

The European Commission's Consultative Communication on CCS

The Bellona Foundation's Response

Introduction

Bellona applauds the Commission's proposal to move beyond ETS and introduce new mechanisms to drive the deployment of CO₂ Capture and Storage (CCS). The EU's ability to decarbonize over the coming decades depends on clear and predictable incentives for the European energy and industrial sectors, but the carbon market in its current form will not bring about the timely innovation we need to cost-effectively achieve all the necessary emission reductions.

The Commission's call for far greater commitment from both national governments and industry actors is timely and justified. Many have failed to accept the necessity of CCS.

But it is clear that stakeholders are now looking to the Commission itself for the leadership on CCS that is badly needed at this moment. The Commission should be bold and propose an ambitious new policy framework for CCS that is fully integrated within the 2030 Climate and Energy Package.

The current suite of EU-level policies provides effective, targeted support to wind, solar, biomass, cogeneration and energy efficiency abatement opportunities – but not CCS. This makes CCS especially dependent on the EU Emissions Trading System (ETS) and the related NER300 scheme to drive its deployment.

However, because the CO₂ price in the EU has been much lower than anticipated, the current EU policy framework is not simply trying to pick winners but effectively picking CCS as a loser. Until an effective structural reform of the ETS can be realized, targeted support for CCS will be necessary.

CCS is essential for cost effective decarbonisation

Despite the urgent need to reduce CO₂ emissions, global fossil fuel use is on the increase and fossil fuels are forecast to continue to meet most of the world's energy needs to 2035. CCS can abate 90% of emissions from fossil fuel use and complement the large-scale deployment of intermittent renewable energy with low-carbon baseload and balancing power generation capacity.

Moreover, CCS is unique as a climate abatement tool because it is the sole technology able to decarbonise emissions-intensive industrial processes such as cement and steel production. CO₂ emissions result from many industrial processes, making CCS vital to achieving the EU 2050 roadmap goals of reducing industrial emissions by the necessary 83%-87% compared to 1990 levels by 2050. Its development will thus be crucial regardless of energy sourcing.

And when combined with biomass, CCS provides the only large scale route for net negative emissions. Biomass uptake has risen sharply in the EU over the last few years in response to the Union's renewable energy targets.

The cost of tackling climate change is moving up the political agenda. At this stage in the long-term transition to a low-carbon society, CCS may be able to cost-effectively deliver large amounts of CO₂ abatement and complement the large-scale deployment of intermittent renewable energy with dispatchable low-carbon generation. Enabling this will dramatically lower the cost of preventing catastrophic climate change. In fact, the IEA estimates that without CCS, the costs to halve emissions in the electricity sector by 2050 would rise by 40%.

Without a definitive and enduring EU policy shift, however, the Union will lag behind other regions in the world in the deployment of CCS, needlessly increasing the cost of decarbonisation to EU taxpayers and consumers.

What we need to do

In order to prevent further costly delay, Member States must step forward with CCS market incentive schemes at the national level to plug funding gaps created by the current lack of an effective EU policy framework for CCS until 2020.

From 2020 onwards, however, Bellona recommends a core EU CCS policy framework comprised of:

1. An overarching EU-wide CCS target;
2. A complementary EU CCS certificate scheme to help Member States achieve this target efficiently; and
3. A connected CCS fund to provide extra support to first movers and drive the development of shared projects and infrastructure of EU relevance.

It is essential that this policy framework be fully integrated into the EU's 2030 Climate and Energy Package, creating a level playing field for CCS so that it is able to compete with other technologies in the decarbonisation of the EU energy system.

Around this core policy framework, there are several other stand-alone actions that would greatly facilitate the deployment of CCS in the EU.

First off, EU legislation should be put in place to ensure privileged grid access for CCS electricity generation in the same way that priority grid access for renewable energy and cogeneration facilities is mandated by EU law. Such access is necessary to ensure investors in CCS that their plants will actually be run once they are built.

And the EU should also strongly consider how limited border carbon adjustment measures could help specific industrial sectors address the dangers of carbon leakage should they deploy CCS. Whilst significant practical questions remain about such schemes, competitiveness is a key barrier to CCS deployment in industry and the EU has an exclusive competence in the field of international trade.

Bellona's Response to the Specific Questions Posed

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.*

Bellona agrees strongly with the Commission's proposal that all those Member States relying heavily on fossil fuels for their energy and industry development should produce either roadmaps for the carbon-emitting sectors or a national strategy for the deployment of CCS. The work of Bellona in producing such roadmaps for a number of EU Member States (Poland, Hungary, Romania and Greece) has already shown both the benefits of such an approach and the many returns that the deployment of CCS can bring to the Member States.

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?

Bellona believes that it is necessary to reform the current EU ETS. Lessons learnt since 2008 seem to indicate that new ways must be found to respond to significant peaks and dips in CO₂ prices due to 'external' influences such as the current economic situation.

The perception of future scarcity is an important factor for a well-functioning CO₂ market. Bellona promotes a structural reform of the ETS that will allow it to better respond to situations of over-supply, as in the current market context. To this end, Bellona supports the introduction of a discretionary price-based adjustment mechanism into the ETS. This would be a break from the market-based logic of allowing the scarcity of a pre-determined limit on emissions determine the CO₂ price. Many would also view it as a breach of the political mandate granted to the EU on how climate change should be addressed. However, the current shortcomings of the pure market-based ETS justify the clear need for structural intervention.

Notably, Bellona does not promote a fixed minimum or floor price solution, which in practice would take the form of a carbon tax. We rather promote the introduction of a mechanism that provides the ability to adjust the overall supply of allowances in the market, e.g. a price management reserve as briefly described in COM(2012)652. The key feature to ensure is the withdrawal of a certain amount of allowances intended for auctioning once decreased demand causes an excessive price decrease below a certain level 'deemed to affect the orderly functioning of the market'.

As the Commission itself appreciates, the design details of such a mechanism would need to be subject to further elaboration. At this early stage, Bellona would still argue the case for a model with the following key features:

- Allowances withdrawn from auctioning due to prices below the threshold should be cancelled rather than deposited in a reserve, to ensure the necessary tightening of the carbon market.
- Following the above, and justified by the same fundamental concern of tightening the EU carbon market and increasing the carbon price, the option of releasing allowances from a reserve in the case of substantial demand is not a feature of the mechanism supported by Bellona. We rather promote the immediate permanent retirement of allowances withdrawn from auctioning due to low prices.

These features would allow the EU Institution with executive responsibility for the system to react to inherently unpredictable changes in carbon demand that could lead to excessive price movements.

One advantage of the proposed reforms would be the improved alignment with other policy measures. Notably, such structural reform would allow the targeted support provided to renewables and energy efficiency from undermining the CO₂ price signal for other low-carbon technologies. There is a clear need for a combination of both technology neutral CO₂ pricing and technology specific targeted support measures at this point in time.

This discretionary price-based mechanism should be regulated by an independent bank; the **European Central Bank of Carbon**. In order to ensure stability and predictability the carbon bank needs the authority to act decisively when required in order for the market to function efficiently. Effective and transparent criteria for intervention will need to be drawn up and the executive institution will need to be assured of both a strong mandate and the complete political independence to execute this mandate.

There are two reasons why the creation of a carbon bank is essential:

- 1) Because carbon markets are government created they can be regarded as artificial markets. As such, when over-supply occurs, it is not naturally addressed by market dynamics. The functioning of a carbon market is reliant on the quality of the administration of the market.
- 2) Addressing climate change is too important for each market decision to be subject to lengthy political discussions. The carbon market should be entrusted to a regulator to make the necessary decisions to enable the market to function, such as to regulate over-supply. Currently, adjusting the supply of EUAs requires a proposed amendment to the ETS Directive by the European Commission, which the European Parliament and Council both then need to approve. This is a lengthy and uncertain political process.

See response to Question 3 for the description of how an EU CCS fund based on auctioning revenues could form an important part of a CCS policy framework within the 2030 Climate and Energy Package.

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*

Europe's ability to decarbonize over the coming decades depends on clear and predictable incentives for the European energy and industrial sectors. However, the carbon market will not bring about the innovation necessary to achieve the necessary emission reductions in its current, volatile form. Therefore, Bellona applauds the Commission's proposal to move beyond ETS and introduce new mechanisms such as Emission Performance Standards or a CCS certificate system as the main drivers for deploying CCS.

Given the long lead times in the energy sector and the "carbon lock-in" that would result from delaying the introduction of CCS, Bellona recommends that EU Member States come forward with CCS market incentive schemes at the national level to plug existing funding gaps and drive the early deployment of CCS within their borders – until the EU can put in place an effective CCS regulatory framework. Rapid progress needs to be made on the drafting and adoption of the necessary legislation.

From 2020 onwards, however, Bellona recommends a core EU CCS policy framework comprised of:

1. An overarching EU-wide CCS target;
2. A complementary EU CCS certificate scheme to help Member States achieve this target efficiently; and
3. A connected CCS fund to provide extra support to first movers and drive the development of shared projects and infrastructure of EU relevance.

It is essential that this policy framework be fully integrated into the EU's 2030 Climate and Energy Package, creating a level playing field for CCS so that it is able to compete with other technologies in the decarbonisation of the EU energy system.

National Market Incentive Schemes until 2020

There have been many successful examples of the use of financial incentives to shape energy markets in EU Member States: Grant schemes, loan guarantees, green certificates, capacity auctions,

purchase contracts, emission performance standards and feebates have all been successfully employed. Each has its merits and a place in the policy maker's toolbox.

Amongst the policies examined, however, feed-in tariffs arguably offer investors the greatest security of income for low-carbon investors. This is because well-designed feed-in tariffs provide financial support to power plants in a form that best ensures them of access to the electricity grid, reducing both revenue risk and price risk for investors. For this reason, they have been very successful in driving the deployment of other forms of low-carbon technology in the EU.

Whatever policies are enacted, they should provide an output-based rather than a CO₂-storage-based incentive to avoid perversely incentivising the use of high-carbon fuels and inefficient processes.

An EU 2030 CCS Target

At the EU-level, Bellona recommends that the Union makes a CCS milestone (similar to the '20% by 2020' renewable energy target) an integral part of its 2030 Energy and Climate Package.

EU and IEA studies show that in order to maintain standards of living whilst limiting global temperature rises to 2°C at the lowest cost, CCS will need to account for 32% of gross power generation in the EU by 2050,¹ whilst 328 MtCO₂ will need to be captured annually from EU industrial sources.² To be on track to meet these 2050 volumes, by 2030 at least 60GW of CCS generation capacity will need to be installed and 80 MtCO₂/year of non-power industrial emissions captured and stored.

A legally binding EU requirement for Member States to hit these 2030 targets would be a politically salient and mobilizing goal, driving CCS deployment in both the power and non-power sectors. It would reassure investors of the political commitment to CCS, but still be flexible enough to complement other policy initiatives at the EU- or national-levels. It would also accommodate Member State differences in ability and willingness to deploy CCS.

Should a CCS milestone prove too difficult to agree, however, a constructive fall-back option would be the adjustment of the current EU renewables target to allow it to be met through CCS in the future. For example, instead of a 2030 renewable energy target, a low-carbon energy target would grant Member States increased freedom to choose a decarbonisation trajectory that best matched their strengths. It would permit CCS to compete on a level playing field in the EU, allowing it to find a suitable niche in the energy mix.

An EU CCS Certificate System

This overarching CCS target should be coupled with a complementary EU CCS certificate system that provides the revenues to cost effectively achieve it.

¹ As per the 'Low Nuclear' scenario in the 2050 Energy Roadmap, in line with events since Fukushima.

² Necessary CCS deployment in the energy intensive Iron & Steel, Cement, Chemicals, Pulp & Paper, Refining, Biofuels and Gas Processing. International Energy Agency, 2012. Energy Technology Perspectives, Paris. Industrial emissions in the EU amounted to 940 MtCO₂ in 2010. Source Eurostat.

Such a scheme would see the EU issue tradable certificates to CCS power or industrial plants for the low-carbon output they produce. Utilities and industry would then be obliged to acquire a certain number of certificates for the CO₂ they emit, giving the certificates a monetary value that would provide a supplementary income to CCS plant operators. Alternatively, fossil fuel providers could be obliged to source certificates against the CO₂ embedded in the commodities they supply to the EU market. There would be no need for EU institutions to directly manage revenues – the Union would simply control the scarcity of certificates, indirectly giving them value to their bearers.

Because it is a market-based system, an EU CCS certificate scheme would not offer industry the same revenue certainty as, for example, a national feed-in tariff. It would therefore be less effective at driving deployment. However, the advantages of a pan-European CCS market incentive scheme are that it is more compatible with the EU's single-market ambitions, and the larger market for tradable certificates would also put greater downward pressure on CCS costs. As such, there appears to be a degree of support for such a scheme amongst EU decision makers.

A note of caution, however: Whilst an EU-wide market based instruments for CCS is theoretically attractive, great care will have to be taken to ensure that it neither falls prey to the shortcomings of the EU ETS, nor undermines its operation. The challenges faced by the ETS suggest that suitable floor and cash-out prices would be necessary to ensure revenue stability for market actors, with unused revenues paid into the CCS fund described below.

An EU CCS Fund

From 2020 onwards, the EU should consolidate its existing grant programmes for CCS to provide extra support to CCS first movers and drive the development of CCS projects of interest to the Union.

Providing that the teething problems in the first rounds of the NER grant scheme are not repeated, allocating one portion of the revenues from such a programme to the initial wave of commercial scale plants would help counterbalance the commercial risks taken by CCS first-movers.

Another share of revenues should be earmarked for the development of the necessary EU enabling infrastructure, including the characterisation of geological storage formations, the development of storage hubs and the development of connecting CO₂ transport routes.

As well as NER auctions and the EU budget (as is the case now) revenues could also be drawn from national ETS auctions and/or the cash-out proceeds from the CCS certificate scheme. The administration of these revenues should be directed by an inter-service panel drawn from DG CLIMA, DG ENER and DG ENTR to ensure that CCS is deployed harmoniously with the EU's other policies in both power and non-power industrial sectors.

Other EU Recommendations

Around this core policy framework (an EU-level goal combined with market mechanisms and a grant scheme to help Member States meet the goal efficiently), there are several other stand-alone actions that would greatly facilitate the deployment of CCS in the EU.

First off, EU legislation should be put in place to ensure privileged grid access for CCS electricity generation in the same way that priority grid access for renewable energy and cogeneration facilities is mandated by EU law. Such access is necessary to ensure investors in CCS that their plants will actually be run once they are built.

And the EU should also strongly consider how limited border carbon adjustment measures could help specific industrial sectors address the dangers of carbon leakage should they deploy CCS. Whilst significant practical questions remain about such schemes, competitiveness is a key barrier to CCS deployment in industry and the EU has an exclusive competence in the field of international trade.

An Emission Performance Standard

Emissions Performance Standards (EPS) have long been a key tool in achieving desired environmental goals. EPSs are attractive to policy makers due to their simplicity of implementation, predictable results and low direct cost to the state.

EPSs have effectively promoted CCS deployment outside the EU. Most notably, the Canadian government finalised performance standards affecting coal electricity generation in 2012. All new coal facilities post 2015 and existing facilities over 50 years will be mandated to reduce CO₂ emissions to the level of Combine Cycle Gas Turbine (420kg/MWh), requiring the application of CCS. This legislation has strongly motivated provincial authorities to work together with industry to keep coal and oil sands resources relevant in the future (i.e. de-risking the significant indigenous resource base) leading to bold action to realize CCS on both their parts.

However, as a net energy importer, it is likely that an EPS in the EU would not have the same effect. An EPS would reaffirm the political commitment to incremental decarbonisation, reassuring market actors of the long-term necessity of CCS for continued fossil fuel use. However, because of political acceptance issues, a basic standalone EPS would probably be set at a level that incentivizes the switch from coal to gas, rather than deliver near-term CCS deployment in the power sector.³

That being said, Bellona strongly support an EPS as an invaluable part of a suite of policies aimed at energy system decarbonisation more generally. For example, a modest CO₂ EPS could ensure that that a transitory surplus in CO₂ allowances does not lead to the most highly polluting generation sources being built or run. More information can be found in our 2030 Communication response.

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?

As pointed out in the Commission's Energy Roadmap 2050, "for all fossil fuels, CCS will have to be applied from around 2030 onwards in the power sector in order to reach decarbonisation targets". For this to come to fruition in time, prompt and decisive action must be taken to ensure the rapid

³ Bloomberg New Energy Finance, 2011. Emission Performance Standards: Impacts of power plant CO₂ emission performance standards in the context of the European carbon market, Bloomberg New Energy Finance.

deployment of CCS demonstration projects as well as full-scale commercially operating CCS installations. While EU legislation (Directive 2001/80/EC as amended by Directive 2009/31/EC) requires an assessment of CCS readiness of any new plant (of 300MW or more) before it can continue to the permitting and licensing stage, Member States still have considerable flexibility in what happens after the assessment. In fact, if it is concluded that CCS readiness is not feasible for the new plant (for whatever reason, but mainly based on the lack of an available or acceptable storage site) the plant can progress to permitting and licensing in some Member States.

The task of determining whether or not a storage site is suitable includes a number of judgments which may lead to difficulties in legal interpretation. This results in the present situation where there are significant variations between Member States in application of the Directive. In some countries the assessment rules are very stringent, while in others they are less so. While some states allow plants to proceed if the assessment of their CCS-readiness is positive, other states requires all new plants to be CCS ready and others yet allow plants that cannot be made CCS-ready to proceed.

Certain circumstances could therefore allow preference to be given by companies to building plants in such areas where CCS-ready criteria are not yet achievable. This is because, depending on the carbon price, it would reduce their costs and potentially increase their competitiveness.

It would be in the interest of the European Union to remove all the flexibility around CCS-readiness and introduce the requirement that all new power plants (at least those of 300MW or above) need to be assessed as CCS ready before being allowed to progress to permitting and licensing. This amendment to existing legislation should come into effect immediately so as to avoid a rush to build a number of unabated plants. It should equally apply to coal and gas fired power plants.

This would level the playing field across Europe, increase certainty concerning future policy and avoid stranded assets when CCS is made compulsory on all such power plants in the future.

While indicative dates for when CCS might be made compulsory may be difficult to achieve, Bellona believes such an accomplishment would lend necessary further strength to the legislation. Bellona believes that already including indicative dates for when CCS might be made compulsory for existing plants (say 2025 for coal-fired power plants and 2030 for gas) would further strengthen the legislation, although it realises that agreement on such dates may still be difficult to achieve.

Question 5

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

The CCS value chain is long and complex, and specifically targeting any part of it with measures that may be perceived as discriminatory and/or disproportionate will not deliver progress in deployment. Cost- and effort-sharing must be distributed in an objective and 'fair manner in order to secure buy-in from all market actors, overcome the collective action problem that CCS joint ventures face, and unlock investment in the technology.

It falls squarely on the shoulders of public authorities – such as the European Commission – to propose and implement the policy frameworks necessary to enable this.

That being said, one way for fossil fuel providers to contribute to CCS demonstration and deployment relates to the way in which the CCS certificate system described in the response the Question 3 of this consultation could be designed.

We might see the obligation for purchasing certificates shifted from utilities and factories to suppliers of coal and gas. This would require companies that export coal and gas to Europe, as well as domestic producers, to purchase CCS certificates against the coal and gas they sell within the EU. This might align the costs of CCS deployment more closely with the market actors who have the most to commercially gain from it, making such a scheme politically easier to implement.⁴

Moreover, it may more directly incentivize market actors in the upstream and mining sectors to develop the safe CO₂ storage services necessary to unlock investment in CCS. By doing so, they would be allocated free-of-charge the certificates necessary to secure the continued sale of their products in the EU.

Question 6

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

There are two main obstacles. First, the lack of a clear business case for CCS, and second, the closely-related challenges regarding public acceptance (see response to Question 7).

The current suite of EU-level policies provides effective, targeted support to wind, solar, biomass, cogeneration and energy efficiency abatement opportunities – but not CCS. This makes CCS especially dependent on the EU Emissions Trading System (ETS) and the related NER300 scheme to drive its deployment.

However, the first round of the NER 300 funding programme failed to deliver financial support for any CCS projects in the EU. Moreover, the low price of 10-year CO₂ futures indicates that the market currently does not see the price of EUAs increasing dramatically in this time window. The failure of the ETS to provide as robust a CO₂ price as originally forecast has eroded the business case for CCS in the EU in two important ways.

1. The faltering EUA price failed to provide the long-term price signal for CO₂ emitters to pursue the development of CCS technology.
2. The lower price of EUAs auctioned for the NER300 scheme greatly reduced the funds available to immediately support demonstration projects

The degree of operational support the ETS would have offered CCS demonstration plants has become minimal, placing the burden on host states and sponsor companies. This has left

⁴ However all certificate schemes eventually pass costs through to consumers.

demonstration operators with significant commercial risks to sunken investments, including reduced reliability of plant, higher operating cost and reduced competitiveness in the electricity market.

In addition, this led to fewer full-scale plants able to be supported. Since this diminished the chances of success for individual candidates, it also reduced their incentive to devote significant resources to taking part in the process.

The lack of a clear business case has put the EU behind the United States, Canada and Australia, who have all already made investments in commercial-scale CCS projects. As recognized by the IEA and others, a delay in implementing CCS will put the EU on a path whereby decarbonisation will ultimately be more expensive. Apart from a further weakening of the business case, such a path would also be devastating for climate change objectives, European competitiveness, jobs and technological progress.

We acknowledge the critical role of the EU ETS in promoting low carbon technologies, including CCS, in the long term. However it is clear that today's low carbon price will not enable the necessary and immediate investments in CCS. Additional mechanisms will need to be brought into play and, given the long lead times in the energy sector and the "carbon lock-in" which would result from delaying their introduction, they need to be addressed with urgency.

Question 7

How can public acceptance for CCS be increased?

Public acceptance for CCS is complex and must be considered from the very start of every project.

It is best achieved and most effective, when:

- Public confidence is worked on in an individual case-by-case manner, where local impacts of each CCS case can be thoroughly addressed;
- When the messenger is considered as equally important as the message, and;
- Information and knowledge levels are higher, and are addressed along with the technical aspects of each project.

Like any large-scale infrastructure, CCS can trigger controversy and provoke "not-in-my-backyard" (nimby) activism from local communities, despite the safety of the relevant installation.

Defining the tangible local benefits of CCS projects, as well as clarifying concerns, whether they are individual, social or environmental, is key. Inhabitants of Barendrecht, the location of a Dutch CCS project which failed to come to fruition as a result of local opposition, feared the plan would endanger the town and lead to a fall in house prices.

Projects that met less opposition and were ultimately more successful, including FutureGen (US), Otway (Australia) and Zerogen (Australia), were all based on site selection which actively involved

government and local stakeholders from the very beginning. The messenger is often as important as the message itself.

Part of Barendrecht residents' concern emanated from the project being perceived as an exclusively private and top-down initiative. Independent experts, scientists and NGOs are generally the most trustworthy information sources and have a great role to play. Involving local stakeholder and government also allows local residents to take part in decision-making processes, thus lending legitimacy and a sense of "ownership" of the project development.

On a European scale, CCS suffers from a huge lack of public awareness. Even if the public is involved, if they meet the project with limited and negative information, the project is faces a huge obstacle from the start. Broad public information and education about CCS, and targeted audience knowledge, are therefore key. Opinions on CCS are unstable and depend on social aspects and on the CCS project kind, whether it is an onshore storage project, or a transport project, etc. The social aspects – site information gathering, knowledge provision, visits to sites, monitoring etc. – should therefore feed into the technical process, especially in the pre-project stage but also throughout implementation. Most of the steps of the social process are taking place before the internal technical approval of the project. The feedback gained through public engagement processes should be considered during the final stage of project design.

ANNEX

Driving CO₂ Capture and Storage in the EU: New Policies, New Perspectives