

**Carbon Capture, Transport and Storage
Regulatory Test Exercise**

11 & 12 August 2010

Output Report

Produced by Scottish Government Energy Markets Unit

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1. INTRODUCTION

The Scottish Government document “Carbon Capture and Storage – A Roadmap for Scotland” sets out key milestones considered to be necessary to enable CCS to become a reality. A main role for Scottish Government and the public sector was identified: to ensure that an “appropriate consenting and regulatory framework is in place”.

Scottish Government (SG) and the Scottish CCS Regulatory Stakeholders Group¹ developed a regulatory matrix which provides a comprehensive outline of the key consents and licences required (from consent to decommissioning) for the whole CCS chain – capture/transport/storage. This identified over 50 separate consents were required for a CCS project.

This project was intended to provide an essential first step in achieving the Roadmap’s aims for regulation through assessment of the current regulatory and consenting framework.

Milestone dates

It was intended the project would take six months from development to finalising this report. The timelines associated with the project were as follows:

- 20 April – 18 June 2010: project development and consultation with stakeholders including consulting with the Thermal Generation & CCS IAG, the Scottish Government Energy Advisory Board, and the Scottish CCS Regulatory Forum. During this time the mock project application was developed and finalised.
- 21 June – 31 August: run scenario / live application process including planning and holding a 2 day event (11/12 August) which provides the opportunity for a live run through of a licence application.
- 1 September - end October 2010: undertake assessment of the two day event, consult with stakeholders and write up report.

¹ Department for Energy and Climate Change (DECC) Offshore, The Crown Estate, Marine Scotland, the Scottish Environment Protection Agency (SEPA), the Health & Safety Executive (HSE) and Scottish Natural Heritage (SNH))

2. EXECUTIVE SUMMARY

From April to August 2010, the Scottish Government coordinated a scenario project to assess the regulatory framework for carbon capture and storage (CCS) in Scotland. The principal objective of the project was to identify any regulatory gaps or overlaps that could be streamlined or better managed, and to evaluate the risks, barriers, information gaps and any other issues that would affect the successful demonstration and deployment of CCS in Scotland.

The project comprised the following components:

- An illustrative CCS project application to cover full chain, capture, transport, storage and decommissioning – based on a coal-fired plant, post-combustion capture, onshore pipeline transport, with storage in the North Sea;
- Consideration of the project application in a live process exercise involving all of the major stakeholders in a two day workshop (developers, regulators², government, NGOs, public interest groups);
- Cradle to grave assessment of the whole project for the full raft of 56 consents / licenses required.
- External peer review assessment and critique of the process by observers from the Global CCS Institute and EU Zero Emissions Technology Platform (ZEP).

Key findings of the process:

- **Full chain CCS projects are some of the largest infrastructure projects ever considered in Scotland with some of the greatest amounts of public funding;**
- **These are complex projects involving multiple interest groups and a range of overlapping regulatory regimes;**
- **The regulatory framework for CCS is emerging well in the UK, with regulators taking a positive, enabling approach to CCS projects, whilst protecting the environment and human health;**
- **Aspects of CCS regulation are still emerging, particularly offshore, where there is greatest uncertainty for developers, and regulators and developers will ‘learn by doing’;**
- **Some remaining technological issues need to be addressed before regulators can be certain, but projects are underway to address these gaps;**
- **Environment agencies could permit a good application now within the existing regulatory framework which is generally fit-for-purpose**
- **Co-operation and joint working across Government departments and regulators will be essential to ensuring effective management of CCS regulation within the demanding timescales required by the UK and EU CCS competitions;**
- **Regulators could also look at procedures to improve the way in which environmental information is made available as part of the licensing / consenting process; and at ways to better inform the public about the**

² Department for Energy and Climate Change (DECC) Offshore, The Crown Estate, Marine Scotland, the Scottish Government Energy Consents Unit, the Scottish Environment Protection Agency (SEPA), the Health & Safety Executive (HSE) and Scottish Natural Heritage (SNH)

whole chain of a CCS project and the many consents and consultations associated with this.

- **Early discussions with stakeholders are key to streamlining the regulatory process in all parts of the CCS chain**
- **Public awareness / engagement is the key issue that will determine the overall success of CCS projects.**

Overall conclusions

From this, participants concluded that the CCS demonstration programmes planned at UK and EU level would be the primary vehicle for testing and refinement of the regulatory approach and for effective public engagement. Ensuring that this was a key feature of the demonstration projects was as important as them assessing the economic and technical viability of CCS and will be a key part of the knowledge exchange and learning to be made available in the demonstration programmes.

It is clear that all of the early enablers (developers, regulators, governments, NGOs, academics) have a big responsibility in ensuring the successful demonstration of CCS. Much of the learning around CCS – on the regulatory aspects as well as on the technical and economic ones will come through engagement with the actual project applications coming forward under the demonstration programme.

Overall, given the complexity and size of the CCS projects and the large numbers of permits required, the process showed that effective management of the regulatory framework would be crucial to the success of the demonstration programme in the UK and EU. There is general support amongst participants (developers, regulators, NGOs, government) for managing project applications collectively through some form of project monitoring board that can consider the collective time management of all of the permits in the round.

Next steps

Given that regulators are legally constrained by EU, UK and Scottish regulations, the short-medium term objective of future regulatory reform will not be to streamline the numbers of permits. This may be a longer term objective, following successful completion of permitting processes for the demonstration projects, learning by doing.

The most immediate objective for effective application of the regulatory framework must therefore be **to ensure that the CCS demonstration projects under the UK and EU competitions can be delivered within the timelines required by the competitions.** That means that the next step is to focus on how applications under the regulatory framework can be processed within the timescale available.

The Scottish Government has consulted the regulators who participated in this project, and suggested the following potential areas for actions that can be taken forward as next steps when the demonstration projects come forward for approval. These would be taken forward by a Project Monitoring Board consisting of the regulators and the developers, which would meet quarterly to discuss progress on the following issues:

- 1). Project timeline – the Monitoring Board would meet with developers at the project inception and agree a project timeline for the consenting processes which is aligned by the deadlines required by the UK and EU competitions; this Board would then monitor progress to deal with any slippage and find solutions to keep the project on track to meet the deadlines. This would also help regulators to effectively manage their resources.
- 2). Environmental statements – the Monitoring Board will explore the potential for project developers to take forward single environmental statements for the onshore and offshore areas as a way of streamlining the environmental information process and making it easier for communities to engage with the project overall across its capture, transport and storage aspects.
- 3). Community engagement – the Monitoring Board will explore the mechanisms for effective engagement with the communities affected by the project to explain how the different permitting processes and regulators work together and to make it easier for communities to understand how the project is regulated and how they can respond to the various statutory consultations.

These 3 main areas of activity will address the main gaps identified by the interactive workshop around regulatory coordination, environmental information and community engagement. The Monitoring Board can act as a useful body to collate information on progress to ensure that project delivery is on track. The Monitoring Board will not undertake assessment of permit applications, which will continue to follow the existing statutory processes which the workshop showed are fit for purpose. It will focus instead on providing an overarching view of the progress of the project as a whole .

Together, these actions will represent real progress on the development and implementation of a regulatory framework for CCS that is as robust and streamlined as possible to ensure that the demanding UK and EU timelines are met, whilst ensuring better provision of information to communities.

3. OVERVIEW

Purpose

To date there has been no assessment undertaken within the UK of the effectiveness of the regulatory system developed to implement the 2009 Directive on the Geological Storage of Carbon Dioxide. The scenario project was to test the regulatory framework by undertaking a “Dry Run” based on a hypothetical CCS project to assess and identify any regulatory or licensing gaps and as a result, produce effective solutions to improve the processing of future CCS applications.

The project ran for six months and took the form of a high level assessment of the ability of the regulatory framework to licence a CCS project in Scotland. Undertaking the assessment provided the opportunity to identify and evaluate potential issues, risks, barriers and information gaps within the regulatory provisions for the full chain of CCS. The focus of the exercise was an interactive workshop event for regulators, developers and public interest groups, designed to test a mock illustrative application covering the full chain of carbon capture, transportation and storage.

Objectives

The interactive workshop event provided the opportunity to assess the current regulatory framework and to expose and address any potential risks ahead of any live CCS projects. The test exercise sought to:

- Test assumptions and beliefs regarding the current regulatory framework;
- Highlight uncertainties and regulatory gaps;
- De-risk the regulatory regime by assessing the simulation of a live application;
- Streamline regulation in line with the better regulation agenda where appropriate;
- Consider and report any constraints where there is missing or incomplete information;
- Highlight regulatory areas for amendment or development for SG (and other bodies);
- Provide reassurance to agencies, industry and the public that the regulatory regime is fit for purpose, has been tested and provides a clear route to the safe storage of CO₂ from industrial processes.

Methodology

An illustrative application was developed to cover the full chain of carbon capture, transportation and storage. A two day workshop event was held to assess the mock licence application. The application was based on a mock application for a 300 megawatt electrical (MWe) coal fired power plant with post combustion capture based in the central belt of Scotland, near Dundee. It included an application for consent to construct over 16 kilometres of new pipeline to carry high pressure CO₂ to the gas pipeline network, the reuse of an existing natural gas pipeline to St. Fergus for CO₂ transport, and then offshore to the Mains aquifer for final storage. The application was entirely fictitious and bears no relation to any actual or planned CCS project. Developers who participated in this process did so independently of any

actual CCS project in which they may be involved, using the interactive event to make general comments on the CCS regulatory framework.

The application covered the 4 principal components of the project (capture, transport, storage and decommissioning) and their associated regulations, principally:

- CAPTURE

- s.36 Electricity Act 1989
- Electricity Works (Environmental Impact Assessment (Scotland) Regulations 2000
- Pollution Prevention & Control (Scotland) Regulations 2000
- Control of Major Accident Hazards Regulations 1999
- Planning (Hazardous Substances) (Scotland) Act 1997
- Planning (Control of Major Accidents Hazards) (Scotland) Regulations 2009

- TRANSPORT

- Pipelines Act 1962
- Pipeline Works (Environmental Impact Assessment) Regulations 2000
- Town & Country Planning (Scotland) Act 1997
- Conservation (Natural Habitats, & c.) Regulations 1994
- Pipeline Safety Regulations 1996
- Environmental Impact Assessment (Scotland) Regulations 1999
- Control of Major Accident Hazards Regulations 1999
- Pollution Prevention & Control (Scotland) Regulations 2000
- Greenhouse Gas Emissions Trading Scheme Regulations 2005

- STORAGE

- Energy Act 2008
- Petroleum Act 1998
- Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001
- Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999
- Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001
- Coast Protection Act 1949
- Offshore Installations (Safety Case) Regulations 2005
- Offshore Petroleum Activities (Oil Pollution Prevention & Control) Regulations 2005
- Offshore Chemicals Regulations 2002
- Pipeline Safety Regulations 1996

- DECOMMISSIONING

- Energy Act 2008
- Marine & Coastal Access Act 2010

The process for application for a lease from the Crown Estate and an application for a storage licence from DECC and the Scottish Ministers was also assessed.

Participants

There were over 70 participants in the event, broadly grouped as follows:

- REGULATORS
 - Scottish Government (Energy consenting team, Planning, CCS Policy)
 - UK Department of Energy & Climate Change – offshore licensing
 - Scottish Environment Protection Agency
 - Health & Safety Executive
 - Marine Scotland
 - Crown Estate
 - Local Authorities (Fife Council, North Ayrshire Council)

- DEVELOPERS
 - Scottish Power
 - Scottish & Southern Energy
 - CO2 Deepstore
 - Shell
 - National Grid

- PUBLIC INTEREST GROUPS
 - WWF Scotland
 - RSPB

- OBSERVERS & FACILITATORS
 - Professor Russel Griggs, Chair of Scottish Government Regulatory Review Group
 - Global CCS Institute
 - EU Technology Platform for Zero Emissions Power Generation (ZEP)
 - Scottish Government

The event was effectively facilitated by Professor Russel Griggs, with support from ZEP and the GCCSI and it was useful to have some distance between event co-ordinators and those taking part.

The event was run on the lines of a live process/game theory exercise in which the project was presented, considered and assessed under each of the different regulations.

Risks and barriers identified during the workshop were captured in participant feedback sheets and by observers.

This report sets out the key findings from the workshops including gaps, constraints and issues that may be considered as “show stoppers” to a live application. There are three main sets of issues that recurred in each of the sessions and they are summarised below:

- Project timeline

- Environmental information
- Community engagement

The Scottish Government is keen that this report can be used to help others in the development and refinement of the regulatory process. The report does not contain all of the answers but sets out some key areas for action and improvement, and has initiated a process which will then be tested and refined through actual testing of the framework against a real application.

4. KEY FINDINGS – CAPTURE

The Scottish Government is committed to processing all s36 development consent applications within 9 months – if the application is referred to Public Local Inquiry (PLI) the duration would be extended by a minimum of one year. Environmental permitting would require a minimum of five months – this includes time set aside for public consultation. The time required to determine an application for a permit under the Pollution Prevention and Control regime will vary depending on the complexity of the application and upon the quality of the application.

Project timeline

Overall the capture portion of the CCS chain was seen to be “fit for purpose”. There were some examples where streamlining could be applied (environmental statement) but overall the planning regime, the environmental permitting regime and the health and safety regimes were well understood by both developers and by regulators.

The community/public was considered to understand the planning regime well and to understand their role and opportunities to participate. It was suggested that the public are less likely to understand the environmental and health and safety regimes in the same way. It was noted that the public also have the opportunity to participate in the environmental permitting regime.

Regulators and developers need to adopt a joined up approach and it was suggested that developers should submit consents in parallel rather than in sequence. It was also suggested that consideration to combining consents applications, where potential exists and to move to a more cohesive approach. There are relatively few consenting / permitting regimes under the capture portion of the CCS chain and there is likely to be significantly more potential for this type of approach to be applied to the offshore regime.

It was agreed that there is a need for a coordinating body/manager that could oversee all the consents for the same project with a view to reducing timescales.

There is currently no scope for the Scottish Government to refuse applications under section 36 on the grounds of being incomplete. Poor initial applications from developers can cause delay and it was suggested that those with insufficient detail should be rejected.

It was also noted that the application for development consent can have implications for staff resources both within Government and the statutory consultees. Poor applications take the same amount of input as quality applications. There are time constraints for the local authority to return recommendations and conditions within the allocated 4 months while also allowing for presentation of their response to internal committees to secure agreement.

In order to shorten the timescales for the consenting process it is important there is early, full and open dialogue between the developers, the regulators and community representatives (both local communities and national communities dealing with wider policy issues).

Environmental information

It was noted that in order to make better provision of environmental information for the whole project, there was the potential for undertaking one environmental statement for the onshore portion of the CCS chain. It was suggested that this might provide a more holistic view of the application. It was unclear whether developers would be amenable to providing this or whether it would be possible to require one environmental statement to be produced.

Community engagement

Early engagement was viewed to be critical (a theme echoed in all workshops) to ensure sufficient fit for purpose information is produced to enable the application to be determined quickly and for the community to be engaged effectively.

Raising public awareness and engaging communities at an early stage of projects is crucial. It is important that the most appropriate people are chosen to engage with the community and that there is genuine local community involvement. There is a need for a greater level of public understanding and the Scottish Government should ensure that any public participation is transparent. A distinction was noted between engaging with local and national communities, and it was also noted that there would be different levels of engagement with the public, with regulators and with government.

It is also critical to engage with elected members, planning committees and local authorities in the pre-application stage in order to mitigate objections and enable developers to avoid a public inquiry based on issues that could be resolved through better consultation.

5. KEY FINDINGS - TRANSPORT

Planning and authorising CCS projects with a holistic approach was considered important in order to manage risks and impacts and minimise the possibility of transferring risks from one part of the chain to another. Mitigation of hazards in one part can lead to problems in other parts of the chain and it was considered inappropriate to look at each process separately. It was also noted that communities may benefit from the opportunity to be presented with a holistic picture, especially given the length of many proposed pipelines of hundreds of miles and the many communities who will be affected along the route. From a developer's perspective it is a challenge to join up different parts of the project, however a consortium-based approach can help with communication and knowledge transfer.

It was noted that the EU is currently examining pipeline networks to support an EU-wide CO₂ transport and storage network, and that DECC's CCS Industrial Strategy encourages clustering. Questions were raised over who is planning networks and making decisions on requirements / standards of pipelines, third party access. Technical issues around standard of pipelines and safety for different pressures were identified.

Project timeline

Overall the general regulatory requirements under the transport section of the CCS chain were viewed to be understood and to be "fit for purpose". It was however noted that there were elements that could be considered for streamlining. In particular it was suggested that consideration should be given to whether it is possible to require that a developer produce one environmental statement to cover all on shore elements of a CCS scheme.

Concern was raised regarding the potential for delays under the planning regime for onshore pipeline transportation of CO₂. Whether a new pipeline is to be developed, or whether a developer intends to reuse existing pipeline, multiple planning applications may be required in the case of longer transport routes and these applications would be made to a number of planning authorities. The potential for delays increases where an application rests on multiple consents. It was noted that community engagement is essential in relation to the onshore pipeline, and that it is important for communities to be provided with the opportunity to understand the project as a whole.

Environmental information

A single Environmental Impact Assessment or two running in parallel for onshore and offshore activities was thought to be a practical mechanism to enable a whole chain view to be taken. It was suggested that consideration should be given to assessing the practicality of this for the developer/developers.

Community engagement

Public awareness and engagement was seen as increasingly important to the success of demonstration projects. Public perception of CCS (and wider climate change issues) is still forming with concerns around safety and costs more likely to lead to objections. Public concerns are likely to be based on the effect on individuals and the exchange between risks and benefits to local communities.

The public will be more aware of issues around construction, increased transport, unsightly buildings etc but operational issues around safety also need to be addressed. Early and effective public engagement was also seen as key with issues of land access and compulsory purchase orders. Addressing concerns with robust research was seen as fundamental.

The credibility of the messenger was considered to be as important as the message. Governments have a key role to play in public acceptance and setting the context for policy in terms of climate change and economic benefits. Developers also have an important role to play within the remit of specific projects, particularly since they are required to lead local consultation within the planning process.

It was agreed that every player (Government, Industry, Academia, NGO's) has a role to play in engaging with the public. A co-ordinated approach is necessary, together with robust research information on safety aspects to provide fact-based evidence to address concerns. DECC have established a government working group on public perception. A suggestion was made to explore issues of public understanding with a mock consultation exercise.

6. KEY FINDINGS – STORAGE

It was not possible to agree a timeline as portions of the regulatory regime for offshore storage have not been laid. UK and Scottish Governments were clear that the regulations will be in place by June 2011, as required under the EU CCS Directive.

It was noted that there are a number of uncertainties related to the offshore permitting regime. The OSPAR convention requires ratification by 7 sovereign states before amendments are agreed that will enable CO₂ from industrial processes to be stored offshore. It was reported that this information should be available by summer 2011.

It was noted by participants that the regulations for offshore transport and storage are complex. While they are 'understood' by the current players, this complexity may disadvantage non-oil industry parties.

The significant proportion of the regulatory framework is related to the offshore regime for CCS. The regulatory framework showed that more than half of the regulations apply offshore. As a result it was suggested that as the regulations are still being laid in this area it might be possible for the UK and Scottish Governments to consider how to simplify and streamline the process or to provide detailed guidance on how to best make applications under this section of the CCS chain.

There is a lack of understanding around storage risks and performance of aquifers and concerns were raised about any 'onerous' guidelines from the EU Scientific Panel Review of storage permits. The purpose of the Commission review is to ensure consistent application of the Directive across Europe and therefore promote public confidence in carbon capture and storage. The Commission's opinion would be public, although the final permitting decision lies with the national competent authority (although it would have to justify any deviation from the opinion of the scientific panel).

Project timeline

As noted above it was clear that the regulatory regime is currently not fully in place for the offshore area. This was viewed as causing some uncertainty and with a lack of clarity on the regulatory framework for the offshore area, delegates were unclear how the timeline could be considered, or how suggestions could be made for streamlining the approach. There are options for Scottish Government and the UK Government to consider how to ensure that there are no onerous requirements associated with the change of regulatory control between Scottish waters and UK waters. To help with this, it was suggested that regulators could work together to monitor the progress of the first CCS demonstration projects to ensure that the new offshore regulatory framework can meet the timescales required by the UK and EU CCS competitions.

Environmental information

As with the onshore portion of the CCS chain, it was suggested that Scottish Government should consider the potential for requesting the submission of one environmental statement for the offshore area.

Community engagement

There are uncertainties around multiple users of aquifers and difficulties defining a 'storage site' which is a three dimensional formation. There is a high degree of uncertainty around what a 'site' is. Leasing arrangements will need to incorporate this aspect and the Crown Estate are open to help and guidance with definition. They will be able to draw from previous experience around leasing pipes, renewables etc.

There are also concerns that aquifers will have an impact on coastal waters and uncertainties around which projects would have an impact. It was agreed that a scoping opinion would help to identify risks and that British Geological Survey (BGS) could advise on this.

7. KEY OBSERVATIONS ON THE LIVE APPLICATION PROCESS

Participants generally welcomed the innovative approach of the live application workshop and the discussions that flowed from this. Overall the approach was seen to have provided a useful forum for open discussion, particularly given that all of the key players were in one room and given that the Chatham House Rule guaranteed anonymity in recording the discussions.

The key observations from participants below give guidance on how such a process could be improved if run again in future.

Participants felt that the following aspects of the process worked well:

- Facilitation – the lead facilitator was experienced at handling the range of stakeholders involved and ensured that the conversation kept moving well. They helped address all of the issues included in the discussion.
- Quality of discussion – generally seen as good throughout, helped by having the right participants in the process who could speak authoritatively for their organisations and with all participants having appropriate levels of knowledge to make the process work. Participants were positive that all groups (developers, regulators, NGOs) were represented.
- Use of hypothetical case study – this helped as a stimulant for discussion and enabled stakeholders to move away from referring to actual projects all of the time (though these were often referred to during the discussions). This helped build a more open, trusting process.
- Openness and trust – this was a crucial feature of the discussions. Participants spoke frankly and openly throughout which built trust and confidence and created a space in which participants felt they could be honest.
- Quality of presentation material – the balance of non-verbal inputs and content was felt to be broadly correct, with good quality presentations from the key stakeholders focusing on the important issues and not wasting time on detail that was not relevant to the overall process..
- Focus of the discussion – ensuring that the discussion was focused on identifying gaps and duplication in the overall regulatory process meant that participants engaged in a critical rather than passive manner, with a sense that there was ‘work to be done’.

They felt that the process could be improved by:

- Status of the mock application – at times in the discussion, reference to the mock application was limited and the conversation often strayed away from the detail in the application. However, it was generally viewed as providing a good reference and context for discussion and did serve to expose many issues relevant to a real application.
- Separation of capture / transport / storage into 3 workshops – participants felt that it was perhaps artificial to split discussion like this and that issues should have been discussed as a whole process.
- Conclusions of process – on the actual day these felt a little too general to participants before the preparation of this summary report.

- Grouping of consents – if the consents had been presented in groups it would have been easier to see the connections and overlaps between each.
- Record sheets – having record sheets that are more flexible and reflect the discussion as it actually emerges, not what was envisaged beforehand.

8. OVERALL FINDINGS AND LESSONS LEARNED

Overall, the majority of participants were supportive of the interactive workshop event as an innovative approach to stakeholder engagement and as a general approach to assessing the robustness of the regulatory framework.

The key lessons learned from the process are:

- Early discussions with stakeholders are key to streamlining the regulatory process in all parts of the CCS chain
- Planning & authorising CCS projects with a holistic approach between regulators was considered important to manage the complex risks and impacts of such large infrastructure projects
- Capture regulation seen to be overall “fit for purpose” with some examples for streamlining, but the regulatory framework understood by all.
- Transport (pipeline) regulation also overall “fit for purpose” – though with some concern about multi-authority consents that might be required for long sections of pipeline
- Storage (offshore) – some regulations are still to be laid which created uncertainty for developers, particularly early movers. However there was a willingness of offshore regulators to work proactively to support the development of early CCS projects and ‘learn by doing’.
- Some concern over lack of major hazards legislation for the offshore part of the CCS chain.
- European Commission Scientific Panel review and ratification of OSPAR raised concern and were viewed as uncertainties.
- Public awareness / engagement is the key issue that will determine the overall success of CCS projects.

From this, participants concluded that the CCS demonstration programmes planned at UK and EU level would be the primary vehicle for testing and refinement of the regulatory approach and for effective public engagement. Ensuring that this was a key feature of the demonstration projects was as important as them assessing the economic and technical viability of CCS and will be a key part of the knowledge exchange and learning to be made available in the demonstration programmes.

It is clear that all of the early enablers (developers, regulators, governments, NGOs, academics) have a big responsibility in ensuring the successful demonstration of CCS. Much of the learning around CCS – on the regulatory aspects as well as on the technical and economic ones will come through engagement with the actual project applications coming forward under the demonstration programme.

Overall, given the complexity and size of the CCS projects and the large numbers of permits required, the process showed that effective management of the regulatory framework would be crucial to the success of the demonstration programme in the UK and EU. There is general support amongst participants (developers, regulators, NGOs, government) for managing project applications collectively through some form of project monitoring board that can consider the collective time management of all of the permits in the round and this is discussed in Next Steps below.

9. ACTIONS & NEXT STEPS ON DEVELOPMENT AND IMPLEMENTATION OF THE REGULATORY FRAMEWORK

There were several overall lessons coming from the interactive workshop which will inform the next steps and way forward on development and implementation of the regulatory framework:

- The regulatory framework itself is set out in legislation by the EU, UK and Scottish Parliaments and will not be amended in the short to medium term;
- Much of the regulatory framework is not specific to the capture, transport and storage of carbon dioxide (planning, environmental and health and safety);
- Regulators demonstrated that they have robust regulatory processes both onshore and offshore which are generally fit-for purpose and subject to proper scrutiny;
- It is important to look at ways of coordinating the applications required to develop and operate CCS projects, given their complexity and large numbers of permits involved, but coordination and information exchange between regulators does not remove regulatory independence which must be maintained;
- There are several gaps and pressures in the regulatory approach which can be addressed as the next steps of this project – 1). permitting timelines; 2). environmental information; 3). community engagement (see below);

In charting a way forward for the regulatory framework, it is clear that the regulators will ‘learn by doing’, principally through permitting of the planned CCS demonstration projects under the UK CCS competitions 1-4 and the EU New Entrants Reserve. Both of these UK and EU processes involve substantial sums of public funding (€ billions) and have stringent timelines set for the demonstration projects to be fully operational across the capture, transport and storage chains.

Given that regulators are legally constrained by EU, UK and Scottish regulations, the short-medium term objective of future regulatory reform will not be to streamline the numbers of permits. This may be a longer term objective, following successful completion of permitting processes for the demonstration projects, learning by doing.

The most immediate objective for effective application of the regulatory framework must therefore be **to ensure that the CCS demonstration projects under the UK and EU competitions can be delivered within the timelines required by the competitions**. That means that the next step is to focus on how applications under the regulatory framework can be processed within the timescale available.

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Together, these actions will represent real progress on the development and implementation of a regulatory framework for CCS that is as robust and streamlined as possible to ensure that the demanding UK and EU timelines are met, whilst ensuring better provision of information to communities.

