

European Commission consultative Communication on “The Future of Carbon Capture and Storage in Europe”

A EURELECTRIC comments paper



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TF Carbon Capture & Storage

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Key Messages

EURELECTRIC is a strong supporter of carbon capture & storage (CCS)

CCS is a fundamental climate technology and a key enabler of a carbon-neutral power sector. All serious analyses – including EURELECTRIC's – reveal that the cost of decarbonising the EU power sector and economy without CCS will be far higher.

EU CCS ambitions are at a turning point: either we devise new ways of stimulating CCS development or we sit back and hope for the best

Despite old pledges, there is no CCS demonstration project up and running in the EU today. This is a serious setback to EU ambitions of becoming a CCS world leader. A renewed effort is needed by all concerned stakeholders – the European Commission, Member States and industry – to make CCS investment happen.

The EU must learn from past mistakes: it must put in place a fit-for-purpose CCS policy centred on public-private partnerships

Given its role in mitigating climate change, CCS needs a robust carbon price to be viable. While the EU Emissions Trading System (ETS) can act as a long-term engine for the development of CCS, it does not reward research and innovation, and can only have a limited role in demonstrating technologies. To incentivise CCS, a suite of 'top-up' innovation policies that do not distort price formation in electricity and carbon markets are needed.

CCS is a novel industrial concept. Faced with the unfamiliar, people have every right to be sceptical. Industry and policymakers have the obligation to explain the workings and benefits of CCS

CCS can only flourish if the general public are convinced of its benefits, i.e. if a societal case is made. Policymakers and industry should team up to communicate on CCS more straightforwardly and effectively.

General Remarks

EURELECTRIC – the sector association representing the common interests of the electricity industry at pan-European level, plus its affiliates and associates worldwide – is pleased to take part in the European Commission’s (EC) consultation on the “Future of Carbon Capture and Storage in Europe.”

CCS is one of the key enablers for the transformation of the power sector towards carbon neutrality. CCS has multiple potential strengths that make it crucial in a wider basket of low-carbon technology solutions which includes renewables and nuclear, as well as greater energy efficiency. These include: industrial competitiveness and affordable electricity supply; fuel diversity and reliability of supply; creation of specialised jobs and preservation of jobs in the mining and oil & gas industry; etc. Furthermore, the need for CCS has become all the greater, given the discovery of substantial unconventional gas resources as well as the continued use of coal worldwide. It is clear that fossil fuels will be used for a considerable time to come and wide deployment of CCS will be needed if greenhouse gas emissions are to be kept in check.

Several energy- and emission-intensive industrial sectors other than electricity (such as chemicals or iron and steel) can only substantially reduce their carbon footprint by applying carbon dioxide capture to their processes. **This makes CCS a unique climate technology that needs to be rapidly demonstrated in preparation for a commercial roll-out in the next decade.**

To avoid Europe becoming locked into a considerably higher-cost trajectory to decarbonisation, EURELECTRIC has stressed that Europe needs to show a **sense of urgency in tackling the failures so far of the CCS demonstration programme**: the earlier demonstration projects are up and running, and operating according to their design, the earlier utilities will consider investing in commercial scale CCS.¹ To these ends, EURELECTRIC has made a number of recommendations on how to kick-start CCS demonstration. These can be summarised as follows:

- **Recycling of unspent European Energy Programme for Recovery (EEPR) funds**
- **Thorough and timely transposition of the CCS Directive**
- **Maximisation of the effectiveness of the EU Emissions Trading System (ETS) as an engine for CCS (and other low-carbon) technology development, recalling that CCS is intrinsically dependent on a strong carbon price to become commercially viable**
- **Europeanisation of the CCS demo programme**

Whilst this timely consultative communication emphasises the barriers and constraints faced by CCS developers and generally poses the right questions, EURELECTRIC recommends that the Commission should take a more holistic approach to developing CCS instead of narrowly focusing on CO₂ capture. CCS demonstration and early deployment must address the issues of transportation and storage upfront, two areas where public acceptance must be obtained before further measures on CO₂ emitters are proposed.

¹ EURELECTRIC, *Now or never? The urgent need for CCS demonstration*, December 2012, http://www.eurelectric.org/media/70511/eurelectric_position_ccsdemo_programme.final-2012-170-0006-01-e.pdf

Furthermore, the interplay between this consultation and the broader one on the energy and climate policy framework for 2030 is crucial. Any new policy framework post-2020 should allow CCS to develop on a level playing field with other low-carbon options.

Consultation questions

QUESTION 1

- 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.

The primary objective of the communication is to define the best toolkit to kick-start the demonstration and deployment of CCS in Europe. Whilst we recognise that in the long run CCS could be potentially applied to non-fossil based processes, e.g. biomass combustion, its chief function is to help decarbonise coal and gas based electricity generation which currently represents the backbone of the EU power system. Therefore, **requiring member states to set a roadmap to abandon fossil-fuel based generation towards non-carbon emitting fuels by 2050 will not favour the development of CCS**. EU policy should aim to facilitate a range of technology options rather than seeking to constrain Member State choices.

EURELECTRIC is broadly supportive of the development of national strategies for the deployment of CCS technology for those member states that wish to do so, i.e. it should not be made mandatory, given the varying national fuel mixes around Europe. The development of national CCS roadmaps is aligned with the provisions governing the EU energy policy and in particular article 194 of the Lisbon Treaty which stipulates that member states bear responsibility for their energy mix.² Several EU governments have already successfully set up their CCS roadmaps and the United Kingdom can be quoted as a concrete case of a member state providing clarity and consistency in developing CCS.³ On the other hand, EURELECTRIC believes that there are benefits in Member States taking a collaborative approach to developing and demonstrating CCS, first at regional level and then at European level. This will make it possible to exploit synergies and economies of scale.

QUESTION 2

- 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?

EURELECTRIC sees the ETS as the cornerstone of Europe's climate policy. The ETS has a pan-European scope and preserves technology neutrality thereby ensuring competition between rival low-carbon solutions and cost-effectiveness.

² Notwithstanding the above, EURELECTRIC has expressed views that the EC should seize the opportunity to improve art. 194 and make the EU energy policy more European, see *Powering Investments. Challenges for the liberalised electricity sector*, December 2012, http://www.eurelectric.org/media/68619/powering_investments-findings_and_recommendations-lr-2012-101-0003-01-e.pdf

³ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48317/4899-the-ccs-roadmap.pdf. On the other hand, one should not underestimate the fact that the UK CCS competition has so far not been able to allocate funding to CCS demonstrators

Even though CCS is indeed dependent on a strong carbon price to become commercially viable, the ETS is not geared towards piloting technologies along the innovation value chain from basic R&D through to demonstration and deployment. If the carbon price were required to support immature technologies – including CCS – across the whole value chain, the cost would be prohibitively high and damage other sectors of the economy, in particular those that fall under the ETS. To make matters worse, **the recent collapse in carbon prices has removed the demand-pull incentive provided by the ETS, thus undermining the private-sector case for investing in demonstration.** However, even though ETS reform is currently planned, it alone will not ensure the commercial viability of demonstrators and early deployment.

As a solution, **EURELECTRIC sees a case in principle for an ‘ETS plus’ approach. By this, we mean: complementary innovation policies that complement and build on the EU ETS rather than working against it or around it.** The ETS cannot cover the cost for technology development, but it will help drive technology implementation. At the same time, such policies should be formulated to achieve innovation objectives, leaving the cost-effective achievement of CO₂ reduction to the EU ETS based on a level playing field for all technologies.⁴

For all these reasons, **EURELECTRIC is supportive of the introduction of complementary mechanisms that support a limited number of CCS demonstrators through use of auctioning revenues or other funding approaches geared towards RD&D,** e.g. the re-allocation of unspent EEPF funds or other contractual arrangements such as loan guarantees, risk-sharing instruments or tax breaks/rebates which can help to reduce investment risks for CCS developers and make financing easier. Given the size, costs and risk of full chain CCS demonstration projects any chosen mechanism needs to be highly flexible and support should be allocated as much as possible based on negotiations rather than upfront fixed conditions which might no longer be valid at the point award is made.

With regard to the NER300, after a disappointing first phase – that resulted in no funding award to CCS despite applications from 13 projects – EURELECTRIC hopes to see a more favourable and flexible treatment of CCS demonstration projects in the second call for proposals.

QUESTION 3

- 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

EURELECTRIC believes that the primary focus at this stage should be on the successful demonstration of CCS at industrial scale. Targeted policy tools supporting CCS demonstration plants could also be needed to bridge the gap between demonstration and commercial deployment and help nurture knowledge about CCS technology, so that its costs are reduced. EURELECTRIC supports the notion of using EU ETS auction revenues for technology development including CCS. All possible means of support or policy measures aimed at creating a conducive business case for CCS need to be carefully crafted to account for possible interactions with the carbon and electricity wholesale markets; to be flexible enough to accommodate CCS needs and

⁴ For a more detailed analysis of innovation in the power sector and the best innovation policy to spur innovation please see our recently released report *Utilities: powerhouses of innovation*, May, 2013, <http://www.eurelectric.org/innovation/>

linked incentives while the technology develops; and to avoid any other unwanted consequence such as project developers' over-compensation.

EURELECTRIC is opposed to the introduction of an Emission Performance Standard (EPS) as it will overlap and undermine the ETS as the key mechanism to reduce GHG emissions without providing a workable basis for the demonstration and early deployment of CCS. There is no mistaking the evidence that nowhere in the world has the introduction of an EPS provided a positive incentive to build CCS. The often mentioned California example, for instance, has not resulted in any CCS unit coming on line.⁵ Depending on the threshold chosen, the EPS is likely to lead governments – or the EU – to pick winners without respecting the principle of technology neutrality, potentially endangering fuel diversity and affordable electricity supply. Moreover, the proposed EPS would not be in line with recently adopted EU legislation, namely:

- Article 9 of the Industrial Emissions Directive – adopted in November 2010 – which did not establish the introduction of emission limits for GHG;
- Article 38 of the CCS Directive – adopted in April 2009 – which stated that only after the technical and economic feasibility of the CCS technology had been demonstrated, would the implementation of an EPS be studied. It is undeniable that such a situation does not yet exist in Europe.

In reality, the prime objective of the EPS seems to be either to impose a ban on building new coal-fired power stations or to promote early closure of existing plants for which modernisation is being appraised. The key drivers underpinning CCS development will be robust carbon pricing and a positive business case. As long as CCS is not rewarded in the market, there will be no development, regardless of the EPS.

EURELECTRIC is not supportive of the introduction of a CCS certificate system and thinks this option needs to be further evaluated as it raises a number of methodological questions whilst showing no clear benefits. The interplay between a certificate system and the ETS is a key concern in that any support scheme for CCS could have considerable negative impacts on the workings of the ETS, as the unfortunate situation caused by RES support schemes has demonstrated in the recent past. However, the idea that Emission Unit Allowances (EUA) would be automatically subtracted from the overall ETS cap seems likely to limit its impact on the ETS as it will not result in extra EUA being added to the market and the actual retirement of an equivalent number of EUA upfront will likely not impact carbon price formation. On the other hand, it could be argued that a CCS certificate scheme introduces yet another niche market based on non-competitively priced electricity within the broader electricity market, thereby further reducing the size of the liberalised market where generators can freely compete without support mechanisms. Also, the scheme seems to push a double penalty onto plant operators as they already face carbon costs. (This could potentially be solved by designing the scheme in a way that CCS certificates can be surrendered to demonstrate compliance with the ETS.) Care should also be taken with regard to free allocation to oil and gas companies as this would not drive the development of saline aquifers for CO₂ storage and could unnecessarily favour existing operators over competing operators. Finally, the lead times to generate the CCS certificates are long and unpredictable, making any pricing highly speculative.

EURELECTRIC believes that the European Commission should seize the opportunity of the revision of the EU regime for state aid – the so-called State Aid Modernisation (SAM) – **to include an innovation dimension in the state aid guidelines.** Today, the Community framework for State aid

⁵ It should be also stressed that the adoption of the EPS in California has neither promoted the development of CCS nor had a substantial impact on the Californian generation mix, whilst it could have substantial and disparate effects on the different EU member states, potentially jeopardising the EU internal energy market.

for research and development (commonly known as RDD guidelines) are vaguely formulated and inconsistently applied. Worse, the R&D state aid guidelines seem to discriminate between near-commercial technologies and R&D needs, blocking technology development and acting as roadblocks to demonstration, which seems to be less highly valued than basic R&D. Greater flexibility and dynamism on how to best stimulate innovation across the whole value chain and make RD&D support more market-oriented and output-based is therefore desirable.

Prizes are often used as alternative mechanism to reward innovation. However, a limited current use can be observed in the EU energy and climate policy. Therefore, the EC should consider awarding an EU prize as an effective, competitive and open mechanism to reward innovation breakthroughs. It should be noted, however, that the prize money should correspond to the size of the challenge to be addressed to maximise its effectiveness.

Finally, **the EC should think of making greater use of its “soft powers”, compared to use of either regulatory decisions and/or incentive schemes.** If the Commission is convinced that the demonstration and subsequent widespread deployment of CCS are necessary to meet the CO₂ emission reduction goals, it should consider building an inclusive platform for discussion with member states to help further common understanding on CCS technology and favour cross-border solutions.

QUESTION 4

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?

EURELECTRIC **supports the application of sensible provisions in terms of carbon capture readiness (CCR)**, e.g. having enough land for the capture kit, surveying pipeline routes and storage sites, etc.

However, if generators do become required to fit CCS in the future, **it should only be at a time when the technology has been demonstrated at scale and is readily available through conventional procurement routes.** Furthermore, it should apply equally to all large emitters of CO₂.⁶ If these preconditions are not met, we fear that the debate risks becoming too academic and is simply likely to put further barriers in the way of new investment. Therefore, EURELECTRIC favours maintaining the CCR provisions as laid down in the current CCS Directive. It should also be recalled, that some equipment designed for CCS will have lower efficiencies when being operated off specification at plants not yet equipped for CO₂ capture.

⁶ Finally, it must be made clear how the extra cost of installing, operating and maintaining such equipment will be recouped

QUESTION 5

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

The idea that fossil fuel suppliers contribute and share the burden in demonstrating and deploying CCS should be given consideration as it is in their best interest to do so, as also shown by COAL21, the funding mechanism put in place by the Australian Coal Association to support GHG abatement.⁷ **However, several methodological issues arise that would need to be clarified upfront.**

For instance, if fossil fuel providers were to be included in the CCS certificate scheme, as the EC hints at in their paper, it would have to be determined who should be required to demonstrate compliance with the scheme between the supplier, i.e. the fossil fuel provider, and the buyer, i.e. the power plant operator? In other words, how could double-counting be avoided?

Also, how could the EC make sure that non-EU suppliers are effectively bound by the rule? The recent quarrel over the inclusion of non-EU airlines under the ETS, and the temporary freeze to the rule until the ICAO has come up with a global solution, is a case in point here.⁸

Finally, it is unclear whether this would require a substantial change to the ETS, as the liability for greenhouse gas emissions lies with the owner of an installation performing any of the activities referred to in Annex I of Directive 2009/29/EC.

QUESTION 6

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

Besides the economic crisis that has made its effects felt on the power sector as a whole, some specific **obstacles to the demonstration of CCS** in the EU can be summarised as follows:

- **Lack of business case** across the CCS value chain, i.e. for both power generators and storage operators. Several roadblocks can be outlined here, in particular:
 - Currently weak carbon and electricity prices, i.e., well below the price needed to make CCS economically viable. Decarbonisation is the main reason for developing CCS, so the value of carbon is critical
 - Efficiency penalty, thus increased energy requirements and associated fuel costs caused by the application of the capture kit to the power station
 - Unclear operational pattern of the CCS-fitted power stations in a power system with ever increasing shares of variable renewables
- **Disappointing phase 1 of the NER300 competition** which resulted in no CCS projects being awarded funding despite 13 projects originally applying for support. A number of impediments have been identified by the EC and stakeholders, including cooperation and communication between member states and the EC, the unfavourable rules applied to CCS projects compared to renewables (e.g. accounting operational benefits CCS for 10

⁷ <http://www.australiancoal.com.au/coal21.html>

⁸ http://ec.europa.eu/clima/policies/transport/aviation/index_en.htm

years, 5 years for renewables) as well as the specific role of the EC and member states in the demonstration programme

- **Insufficient funding** for an innovative technology that requires enormous upfront investment costs during development and demonstration, including the necessary incentives for technology providers to invest in CCS
- **Unclear legal and regulatory framework**, ranging from delayed transposition of the CCS directive by Member States to specific barriers to parts of the CCS chain (e.g. CO₂ pipeline permitting, cross-border CO₂ transportation, long term liabilities, etc.)
- **Missing societal case for CCS, directly linked to public awareness and acceptance** of the technology as also ascertained in the mentioned Eurobarometer survey of May 2011

QUESTION 7

7) How can public acceptance for CCS be increased?

The involvement of the general public – and local administrations alike – in technology complex yet crucially important projects such as CCS is fundamental to allow the technology to develop and become a pivotal climate mitigation tool in the wider basket of low-carbon options that are needed to secure carbon-neutral electricity supply to both Europe and worldwide. In line with this, the EU power sector maintains its belief that a successful EU CCS demonstration programme will not only kick-start the deployment of CCS, but will also foster greater public understanding, and hence societal acceptance of the technology.

Public acceptance could be fostered in a number of ways, e.g.:

- **Showcasing CCS as part of the solution**
Avoiding unnecessary and unhelpful confrontation between CCS and other low-carbon technologies such as renewable energy and nuclear in public debates is crucial. Conversely, it should be emphasised that CCS and other low-carbon options are complementary and they do not rule out each other.
- **Piloting transportation and storage**
The March 2011 Eurobarometer survey on CCS referred to by the EC indeed shows that 60% of the interviewees have some sort of concern with CO₂ storage and, crucially, its safety.⁹ The number becomes even more staggering considering that in all the 12 surveyed member states the people concerned the most – those classified as ‘very concerned’ and ‘fairly concerned’ – reached 50%. To compare, only 1 person in 6 (i.e. 16%) said they were not concerned at all about having a CO₂ storage site within 5 kilometre of their home.

Therefore, storage is one of the most critical areas to ensure that CCS is well understood, hence accepted. The same largely applies to transportation, as the general public is well accustomed to the benefits of oil and natural gas pipelines but does not have the same equivalent information on CO₂ pipelines. Piloting CO₂ transport and storage is thus necessary to allow people to become familiar with CCS, grasp the complexity of the technology and have a first-hand insight into its functioning.

⁹ http://ec.europa.eu/public_opinion/archives/ebs/ebs_364_en.pdf

- **Painting a fair picture of CO₂ and CCS**

Awareness should be raised that CO₂ is, in fact, a naturally occurring gas which has been safely used as a feedstock in the food industry for decades. It is neither toxic, carcinogenic, explosive, nor inflammable.

Besides the well-known enhanced hydrocarbon recovery – which indeed represents an example of CO₂ utilisation –, examples exist of utilities that have established successful partnerships with industrial users of CO₂, among others:

- Chemical factories that receive CO₂ supplies to replace petroleum products to produce polyurethane or other chemicals thus greening their carbon footprint
- Greenhouses using CO₂ as fertilizer in crop production
- Etc.

The so-called Carbon Capture & Usage (CCU) could actually play a much greater role in demonstrating the benefits of carbon capture technology, although the potential to use CO₂ there is somewhat limited. In the long run, CCS could also be coupled to biomass-fired plants, showing the benefits of directly linking renewables and CCS by achieving negative CO₂ emissions.

- **Engaging the public, fostering acceptance**

Public acceptance can be fostered by showing the benefits arising from CCS that have been outlined in the general remarks section. Lesson learned in diverse environmental fields suggested that engagement of people is a necessary condition to be fulfilled as from project inception, i.e. the early phases of project development. Developing CCS projects requires information campaigns tailor-made to the relevant audience as there is a limited public knowledge surrounding the technology. Furthermore, experience has shown that the best way to secure public understanding and support is to develop strategies at national and regional level, for the cultural differences among countries and regions needs to be recognised and tackled if the conveyed messages are to be successful and effective. For the messages to be effective, great value should be attached to their credibility. Referencing trustworthy, independent and respected sources of information is a way for achieving it.

The Endesa-led Compostilla CCS project in Northern Spain can be commended and quoted as a good example of a project engaging the public in a thorough and inclusive way.¹⁰ A well-staffed team of communication specialists working alongside the research partner Ciudad de la Energía (CIUDEN) has identified from the very beginning what worked best for targeted audiences, providing effective outreach and high-quality engagement studies. Engagement campaigns based on different set-ups (e.g. media relations, publications and other print materials, exhibitions, town-halls presentations, etc.) and social media tools (e.g. website, YouTube videos, etc.) have also been instrumental in raising awareness and building support for the project.

¹⁰ <http://cdn.globalccsinstitute.com/sites/default/files/publications/89566/thematic-report-public-engagement-session-otober-2012v1.pdf>



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