Scotland's Net Zero Roadmap: D1.4.3 Community Engagement Messaging & FAQs

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About Scotland's Net Zero Roadmap and Partners

Scotland's Net Zero Roadmap (SNZR) is Innovate UK-funded project number 75206. The aim of the project is to develop a roadmap that sets out how Scottish industry can move towards Net Zero by 2045, based on exploring a number of decarbonisation scenarios. The project focuses on a cluster of industrial activity on the East Coast of Scotland which covers many of the largest industrial sites across a range of sectors and 80% of Scotland's industrial CO_2 emissions.

SNZR is led by NECCUS and other project partners are Aker Solutions Limited, Costain Limited, Doosan Babcock Limited, Energy System Catapult Limited, Halliburton Manufacturing and Services Limited, Net Zero Technology Centre, Optimat Limited, Pale Blue Dot Energy Limited, The University of Edinburgh, The University of Strathclyde, and Wood Limited.

Executive Summary

At the application stage of Scotland's Net Zero Roadmap (SNZR) project, the reviewers identified the need to understand the views of the public and to identify key messages and narratives that would support the development of the decarbonisation plans, for CCUS in particular.

With no live projects in the UK, limited public awareness of CCUS, and the negative attitudes of some NGOs to CCUS, this is an area that may impact on project development. To address this, SCCS developed a "Industrial Decarbonisation Clusters: communicating with the public" series comprised of two webinars to explore these issues, and enable discussion between experts and SNZR project members, the other UK cluster plan projects and industry partners engaged in CCUS, and other key stakeholders.

The first of these webinars was held on 28 June 2021, and brought together academics to discuss their findings and analysis around the following questions:

- What do the public think about CCS? Do they think about it at all?
- There are many new projects in the pipeline in the UK and some repositioning of attitudes of NGOs – what impacts are there on developing projects?
- Multi-industry decarbonisation clusters are forming – how does communicating these projects differ in comparison with a project on a single point source?
- Who should be undertaking this communication?

The second webinar was held on 7 December 2021, and brought together speakers and a chair from academia and industry representing CCS projects in four continents. The event explored how those projects had undertaken engagement with publics and enabled discussion around effective and successful routes and techniques.

This report summarises the key messaging from this webinar series and lists a (not exhaustive) number of frequently asked questions (FAQs) by publics where CCUS projects are concerned. This report fulfils the requirements of deliverable D1.4.3.

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Approved By: XXX	**Date:** XXX

1 Introduction

At the application stage of Scotland's Net Zero Roadmap (SNZR) project, the reviewers identified the need to understand the views of the public and to identify key messages and narratives that would support the development of the decarbonisation plans, for CCUS in particular.

With no live projects in the UK, limited public awareness of CCUS, and the negative attitudes of some NGOs to CCUS, this is an area that may impact on project development. To address this, SCCS developed a "Industrial Decarbonisation Clusters: communicating with the public" series comprised of two webinars to explore these issues, and enable discussion between experts and SNZR project members, the other UK cluster plan projects and industry partners engaged in CCUS, and other key stakeholders. The first webinar broadly focused on historical issues and the pitfalls and strategies to avoid; the second webinar focused on learning by example, with contributions from real-world projects. The two webinars were held in June and December 2021 respectively.

This report summarises the key messaging from this webinar series and lists a (not exhaustive) number of frequently asked questions (FAQs) by publics where CCUS projects are concerned. Other useful resources are also highlighted where relevant. The contents and resources herein should prove useful to all stakeholder groups, and be particularly relevant for project developers.

2 Communicating with the public – key messaging

Community engagement is a key part of developing large-scale infrastructure projects, and it is important to communicate effectively with the public, in the right way and at the right time. Where CCS is concerned, history tells us that there are certain practices and processes that ought to be followed and others that need to be avoided. This section outlines the key messaging from the two webinars in this series.

Webinar 1 focused on community engagement routes and explored historical issues with CCS communication and public acceptance, and brought together four academics to discuss their findings and analysis around the following questions:

- What do the public think about CCS? Do they think about it at all?
- There are many new projects in the pipeline in the UK and some repositioning of attitudes of NGOs - what impacts are there on developing projects?
- Multi-industry decarbonisation clusters are forming - how does communicating these projects differ in comparison with a project on a single point source?
- Who should be undertaking this communication?

Webinar 2 brought together four speakers and a chair representing CCS projects in four continents to explore how those projects have undertaken engagement with publics and to enable discussion around effective and successful routes and techniques. The projects discussed were:

- CO2CRC, Australia
- CTSCo, Australia
- Tomakomai Project, Japan
- Acorn Project, UK

- Illinois Basin – Decatur Project, USA

The key messaging from the presentations, polls and panel discussions from both webinars is listed below.

- **Public opposition** – Opposition to a particular project(s) has wider implications – it threatens to slow the speed at which we can transition to a decarbonised economy.
    - **Sources of opposition** – The loudest voices may not come from within the communities most affected or involved; they may come from the national level;
    - **Opinions based on perception** – Opinions tend to be formed based on perceptions of the person delivering the message, not necessarily on knowledge of a technology or its potential benefits or risks;
    - **Opinions based on flawed information** – Opinion-shapers and publics may latch onto so-called 'scientific' claims and outputs which may lack appropriate levels of rigour and quality, and which may even have subsequently been discredited.
- **Social acceptance** – The deployment of major infrastructure needed for deep decarbonisation can only be successfully achieved with social acceptance. Social acceptance in this context refers to (i) the general acceptance of the technology by the wider public and, importantly, (ii) acceptance by the community(ies) that will host the facilities and/or infrastructure.
- **Social acceptability** – As opposed to social 'acceptance', this implies a conscious effort to design, implement and deliver a project (more) agreeable to stakeholder groups, i.e. one that is acceptable to, and not just accepted by communities. This suggests a more fair and participatory approach.
- **Necessity and fairness of CCS** – While much work on the public acceptability of CCS has focused on safety, risk, trust and social licence to operate, the majority of opinion-shaping concerns relate to the perceived necessity and fairness of CCS.
    - **Necessity** – It is important to outline:
        - *"How current and upcoming CCS projects **will differ from past attempts**;*
        - *Where and how CCS is the **most desirable and necessary** option;*
        - *What can be done by CCS now to **meet Just Transition imperatives**."*[1]
    - **Three tenets of fairness:**
        - ***"Procedural justice**: the way in which the process is structured and implemented;*
        - ***Distributional justice**: how benefits and ills of the project are distributed;*
        - ***Recognition justice**: acknowledgement, recognition and respect."*[2]
- **Engage early** – The earlier the better. Early and open communication with the public helps to build mutual trust between stakeholder groups.
- **First impressions** – First impressions are important and actions tend to be interpreted through the lens of relationships. In the context of a poor relationship, actions could be seen as hostile, while a more hands-off approach could lead to perceptions of withholding information or of having something to hide.

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1 Mabon, L. (2021). *Ethical and justice concerns around CCS: what they are, and why do they matter?*. Webinar 1 slides (June 2021)

2 Dunphy, N. (2021). *Effective engagement with public(s)*. Webinar 1 slides (June 2021)

- **Understand your audience** – Technology deployments often tend to be located in peripheral areas, in/near communities with poor infrastructure, lack of employment opportunities and low incomes. A good project will respond to these.
- **History and context** – A detailed understanding of target communities is vital to developing and implementing appropriate engagement strategies that properly reflect the specific cultural and historical context if those communities.
- **Understanding support** – While communities built around large industrial facilities may be more receptive to a project(s), support for one aspect of a project does not necessarily mean there is support for another. For example, support for industrial clusters is not the same as support for decarbonising industrial clusters.
- **Expertise & community liaisons** – Employing appropriately skilled staff and/or enlisting the help of known and trusted entities within local communities is vital to building relationships.
- **Blended approach to communication** – Complementing official formal communications and processes with more informal modes helps to ensure more effective outreach and to build and maintain trust among and across different stakeholder groups.
- **Information** – The provision of high-quality and tailored information helps to build trust, and can pre-empt potential issues and generally promote the credibility of both the project and its proponents.
- **Listening** – Real engagement involves a genuine two-way flow of information. Listening to the public's concerns, views and interests is essential and encourages their participation in the decision-making process.
- **Project framing** – An appropriately framed project can tap into the local consciousness and promote pride in being part of the solution to climate change while driving technological development.

3 Frequently Asked Questions (FAQs)

The two webinars highlighted the importance of *place* and *history* in the attitudes that public and other key stakeholders take to CCS and other large-scale infrastructure projects.

For example, a history of coal-mining in the area may mean that people are accustomed to working with the sub-surface and are comfortable with CO_2 storage concepts. Alternatively, if there have been issues, such as with subsidence or pollution this may result in an increased awareness of risks, and a resultant anxiety around health and safety issues. This history of place will influence attitudes and the questions that are asked.

For onshore storage a FAQ is whether the CO_2 will pollute potable water. However, locating storage offshore does not remove concerns around the impact of storage on water: the marine environment is a major source of employment in Scotland. The QICS project explored the impact of offshore CO_2 leakage, including public perception. It was found that "*a number of participants in this study used their knowledge of physical processes on land to envision what the risks of offshore storage might be,*

and did not always see physical distance as insulating them from problems like ground-water contamination or induced seismicity."[3]

Project developers need to be aware of these sensitivities and listen to concerns raised. Below is a non-exhaustive list of commonly asked questions and example answers about the safety and general viability of CCUS. Project developers, however, should consider their responses in the context of a given project: geographical area, stakeholders, technology(ies), history of site and local employment, etc. It is comprised of content independently researched by SCCS, and, in section 4, links are provided to FAQs prepared by other organisations.

3.1 How will CCS contribute to climate action when fossil fuels are being phased out?

Not all CO_2 emissions are due to the combustion of fossil fuels. Around 6-8% of global emissions are from steel production and 6% from cement production, with these emissions predominantly due to the production process not energy use[4]. We need to be able to decarbonise these industries in order to continue building infrastructure, such as roads, railways, buildings and renewables. CCS enables us to begin to decarbonise these industries now.

CCS also enables the early production of low-cost hydrogen at the volumes needed to decarbonise both residential and industrial heat, and transport (road haulage, construction, aviation and shipping).

It may also provide carbon dioxide removal and negative emissions which can offset those hard-to-abate sectors such as agriculture and aviation. This can be achieved through direct CO_2 capture from the air, and capture on CO_2 emissions that come from biomass sources such as large-scale fermentation (distilleries, anaerobic digestion, etc.) and biomass combustion, including energy-from waste.

3.2 How is CO_2 stored underground?

In the UK CO_2 will be stored offshore in the subsurface, about which we have lots of information and knowledge. The UK has been extracting oil and gas for many decades, and the offshore subsurface is well-characterised; this information is used to select appropriate sites and model the behaviour of the CO_2 in a storage site. The CO_2 is stored in tiny pores in the rock, previously filled by salt water or oil and gas. Selection of a storage site uses the data we have (seismic, well-bore logs, etc.) to identify an area at least 800m below the seabed, consisting of a layer of porous, permeable (the pores are connected) rock, with impermeable *cap rock* layers above. The cap rock acts as a lid on the storage site, preventing the migration of CO_2 to the surface.

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[3] Mabon, L., Shackley, S., Blackford, J. C., Stahl, H., & Miller, A. (2015). Local perceptions of the QICS experimental offshore CO2 release: Results from social science research. *International Journal of Greenhouse Gas Control, 38*, 18-25. doi:https://doi.org/10.1016/j.ijggc.2014.10.022

[4] IEA World Energy Balances Database. Retrieved from https://iea.blob.core.windows.net/assets/8bd626f1-a403-4b14-964f-f8d0f61e0677/World_Energy_Balances_2019_Overview.pdf

3.3 How can we be sure that CO_2 storage is safe?

Experience (including 25 years of CO_2 injection in the Sleipner field offshore of Norway) and models tell us that storage is safe and secure[5]. It is a legal requirement of the licensing of CO_2 stores to measure, monitor and verify throughout the operation of the site, and also post-closure. The characterisation, modelling and verification of these models through real-life measurement is key to ensuring that the store remains safe. In the unlikely event of CO_2 leakage it enables identification of the reason, and hence the leak can be fixed. How this is done will depend on the source of the leak, and may use techniques developed in the oil and gas industry over many decades, and newer techniques developed specifically for CO_2 storage.

3.4 What will happen to the sea and marine life if the CO_2 leaks?

Impacts of CO_2 leakage on the sea and marine life are likely to be small compared to the impacts of ongoing processes such as bottom trawler fishing and ocean acidification. Should CO_2 leak from the seabed, any impacts will be highly localised (radius of tens of metres) and the risk of significant harm being caused to the sea or marine life is very low. Two projects offshore of Scotland have tested the impact of a seabed CO_2 release – QICS and STEMM-CCS. Their findings suggest that there would be impacts on the immediate ecosystem, but the recovery from these is expected to be rapid - within one growing cycle or season – although the impacts on specific plants or animals will depend on their stage of development.[6]

3.5 CCS technology doesn't work, so how can we use it?

The technologies required for CCS have been in use around the world for many decades. Capture technologies have been in use in the oil and gas industry since the 1970s - including in Scotland - and in the USA 100s of km of pipeline have been transporting CO_2 for decades[7]. There is also international experience of the injection of CO_2 into onshore and offshore storage sites, for example the Sleipner field has been operating successfully for more than two decades[8] and full chain projects on coal power plant and oil-refining have injected millions of tonnes of CO_2 in the Quest[9] and Boundary Dam projects in Canada[10]. CCS projects are catalogued in maps from SCCS[11] and the GCCSI[12].

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5 Alcalde, J., et al. (2018). "Estimating geological CO_2 storage security to deliver on climate mitigation." Nature communications **9**(1): 1-13.

6 Dean, M., et al. (2020). "Insights and guidance for offshore CO_2 storage monitoring based on the QICS, ETI MMV, and STEMM-CCS projects." International Journal of Greenhouse Gas Control **100**: 103120.

7 Carbon Dioxide Pipeline [Press release]. Retrieved from https://www.dakotagas.com/about-us/pipelines

8 Sleipner partnership releases CO2 storage data [Press release]. Retrieved from https://www.equinor.com/en/news/2019-06-12-sleipner-co2-storage-data.html

9 Quest Carbon Capture and Storage. Retrieved from https://www.shell.ca/en_ca/about-us/projects-and-sites/quest-carbon-capture-and-storage-project.html

10 Boundary Dam Carbon Capture Project [Press release]. Retrieved from https://www.saskpower.com/Our-Power-Future/Infrastructure-Projects/Carbon-Capture-and-Storage/Boundary-Dam-Carbon-Capture-Project

11 SCCS (2022). Global CCS Map. Available at: https://www.sccs.org.uk/expertise/global-ccs-map

12 GCCSI (2022). Global CCS Facilities Database. Available at: https://www.globalccsinstitute.com/co2re/

3.6 What will happen if there is an earthquake?

CO_2 storage sites are not normally situated near high-risk areas of seismicity. The North Sea basin is a very stable region and, while seismic events do occasionally occur, to date there has been no significant impact on oil and gas operations. Following large earthquakes in one of the most seismically active regions in the world, no leaks were detected from two demonstration CO_2 storage projects in Japan (the Nagaoka pilot project in 2004[13] and the Tomakomai CCS demonstration project in 2018[14]) and CO_2 injection has since continued.

3.7 Is storing CO_2 the same as fracking?

No, CCS involves injection of CO_2 into the subsurface with the intention of storing the CO_2 over geological timescales, the pressure is carefully monitored, specifically to avoid fracturing of the rock which would impact on the security and longevity of storage. Conversely, fracking intentionally fractures the rock and injects liquids into the subsurface under high pressure to enable the extraction of oil and/or gas.

As mentioned above, this is not an exhaustive list of FAQs, additional questions and proposed responses can be found in some of the resources listed in Table 1, particularly the EU CCUS Projects Network report and FAQs on the CCSA website.

[13] RITE (Research Institute of Innovative Technology for the Earth) (2007). Demonstration Test and Monitoring at the Iwanohara Test Site. Available at: https://www.rite.or.jp/English/lab/geological/demonstration.html

[14] Japan CCS Co. Ltd (2018). Research Report on Impacts of Hokkaido Eastern Iburi Earthquake on CO_2 Reservoir.

4 Other useful resources

Table 1 shows a selection of useful resources for the purposes of CCUS community engagement and understanding the safety, application and viability of CCUS more generally.

Table 1: List of resources that explain how CCS works and provide responses to FAQs.

Resource	Link
EU CCUS Projects Network - ***Public perception of CCS: A Review of Public Engagement for CCS Projects***	https://www.ccusnetwork.eu/sites/default/files/TG1_Briefing-Report-Public-Perception-of-CCS.pdf
SCCS – ***Why CCUS?***	https://sccs.org.uk/why-ccus
SCCS – ***Global CCS Map***	https://sccs.org.uk/expertise/global-ccs-map
CCSA – ***Explore CCUS***	https://www.ccsassociation.org/discover-ccus/explore-ccus/
CCSA - ***FAQs***	https://www.ccsassociation.org/about-us/faqs/
GCCSI – ***Understanding CCS***	https://www.globalccsinstitute.com/about/what-is-ccs/
Bellona – Subjects > ***Carbon Capture and Storage***	https://bellona.org/work-areas/ccs
ZEP (Zero Emissions Platform) – ***About CCS/CCU***	https://zeroemissionsplatform.eu/#
IEAGHG – ***CCS Info & News***	https://ieaghg.org/#
BGS – ***Carbon capture and storage (CCS)***	https://www.bgs.ac.uk/geology-projects/carbon-capture-and-storage/
EU Science Hub – ***Carbon capture, utilisation and storage***	https://ec.europa.eu/jrc/en/research-topic/carbon-capture-utilisation-and-storage

5 Appendix

5.1 Webinar 1 - agenda and speakers

Date and time

Monday 28 June 2021, 10:00-11:30 (BST)

Welcome

Richard L Stevenson (UoE/SCCS) - Housekeeping / SNZR introduction

Chair & Introduction

Dr Jen Roberts (University of Strathclyde)

Speakers

Dr Niall Dunphy (University College Cork), “Effective engagement with public(s)”

Dr Leslie Mabon (Open University), “Ethical and justice concerns around CCS: what they are, and why they matter”

Dr David Reiner (University of Cambridge), "Lessons learned on engaging with publics and industrial decarbonisation"

Q&A / Discussion

The meeting was held under Chatham House rule, and it was stated at the beginning that the recording would have the discussion and Q&A removed before release to conserve anonymity of the audience. However, this was deemed not to be necessary as none of the audience were identified in the Q&A and discussion (or the polls) so the recording can be released in its entirety, making it a much more useful record of the event for key stakeholders, particularly for those who were unable to attend.

Recording

https://datasync.ed.ac.uk/index.php/s/6fLDn3Pa5evgpwk (available until SNZR project end date: 31/12/22):

Password (case sensitive): **SNZRWEB1280621**

5.2 Webinar 2 – agenda and speakers

Date and time

Tuesday 7 December 2021, 20:00-21:30 (GMT)

Welcome

Dr Philippa Parmiter (UoE/SCCS) - Housekeeping / SNZR introduction

Chair & Introduction

Dr Sallie Greenberg (Illinois Basin – Decatur Project, USA)

Speakers

Dr Matthias Raab (CO2CRC, Australia) - Public engagement for CCUS – an Australian perspective

Nikki Accornero (CTSCo, Australia) - The challenges of engaging the silent majority

Dr Leslie Mabon (Tomakomai Project, Japan (Open University, UK)) - Societal and stakeholder considerations for offshore CCS projects: insights from Tomakomai, Japan

Kirsty Lynch (Acorn Project, UK) - Public engagement and communication for CCS - learn the lesson

Q&A / Discussion

The meeting was held under Chatham House rule, and it was stated at the beginning that the recording would have the discussion and Q&A removed before release to conserve anonymity of the audience. However, this was deemed not to be necessary as none of the audience were identified in the Q&A and discussion (or the polls) so the recording can be released in its entirety, making it a much more useful record of the event for key stakeholders, particularly for those who were unable to attend.

Recording

The webinar 2 recording was not publicly available at the time of writing. It will feature in an upcoming NECCUS webinar series, after which it will be made publicly available.

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