support CCS is the lack of predictability of the future auctioning derived revenues that will be available to support a CCS deployment mechanism and therefore the outcome that the mechanism will deliver, e.g. total installed capacity of CCS. This creates particular challenges for the CCS supply chain which requires a high degree of predictability on policy outcomes if it is to make investments in delivering this technology. Statoil therefore encourages the EC to investigate possibilities to mitigate this risk for example by predetermining the financial magnitude of the fund whereas the number of EUA to be auctioned is being determined by the process.

Emission Performance Standard (EPS)

Statoil acknowledges the Commission's reference to an EPS as a policy instrument in order to facilitate both CCS deployment and further emission reductions in the power sector. We emphasise that EU ETS should be the long term driver for CCS. Therefore, Statoil believes that further studies and assessments need to be undertaken on the impact of an EPS as a measure for demonstration and early deployment in order to have a clear view on this. In particular care should be taken not to implement performance standards that would undermine the long term role of the EU ETS.

CCS certificate system

Statoil emphasises that introduction of any measures for demonstration and early deployment should be limited in time and should be removed once the EU ETS can act as the principal incentive for investment in CCS and the technology has matured sufficient in order to compete on its own merits. When considering CCS certificates, specific issues have to be addressed, such as the high transaction costs that would be incurred in setting up the system, while the market for a small volume could be open to competitive misbehaviour. Furthermore, investors still carry the main risk since forecasting of the price of the CCS certificate may be challenging; hence and the return on investments may fall due to low CCS certificate prices. In the certificate system, the power plant receives money only if it is actually operated – unless, under the CCSC

scheme, plants are guaranteed to be dispatched and operated for the planned operating regime.

Without satisfactory solutions on the issues addressed above, Statoil does not expect a CCS certificate system to generate investor confidence. We therefore do not expect that this will act as an impulse for investment.

Feed-in tariffs

Feed-in tariffs – or similar mechanism –are already applied to other low-carbon technologies and are being proposed in the UK for CCS. Statoil consider it prudent to take learning from the UK initiative and its experience with its Feed-in tariff scheme on CCS before we offer concrete advice on Feed-in tariffs schemes as a measure for demonstration and early deployment of CCS.

Question 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?

A strong signal showing there is a market rational for future instalment of CCS technology on fossil fuel power stations is the best guarantees for CCS-readiness. Legislation as we have today is a sign of weak climate policies. If there is confidence in a restructured ETS resulting in a EUA price which will make unabated fossil fuel power generation unattractive, companies will ensure that new power plants can be retrofitted with CCS to reduce the risk that new fossil-fuel assets are stranded in the future.

The CCS Directive already provides legislation for capture-readiness. It should be noted that there should be room for conventional power plants to not be required capture-readiness when these plants are planned to be operating as peak-shavers, with associated very low load-factors. It would seem an imposition and very expensive to ask CCS of such power plants.

Question 5)

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

Fossil fuel producers, suppliers and consumers all have strategic interests to see CCS developed on a commercial basis.

Fossil fuel producers, suppliers and large consumers will invest in CCS if adequate certainty regarding long-term policies and climate ambitions is provided. Mixed signals such as the lack of transposition of the CCS directive, ambiguity by some Member States regarding the 2050 process, the recent European Parliament vote on

“backloading” and – more generally – various U-turn in energy policy at the EU and national level increase political risk and are not conducive to private sector investment in CCS.

The establishment of an energy and climate framework for 2030 focused on simplification and market-based mechanisms as well as a rapid reform of the EU ETS must therefore be prerequisite to any development of CCS.

Question 6)

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

Statoil refers to the main statements of this reply. The business case for CCS needs to be in place in order to attract sufficient investors for this technology. We do not support the idea that focus to only one or two of the key areas will be sufficient to generate development at a level needed. It is vital that a comprehensive support package is developed for CCS, or Europe is at risk at undershooting its emission reduction target by far or be forced to meet it at a far greater cost than necessary.

Question 7)

How can public acceptance for CCS be increased?

The main resistance to CCS is based on lack of knowledge of what a fully developed CCS chain really implies in practice. Developing demonstration projects is therefore critical, and will show both what the technology can offer and that CO_2 transport and storage is safe. Such projects are valuable in demonstrating the benefits that CCS brings to the low-carbon portfolio.