

# MANAGING LIABILITIES OF EUROPEAN CARBON CAPTURE AND STORAGE

A CLIMATEWISE REPORT ON DEVELOPING COMMERCIALY VIABLE INSURANCE SOLUTIONS

SUMMARY FOR DECISION MAKERS



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ClimateWise is a global insurance industry leadership group to drive action on climate change risk. It was conceived of and launched by insurance industry Chief Executives in 2007 and our international membership now covers Asia, Europe, North America and Southern Africa. The group leverages the insurance industry's expertise to better understand, communicate and act on climate risks. ClimateWise members undertake collaborations to support the ClimateWise Principles where action needs to be taken at the industry or system level. Collaborations may involve insurers, other industries, policymakers and academics. ClimateWise's secretariat is provided by the University of Cambridge Programme for Sustainability Leadership (CPSL). Further information is at [www.climatewise.org.uk](http://www.climatewise.org.uk) and [www.cpsl.cam.ac.uk](http://www.cpsl.cam.ac.uk).

#### **Acknowledgements**

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Cover image: Dag Myrestrand / Statoil. The full report is available at:

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# Executive summary

## SUMMARY OF THE SUMMARY

1. **The absence of viable risk management solutions presents a material barrier to the development of Carbon Capture and Storage (CCS) at scale in Europe.**
2. **Insurance does have a role to play as a tool to manage the risks arising from the liabilities that the CCS industry faces in Europe.**
3. **For many of the familiar operational risks, insurance solutions already exist and are known to both the insurance and oil and gas industries.**
4. **For the CCS-specific liabilities identified by the EU CCS Directive, ‘off the shelf’ insurance solutions do not exist. This report identifies an innovative way that insurance could address a defined subset of these liabilities.**
5. **However, some liabilities will remain uninsurable because of their nature and insurance solutions do present commercial challenges for storage operators. Insurance does not, therefore, offer an easy or comprehensive solution.**
6. **Ultimately, neither insurers nor storage operators will be able to bear unlimited liabilities, so where liabilities are not limited in size, risk sharing with government will be required to develop CCS at scale in Europe.**

# Executive summary

Carbon Capture and Storage (CCS) is recognised by the International Energy Agency (IEA), amongst others, as a core component of a cost-effective strategy to limit global temperature rise to 2°C by 2050. The IEA has projected that investment of USD 2.5 to USD 3 trillion from 2010 to 2050 in CCS will be needed to achieve the required reductions in greenhouse gas emissions. The CCS industry globally, however, is still in an early stage of development.

In Europe, the EU CCS Directive identifies a number of liabilities for CCS storage providers. These liabilities, together with the commercial liabilities associated with a CCS value chain, create risks for which the storage provider requires risk management. If commercially viable risk management solutions are not available, this presents a material barrier to the development of CCS at scale in Europe. The purpose of this report is to bring a cross-section of insurance industry expertise together to assess whether insurance could be a risk management instrument for any of these liabilities.

A second requirement of the EU CCS Directive is for storage providers to have 'Financial Security' in place before being awarded a storage permit. This is to protect the Competent Authority (CA) in the event it is required to step in under the terms of the Directive. Financial Security covers, to a large extent, the liabilities identified by the Directive. The secondary purpose of this report is to investigate if insurance could contribute to meeting Financial Security obligations.

A large number of the operational risks in the CCS storage process can be addressed through existing risk mitigation and risk transfer options that are familiar to the insurance and oil and gas industries. This represents a significant market opportunity for the insurance industry.

However, a small number of the liabilities are specific to the CCS business. These include:

- a) 'CO<sub>2</sub> Leakage Risk'
- b) 'Decommissioning Cost Risk'
- c) 'Premature Determination and Possession Risk' and
- d) 'CCS Value Chain Integration Risk'

While the risks giving rise to these liabilities are not considered more likely to occur than others, a combination of the potential size of the exposure being unknown, the Directive's requirement to provide Financial Security to meet all but the last of them and the absence of existing, comprehensive risk management solutions to address them means that they represent a material barrier to the development of CCS at scale in Europe. This report examines each of these four risks in more detail.

In particular, focus is given to CO<sub>2</sub> Leakage Risk, which is the risk that, following CO<sub>2</sub> leakage to the atmosphere, storage operators have to surrender European Union Allowances (EUAs) at an unknown future price under the EU Emissions Trading Scheme (ETS). Linking this liability to the unknown future price of EUAs means that the size of this liability is not limited. This is a liability for which storage operators must also provide Financial Security.

An innovative way that existing insurance products could be modified such that, under tightly defined criteria, they would provide cover for at least a subset of the total liability has been identified. However, insurance can only be provided for a defined (and therefore limited) liability and so this does not present a comprehensive solution for CO<sub>2</sub> Leakage Risk. Equally, short-term insurance solutions present commercial challenges for storage operators.

Nonetheless, if the size of this liability could be capped by government, in combination with an insurance risk transfer solution, this could make for a viable risk management approach that significantly reduces the uncertainties faced by the CCS industry in relation to CO<sub>2</sub> Leakage Risk.

## **KEY TAKEAWAYS FOR CCS STORAGE OPERATORS**

1. A large number of the operational risks in the CCS storage process can be addressed through existing risk transfer options and where the EU CCS Directive creates new liabilities, this report gives a clear view of how these risks do or do not meet fundamental principles of insurability.
2. ClimateWise members have identified an innovative, technically feasible way a new insurance product could be developed to transfer a subset of CO<sub>2</sub> Leakage Risk. Such a risk transfer mechanism would likely be more

- capital efficient than alternatives but does not remove all investment uncertainty since it would be a short-term policy.
3. To increase the insurance industry's comfort around how site-specific, risk-based approaches to quantifying loss from a CO<sub>2</sub> leakage event work in practice, the implementation of industry-wide standards for monitoring of storage sites, building on those created by DNV under their Qualstore programme, is recommended throughout the DECC CCS Commercialisation Programme.

### **KEY TAKEAWAYS FOR THE INSURANCE INDUSTRY**

1. If the CCS industry can develop to the scale advised by bodies like the IEA, significant new demand for insurance for risks that the oil and gas and insurance industries are already familiar with will flow from these multi billion pound projects.
2. This market development is being held back by the lack of available risk management solutions for a small number of nonetheless significant liabilities that are largely created by the EU CCS Directive.
3. ClimateWise members have identified an innovative, technically feasible way that existing insurance products could be modified to transfer at least a subset of CO<sub>2</sub> Leakage Risk. This would limit the liability being transferred to insurers but to grow this market, demand from the industry and broad market participation are required.

### **KEY TAKEAWAYS FOR GOVERNMENT**

1. A large number of the operational risks in the CCS storage process can be addressed through existing risk transfer options familiar to industry, but the EU CCS Directive creates particularly challenging Financial Security obligations and risks which still stand in the way of commercial development of CCS at scale, the most important of which is the uncapped liability associated with CO<sub>2</sub> Leakage Risk.
2. ClimateWise members have identified an innovative, technically feasible way that a bespoke insurance product could be developed to transfer at least a subset of this risk. However, insurance can only be provided for

a defined (and therefore limited) liability and so this does not present a comprehensive solution. Operators will still face residual, uncapped liability, which is considered a roadblock for investors.

3. Nonetheless, if the size of CO<sub>2</sub> Leakage Risk could be capped by government whilst avoiding moral hazard, in combination with an insurance risk transfer solution, this could make for a viable risk management approach that significantly reduces the uncertainties faced by the CCS industry in relation to CO<sub>2</sub> Leakage Risk.

## KEY CONCLUSIONS FOR PRIORITY RISKS

### CO<sub>2</sub> Leakage Risk

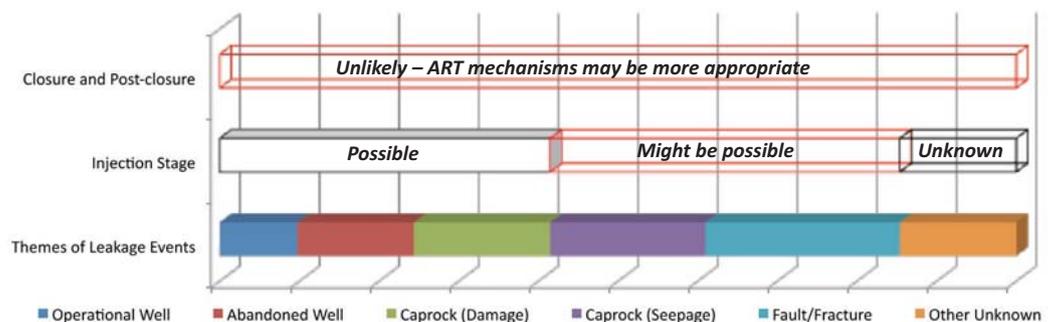
CO<sub>2</sub> Leakage Risk is defined as the risk storage operators face of having to surrender EUAs under the ETS as a consequence of CO<sub>2</sub> leakage to the atmosphere, for which they must also provide Financial Security.

#### *Ways forward have been identified*

- An innovative way that existing insurance products could be modified such that, under tightly defined criteria, they would provide cover for at least a subset of the total liability has been identified.
- This product development is theoretically feasible, although an actual product is not yet fully developed and available.
- Insurance is likely to be provided on an annually renewable basis and could provide cover against leakage events resulting from damage to operational wells, abandoned wells and from the caprock seal over the well bores.
- These are the more likely, of the albeit unlikely overall, proximate causes for a leakage event.
- By modifying other environmental insurance policies, it might be possible to cover gradual seepage through faults and fractures.
- The insured is likely to need to declare the volume of stored CO<sub>2</sub> to be insured up front and the insurer and insured would need to agree the EUA price at which the policy would indemnify the insured following a leakage event, based on a 'ceiling and floor' price or on a moving average based on the previous few years' price.

ILLUSTRATION OF WHERE TRADITIONAL INSURANCE COULD HAVE A ROLE TO PLAY IN THE TRANSFER OF CO<sub>2</sub> LEAKAGE RISK.

- An initial aggregate market capacity of £100 – 300 million per annum is likely to be available, based on the assumption that this product would be a natural extension of existing insurance markets. This is the total available insurance capacity that could be available to each store, assuming that there was no regional or other aggregation of risks between stores. The practical availability of capacity is dependent on the risk appetite of the insurers and reinsurers involved.
- With the engagement of a range of insurers and reinsurers, this market capacity could grow alongside the CCS industry.



**But are not without their challenges**

- The limited insurance market capacity available will in turn limit the indemnity that can be offered to storage operators. Insurance will not, therefore, be a comprehensive solution in the context of the size of the CO<sub>2</sub> Leakage Risk liability being uncapped.
- The fact that insurance would be an annually renewable risk transfer mechanism means that the storage provider still faces a degree of cost uncertainty and may even have to consider the eventuality that insurance cover is withdrawn at some point in the future if CO<sub>2</sub> Leakage Risk for some reason turns out to be more poorly managed than expected. The report identifies some ways to mitigate this, but these implications of using short-term insurance risk transfer solutions in the context of long-term liabilities will continue to challenge investors.
- CO<sub>2</sub> Leakage Risk for the post-closure phase is more likely to be associated with gradual seepage through faults and fractures. Even if an insurance product could be developed for these scenarios, it is not

clear whether storage operators would be receiving income during this phase and an annually renewable insurance policy may therefore not be appropriate.

- Alternative risk transfer mechanisms (such as surety bonds, risk mutualisation or CAT Bonds) might be able to transfer losses beyond the scope or ability of traditional insurance, but these approaches have significant technical and commercial barriers to overcome before they could be considered feasible.
- Overall, CO<sub>2</sub> Leakage Risk therefore remains a difficult risk to transfer in its entirety through the mechanism of insurance. The fact that all insurance policies must indemnify the insured for a defined risk exposure, mean that there will be residual risk residing with operators under the current liability regime.
- By linking the liability to the unknown future price of EUAs under the ETS, the EU CCS Directive does not cap the size of this liability for operators. Ultimately, neither insurers nor storage operators will be able to bear unlimited liabilities, so where liabilities are not limited in either size or time, risk sharing with government will be required to develop CCS at scale in Europe.
- If commercial liability could be capped by the government, this, in combination with an insurance risk transfer solution, could make for a viable risk management approach that significantly reduces the uncertainties faced by the CCS industry in relation to CO<sub>2</sub> Leakage Risk.

### **Decommissioning Cost Risk**

Storage operators face significant uncertainty about the timing of decommissioning their stores following meeting the requirements of the post closure monitoring period, but still need to provide Financial Security for this liability up front as part of obtaining a permit. In other contexts, oil and gas companies are permitted to build up a decommissioning fund over time.

- Due to this focus on the timing of costs being the real risk, there is insufficient fortuity in this risk for it to meet the fundamental principles of insurability and for a risk transfer mechanism such as insurance to be appropriate.

- Some structured financial products have already been created to help manage this risk as alternatives to insurance.

### **Premature Determination and Possession Risk**

'Premature Determination and Possession Risk' is defined as the risk that the operator faces in incurring financial liabilities if its storage licence is temporarily or permanently withdrawn by the CA before the planned 'Transfer of Responsibility'.

- Again, this is a liability for which adequate Financial Security is required by the EU CCS Directive.
- The two main proximate causes identified are operator incompetence or operator insolvency, both of which raise fundamental insurability challenges because of the degree of moral hazard involved on the behalf of the insured. This risk has therefore been deemed uninsurable.

### **Value Chain Integration Risk**

Value chain integration risk is the risk faced by all parties of loss of revenue because of failure in part of the CCS value chain.

- This is not a risk for which Financial Security is required, but because of its potential impact on the economic case for CCS, it was put forward as a priority by CCS operators.
- Most unexpected interruptions to a CCS value chain could be deemed to be fortuitous, sudden and accidental. Where they cause temporary interruption, such as mechanical failure in the CO<sub>2</sub> capture plant, they could probably be covered by traditional insurance policies such as Business Interruption.
- It is very difficult to define a quantum of loss for more serious events causing permanent interruption, such as serious storage complex formation failure, which means a traditional insurance approach is much more difficult.

## Acronyms

The following acronyms are used in this report:

ART	Alternative Risk Transfer mechanism
CA	Competent Authority of Member States in the EU
CCS	Carbon Capture and Storage
CO <sub>2</sub>	Carbon Dioxide
CoW	Control of Well insurance policy
DECC	UK Department of Energy and Climate Change
EUA	European Union Allowance to emit one tonne of greenhouse gases
EOR	Enhanced Oil Recovery
ETS	European Emissions Trading Scheme
IEA	International Energy Agency
LSIP	Large-scale Integrated Project
MWh	Mega Watt Hours

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