

**Summary report on the analysis of the responses received to the Consultative
Communication on the future of Carbon Capture and Storage in Europe
[COM(2013)180]**

EXECUTIVE SUMMARY

In the fight against climate change, the European Union (EU) is committed to reducing its greenhouse gas emissions by 80-95% below 1990 levels by 2050¹. The 2011 'Roadmap for moving to a competitive low-carbon economy by 2050'² puts forward possible cost-efficient actions up to 2050 which would enable the EU to deliver greenhouse gas reductions in line with the targets agreed. The 'Energy Roadmap 2050'³ published in December 2011 explores the challenges posed by delivering the EU's decarbonisation objective while at the same time ensuring security of energy supply and competitiveness. The assessments made in the context of the two Roadmaps see Carbon Capture and Storage (CCS), if commercialised, as playing an important role in the low-carbon transformation of the system. Depending on the scenarios considered by the Energy Roadmap, between 7 and 32% of power generation would need to be equipped with CCS by 2050. Moreover, by 2035, CCS starts to contribute on a broader scale to reducing CO₂ emissions from industrial processes in the EU.

On 27 March 2013, the European Commission (EC) adopted a Consultative Communication on the future of CCS in Europe⁴, effectively launching a public consultation on the issue. The consultation was based on seven questions, and was open until 2 July 2013. More than 150 contributions were received; almost half of these came from citizens, while representatives from industry, NGOs, associations, academic and research organisations, multi-stakeholder platforms, as well as public bodies, made up the other half.

The report below summarises the responses to the Consultation. The analysis has highlighted the following key issues:

There is wide support for the (continuation of the) EU's CCS demonstration programme, as the best way to demonstrate its technical and economic viability, as well CO₂ storage safety and reliability, and also improve public perceptions. In the opinion of several stakeholders (especially among central governments and industry representatives), achieving a successful demonstration programme should be the key priority for the EU for the near future and public funding is essential to achieve this goal. Additionally, increased efforts into Research & Development (R&D), especially into storage and transport infrastructure aspects and including the exploration of Carbon Capture and Usage (CCU) and Enhanced Oil Recovery (EOR) options, should be made.

¹ European Council October 2009: http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/110889.pdf

² http://ec.europa.eu/clima/policies/roadmap/index_en.htm

³ http://ec.europa.eu/energy/energy2020/roadmap/index_en.htm

⁴ http://ec.europa.eu/energy/coal/ccs_en.htm

There is strong support for the development of national roadmaps for the decarbonisation of Member States' (MS) economies in Europe. The majority of NGOs & associations, a large part of industry representatives and some public authorities consider that the national decarbonisation roadmaps should impose no restrictions on the energy mix chosen by MS and that a level playing field for all low-carbon technologies is essential.

A large number of respondents, especially the NGOs & associations and industry, urge the EC to integrate CCS into the 2030 energy and climate policy framework. Complementary to this, the need to treat CCS on a level playing field with other low-carbon technologies, in particular renewables, which have been supported since the 2020 targets have been agreed, is also seen as essential.

The significance of CCS for the industrial sectors, other than power generation, is addressed in two ways. On the one hand, there is quite significant support (among NGOs & associations and some industry representatives – mainly energy utilities and related industries) for the inclusion of industrial facilities in national decarbonisation roadmaps and (CCS) support frameworks. On the other hand, concerns regarding the competitiveness of European industries and a call for moderate ambitions in Europe in the absence of a global climate deal are raised by representatives of the carbon and energy intensive industries. They also call for a detailed impact assessment on implementation costs of CCS before discussing deployment.

A significant number of respondents, from across all categories apart from the citizens, draw attention to the need for a holistic approach which goes beyond CO₂ capture (which is seen as the main focus of the Communication) and also takes transport and storage aspects into account (and incentivises them accordingly). The links between infrastructure development and public opinion and the potential economies of scale associated with the development of shared infrastructure are cited as key arguments.

The interest from and the participation of MS' governments was rather low (four responses from central governments only, besides a few government agencies and regional authorities). The MS that responded generally support the continuation of the EU CCS demonstration programme (i.e. the EEPR and NER300) and national decarbonisation roadmaps, as a prerequisite for further discussions on possible incentives and policies for the medium to long-term. Arguments of national sovereignty and the suitability of the EU Emissions Trading System (EU ETS) to drive decarbonisation are invoked.

A significant number of citizens, however from one MS only, have mobilised themselves in order to express their opposition to the development of the CCS and to any additional support and/or policy measure to pave the way for deployment. They doubt that CCS can be a tool for mitigating climate change. In their view it is only a ruse in order to keep using fossil fuels and the EU's priority should be renewables, energy storage and adaptation to climate change.

1. INTRODUCTION

The EU is committed to supporting CCS both financially and with regulatory steps. Following the European Council's 2007 decision to support up to 12 large-scale demonstration projects by 2015, the Commission took a number of steps to establish a common regulatory and demonstration support framework. The CCS Directive was adopted to provide a legal framework for CO₂ capture, transport and storage, with the transposition deadline set at June 2011⁵. CO₂ transport pipelines were included in Europe's Energy Infrastructure Priorities (EIP) tabled in November 2010 and in the Regulation on "Guidelines for Trans European Energy Infrastructure"⁶ adopted in April 2013. CCS has also become an integral part of the EU R&D efforts, in the frame of the European Industrial Initiative (EII) on CCS that is part of the Strategic Energy Technology (SET) Plan. Two funding instruments have been set up: the European Energy Programme for Recovery (EEPR) and the NER300⁷ programme funded by ETS allowances to channel substantial EU funding to large scale demonstration projects⁸.

Despite these efforts, CCS has not yet taken off in Europe as initially envisaged. In early 2013, the European Commission launched a consultation on the future of CCS in Europe, in order to re-start the debate. The Consultative Communication adopted on 27 March looks into the main reasons behind the slow development of CCS and gives an overview of the current state of play in terms of energy needs and policies, taking into account the global context and trends. It puts forward some available options to encourage CCS demonstration and deployment, in order to support its long term business case as an integral part of the EU's strategy for a low carbon transition.

While acknowledging that 'no action' is not an option, and in the light of the work started on the 2030 energy and climate framework, the Consultative Communication invites contributions from stakeholders on the role of CCS in Europe, in particular on 7 key issues:

- 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.
- 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?

⁵ A detailed report on the transposition of the directive will be published in due course

⁶ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:115:0039:0075:EN:PDF>

⁷ No CCS projects were selected in the first call for proposals of NER300; one project has been submitted in the second call, for which Awards are envisaged by mid-2014.

⁸ However, the projections of a carbon price of 20 to 30€/per ton did not materialise, which lowered the funds available substantially, and also significantly worsened the economics of CCS projects

- 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 approaches⁹
 - b. an Emission Performance Standard
 - c. a CCS certificate system
 - d. another type of policy measure
- 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?
- 5) Should fossil fuel providers contribute to CCS demonstration and deployment through specific measures that ensure additional financing?
- 6) What are the main obstacles to ensuring sufficient demonstration of CCS in the EU?
- 7) How can public acceptance for CCS be increased?

The public consultation was open until 2 July 2013. 171 responses were received, from a broad range of organisations¹⁰. The individual contributions have been published on the public consultation webpage¹¹. The summary of responses is presented in section 2 below. Almost half of the contributions came from citizens¹², which included two group of individuals who signed petitions expressing their opposition to the development of CCS. Each petition has been given one vote in the analysis below.

The remaining respondents can be broadly classified in three categories: industry (including individual companies and industry associations representing specific sectors), NGOs, academic institutions and multi-stakeholder associations and platforms (hereunder referred to as NGOs & associations) and public authorities (which also assimilated municipal authorities and a parliament, besides federal and state authorities).

⁹ Taking into account complementarity with the European Structural and Investment Funds (ESI), as set out in the Common Strategic Framework annexed to the Commission proposal for a Common provisions regulation of the ESI Funds

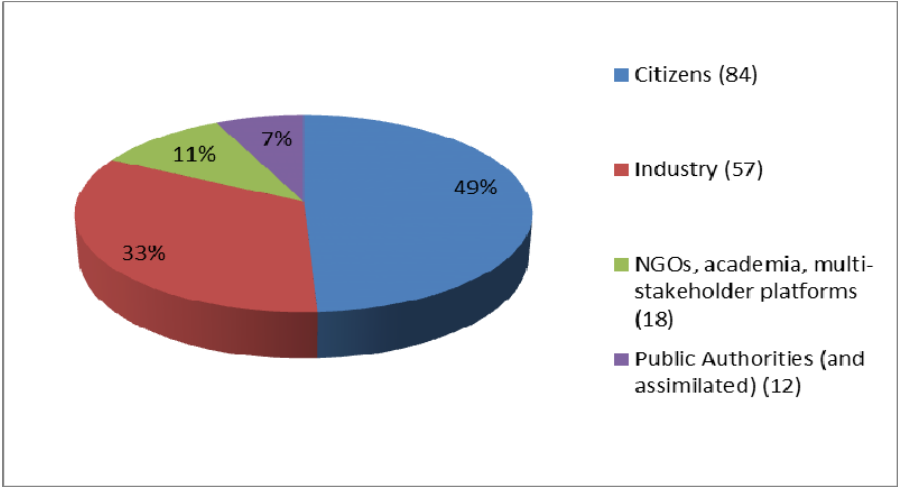
¹⁰ The 171 respondents include: 12 public authorities, or 7% (including 4 Member States; government agencies; one parliament and one municipality); 18 NGOs, academic and research institutes and multi-stakeholder platforms, or 11%; 57 industry representatives, or 33%; 84 citizens, or 49% (67 citizens only have responded to - almost all - the questions, and 2 petitions with 454 and 23 signatures respectively have received 1 vote each in the analysis)

¹¹ http://ec.europa.eu/energy/coal/ccs_en.htm

¹² To note that not all citizens gave detailed answers to all 7 questions.

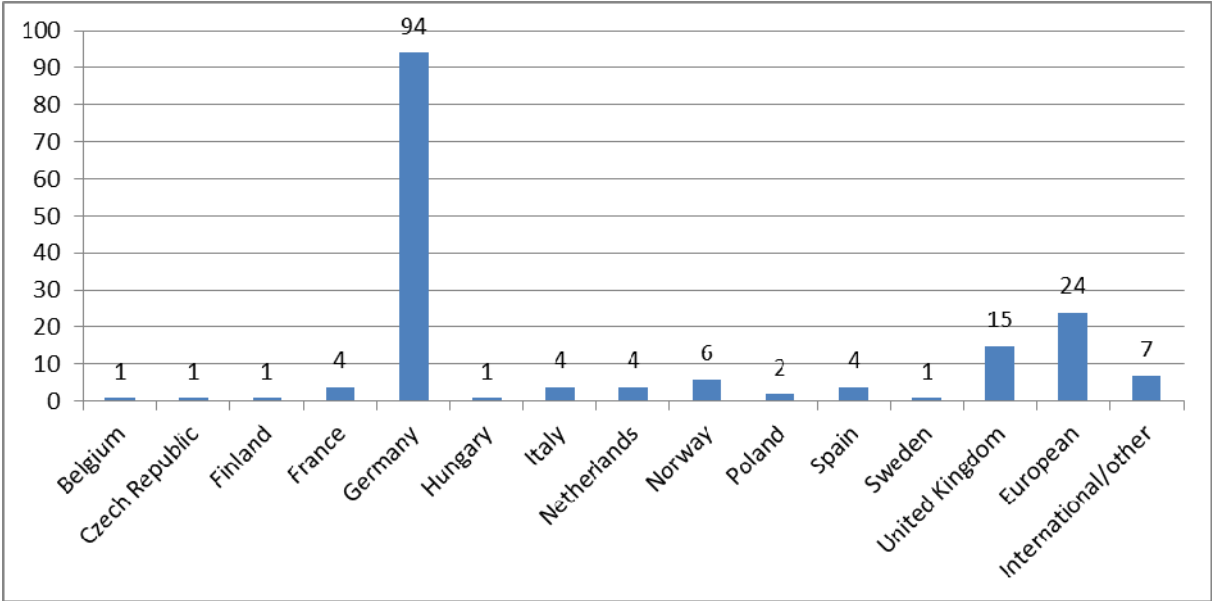
The range of organisations participating is illustrated in Figure 1 below.

Figure 1



The geographical spread of contributions can be seen in Figure 2 below¹³:

Figure 2



¹³ European-wide umbrella industrial associations and/or multi-stakeholders platforms have been classified as 'European'

2. DETAILED ANALYSIS

Question 1 asks stakeholders' views on whether MS with large shares of coal and gas in their energy mix and industrial processes should develop decarbonisation roadmaps aiming towards non-carbon emitting fuels (renewables, nuclear) and/or CCS strategies.

A majority of respondents (67%) consider that Member States should develop clear national roadmaps for the decarbonisation of their economies. National plans that aim at restructuring the energy sector towards non-carbon emitting fuels – mostly renewables – and would need to take into account electricity storage options were supported by a large majority of citizens (39% of all responses) and a few NGOs & associations.

Two thirds of NGOs & associations and half of industry participants would prefer MS to develop national decarbonisation roadmaps, which should constrain no energy supply options, but would ensure a level playing field for all low-carbon technologies and minimise market distortions. Several respondents from these two categories emphasise that this should be valid for all MS, not only those with large shares of fossil fuels in their energy mix, and that both power and industrial sectors, as well heating and transport, should be covered. The national roadmaps should be established in the frame of and consistent with the EU 2050 Energy Roadmap and 2030 climate and energy policy framework, and consider cross-border impacts. They should contain intermediate milestones, policies and incentives for delivery, and provide for regular progress reports. Concerns are raised, particularly by industry representatives, with regard to the need to take the competitiveness of European industries into account and to achieve a global level playing field. Half of public authorities show support for some kind of national decarbonisation roadmaps; some (16%) argue in favour of a single GHG emissions reduction target and a strong ETS as the best way to achieve de-carbonisation, giving MS flexibility to choose the most cost-effective means and energy mix.

A small minority of respondents (11% of the total) consider that CCS deployment strategies should be developed by MS authorities, if conditions are right and the respective national decarbonisation roadmaps rely on CCS development. A voluntary approach that recognises that not all MS need or are able to deploy CCS and that ensures collaboration at regional and European level is favoured by industry representatives. Some respondents would like, or even prefer, to see an EU long-term strategy to move CCS through demonstration to deployment, embedded in the 2030 policy framework, on a level-playing field with other low-carbon technologies, which would inform national CCS strategies. Outright opposition comes from all citizens who oppose CCS in general, as well as from a small number of respondents in the other three categories.

Question 2 invites stakeholder's views on the restructuring of the EU ETS, which would also help CCS deployment, and on the use of complementary auctioning revenues mechanisms.

A quarter of respondents consider that the EU ETS should be reformed and strengthened, as the most appropriate long-term incentive for all low-carbon technologies, including CCS. Nevertheless, it is recognised that exclusive reliance on the ETS/carbon price will not be sufficient to drive CCS development, in the context of uncertain carbon and fossil fuel prices. Support for the reform of the ETS is strongest among public authorities (two thirds); 10% of industry representatives oppose any such measures, arguing either that ETS is functioning well or that its reform will not help CCS development. Citizens have no concrete view on the reform of the ETS, contending that increases in the renewables supply will lead to a decrease in emission allowances.

Support for instruments based on auctioning revenues comes from less than a quarter of all respondents (23%). The percentage is higher among NGOs & associations and industry (50% and 47% respectively) and stands at a quarter of public authorities. Those in favour consider that such instruments should complement and build on the ETS, phasing out as the ETS strengthens and the technology matures (and costs are reduced); a few participants, especially in the industry category, emphasise that they should not go beyond early deployment. Respondents also draw attention to the need to revise implementing arrangements for any mechanisms similar to the NER300 programme, in order to provide more flexibility and transparency about the level of funding available. Opponents to complementary measures make up 45% of all respondents. Some argue that the effectiveness of NER300-like instruments is still doubtful and/or difficult to evaluate and believe that other types of support measures should be explored. Citizens consider that instruments such as the NER300 programme are not realistic and therefore oppose them.

Question 3 calls for stakeholders' opinions on what kind of support and/or policy measures, if at all, should be considered by the European Commission in order to pave the way for CCS early deployment.

Around one third of respondents are in favour of additional support measures and policies to support CCS development and deployment. Support is particularly strong among NGOs & associations (more than 75%) and public authorities (66%), as well as industry (64%). The main consideration is that the EU ETS, albeit the corner-stone of EU's climate policies, will not offer sufficient incentives for CCS development in the short run. Any measures envisaged should not undermine the ETS, or the electricity market, and should be limited in time, until the ETS can provide the main incentive.

Opponents to additional measures, making up 47% of all respondents, include all citizens, who argue that any available funds should be oriented in support of renewables, and small percentages in the other three categories. Some of the latter consider the economic and

technical viability of CCS still doubtful and environmental concerns too many, advocating for an impact assessment first on implementation costs and the effect on the European industry's competitiveness. Others prefer to leave the decision on whether to support CCS development to MS authorities. One argument that is used by both sides is that it might be too early to talk about support for deployment and that the focus should be on demonstration only for the moment - which nevertheless should be financed (mostly) from public sources. Additionally, increased efforts into R&D, especially into storage and transport infrastructure aspects and including the exploration of Carbon Capture & Usage (CCU) and Enhanced Oil Recovery (EOR) options, should not be overlooked.

Three concrete options are put forward in the communication: mechanisms based on auctioning recycling, Emission Performance Standards and a CCS certificate scheme. The mechanisms based on the recycling of auctioning revenues are the preferred ones (16% of respondents), whereas support is lowest for an EPS (5%) and slightly higher for a CCS certificate scheme (8%). Opposing any kind of additional support for CCS development, citizens have expressed no opinion with regard to the options put forward in the Communication.

The CCS certificate scheme finds some support among respondents in the NGOs & associations category, albeit at only 27%. Both the EPS and the CCS certificate scheme are opposed by 41% of public authorities. Rejection among industry participants is even stronger, at 56% for an EPS and 48% for a certificate scheme, respectively. Concerns are raised with regard to the potential distortive effect of both measures on the EU ETS. Furthermore, EPS are not considered effective in incentivising CCS. Further assessments with regard to the functioning of a CCS certificate scheme, in view of the need to have a sufficient number of installations available and their yearly capacity known and guaranteed, is required; other drawbacks mentioned are the high transaction costs and the fact that investors still carry the main risk associated with the development of (early) projects.

The main additional measures proposed by respondents include: CCS market incentives at MS level, especially for the short term (Feed-In Tariffs being considered the most appropriate), potentially combined with an EU wide CCS target integrated in the 2030 policy framework; a readjusted EU-wide low-carbon energy target that would include CCS-based power; the establishment of public-private partnerships to progress the successful demonstration of a few projects; the set-up of a CCS Fund for both power and industrial demonstration projects, with contributions from both the EC and MS, coupled with a power dispatching/operation guarantee to the projects concerned; loan guarantees, risk-sharing instruments, tax breaks or rebates introduced at MS level etc. There is no clear support in favour of any single option mentioned above.

Question 4 calls for stakeholders' views on whether energy utilities should be required to install CCS-ready equipment on all new investments.

Around a quarter of respondents (24%) consider that the current provisions of the 2009 CCS Directive on the CCS-readiness of fossil fuel power generation facilities are sensible and sufficient for the current stage in the development of the CCS technology. Additional requirements would need to be analysed from the point of view of economic feasibility and the impact on the competitiveness of European economies.

Most citizens (39% of all participants) declare their explicit opposition to any provisions on CCS-readiness, as they consider them useless investments. A small group of stakeholders (11%, but including half of NGOs & associations) would like to see provisions stronger than what the CCS Directive currently contains, in order to avoid potential technology and carbon lock-in, and as a strong signal that decarbonisation of the economy will occur.

Respondents from all categories apart from the citizens draw attention to the need to clarify the terms (capture and transport/storage readiness) and to provide a realistic definition of what CCS readiness entails for the facilities concerned. Furthermore, respondents consider that CCS-readiness requirements should apply equally to all large emitters, from both power and industry sectors, once CCS is demonstrated at scale and readily available. A few respondents called for the different situation of base-load and peak-shavers power plants to be taken into account, once such measures are considered.

Question 5 asks stakeholders' standpoint on the potential contribution of fossil fuel providers to supporting CCS demonstration and deployment.

Around 16% of respondents consider that fossil fuel providers should, in some way, contribute to the demonstration and deployment of CCS, since CCS has profound and far-reaching benefits for the entire society and warrants a wider support base. It is however acknowledged that there is a risk of passing on costs to consumers through increased prices, that methodological issues would have to be further examined and an impact assessment conducted. Support is highest among NGOs & associations (with more than half of participants in favour).

Opposition to this proposal stands at 54% of participants. A third of public authorities and of industry representatives are against the proposal, arguing that such measures need careful consideration, in view of potential distortions on the markets and complexity in implementation, especially with regard to non-EU providers. Furthermore, doubts are raised about the EU's competence with regard to the introduction of additional levies. Citizens who responded oppose the contribution of fossil fuel providers because they argue that CCS should not be developed, or deployed, at all.

Question 6 asks stakeholders to identify the main obstacles to ensuring sufficient demonstration of CCS in the EU

The lack of public (awareness and) support for CCS is considered the most important barrier to the demonstration of CCS by almost a third of respondents. The second major obstacle is the absence of a clear long term business case for CCS (22%). The lack of a clear regulatory and harmonised policy framework and the insufficient support for a CO₂ transport and storage infrastructure represent major impeding factors for 19 and 12%, respectively, of participants. 39% of all respondents (most citizens) consider that successful CCS demonstration has been prevented by its own absurdity and harmful effects.

Public opposition as a key barrier to CCS development and demonstration is ranked highest by industry representatives (almost two thirds), but also by 58% of public authorities and 61% of NGOs & associations. According to the answers given, opposition is based on negative perceptions of the potential risks on health and the environment, and concerns mainly onshore CO₂ storage and transport infrastructure, but is additionally underlined by a general lack of awareness of climate change issues and the role CCS can play in combatting it.

The other most important obstacles, in the view of public authorities participating, are the inadequacy of the ETS (the low carbon price) to incentivise the demonstration of CCS and the high costs impacting on the competitiveness of the facilities concerned (33% for each). Another third of the participants in this category consider that the operational, technical and financial uncertainties have prevented a quicker uptake of the technology.

For both NGOs & associations and industry representatives, the other key reasons behind the slow development of CCS are linked to the long-term business case (50 and 44% of responses, respectively) - in particular the insufficient public funding and business incentives, but also the high capital and operational costs (especially for early movers) and the low ETS carbon price. Policy and regulatory uncertainties and insufficient harmonisation are cited as discouraging factors by the NGOs & associations (39%), which also perceive that a clear vision (especially at EU level) that CCS will play a role in the decarbonisation of Europe's economy is lacking. More than a quarter of NGOs & associations and 23% of industry representatives mention the 2009 CCS Directive provisions on liability issues and management of storage sites as a key problem, with some calling for a review of the Directive in 2015.

Question 7 asks stakeholders for their views on how to improve public acceptance of CCS.

Information and awareness raising campaigns on the role of CCS as a key tool in the portfolio of climate change mitigation options, highlighting the economic benefits associated with its development – for energy security and increased uptake of renewable energy, for jobs, growth and investment in industrial sectors etc. - are considered the best way of improving public acceptance of CCS (by 18% of all respondents). Stakeholders' responses also point to a

successful demonstration programme as essential in building public confidence in the merits of the CCS technology and showing that CCS (especially CO₂ storage and transport) is safe and reliable (16%). Participants emphasise the need to involve citizens in decision-making through open and transparent debates and consultation (15%), thus taking into account local concerns. Exploration of alternatives such as CCS-biomass and CCU are mentioned as potential options to increase public acceptance of the technology by 10% of respondents.

39% of all participants (the majority of citizens) consider that public acceptance of CCS cannot be improved and urge the EC to concentrate on other priorities such as renewable energy, energy storage, efficiency, intelligent networks.

Two thirds of the NGOs & associations participating consider that the information programmes focussing on the wide-ranging benefits of CCS will give the best results, followed by transparent and open consultation and debates, and demonstration and pilots projects (33% for each). The latter is considered a recipe for success by a third of industry representatives, alongside information campaigns addressing concerns related to the impacts and risks for health and the environment (32 and 30%, respectively). The options mentioned above are viewed by public authorities as equally effective in gaining the public's trust; they also consider that exploring the potential of CCU, highlighting CO₂'s value as a commodity, would facilitate greater acceptance of the technology.