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GLOBAL CCS INSTITUTE CCS LEGAL AND REGULATORY INDICATOR

A GLOBAL ASSESSMENT OF NATIONAL LEGAL AND
REGULATORY REGIMES FOR CARBON CAPTURE AND
STORAGE



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Project Team

The CCS Legal and Regulatory Indicator report was prepared by the Global CCS Institute. Mr. Ian Havercroft, Senior Adviser – Legal and Regulatory was the project’s co-ordinator.

Baker & McKenzie’s global Environmental Practice Group acted as consultants for the project and members of this team were instrumental in the design of the assessment methodology, as well as in the comprehensive assessment of the individual jurisdictions considered in the Indicator. The Institute would like to acknowledge in particular, Paul Curnow, Ilona Millar, Lauren Kirkwood and Jahan Navidi of Baker & McKenzie’s Australia-based Environmental Practice Group, for their work in the development of this product.

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Executive Summary

The development of law and regulation to support the deployment of Carbon Capture and Storage (CCS) has proven an important aspect of a national policy response to the technology. National regulators and regional legislatures in a number of jurisdictions globally have, in recent years, amended legislation or enacted legal and regulatory frameworks to address the technology.

The Institute's CCS Legal and Regulatory Indicator ("the Indicator") offers a more detailed examination and assessment of national legal and regulatory frameworks, by considering a broad range of legal and regulatory factors, which are likely critical in the regulation of the technology. A broad spectrum of administrative and permitting arrangements across the project lifecycle, including issues related to environmental assessments, public consultation and long-term liability, have been considered.

The resulting Indicator therefore represents a detailed assessment of each individual jurisdiction's legal and regulatory frameworks for the technology, as well as offering a comprehensive model for tracking progress and opportunities for the development of legal frameworks worldwide.

The 2015 assessment

The 2015 assessment exercise has revealed that of the 55 countries considered, five countries in particular have scored highly within the Indicator. These five countries, which are listed in alphabetical order below, have been categorised as possessing CCS-specific laws or existing laws that are applicable across most parts of the CCS project cycle:

- Australia
- Canada
- Denmark
- United Kingdom (UK)
- United States of America (US)

The regimes in these jurisdictions represent advanced and comprehensive frameworks, which are largely capable of addressing many of the critical legal and regulatory aspects throughout the CCS-project lifecycle. These findings reflect an extensive and sustained national commitment to the development of law and regulation for the technology, which is perhaps unsurprising when considering the leadership role some of these nations have adopted with regard to the technology.

Beyond these five jurisdictions however, the majority of countries demonstrate limited or very few CCS-specific or existing laws applicable across aspects of the CCS project lifecycle. These results may be of particular concern to those jurisdictions with strong policy commitments to the technology and CCS projects in the development pipeline. Countries with lower scores should note, however, that the Legal and Regulatory Indicator does not address a country's inherent policy interest in the technology, nor does it consider project deployment in an individual jurisdiction. Notwithstanding the significance of legal and regulatory frameworks for deployment of the technology, countries should also consider a number of other factors including their broader domestic policy support for CCS.

Regional perspectives

A review of the Indicator's results from a regional perspective reveals the disparity between many countries' legal and regulatory regimes.

In Europe, the Middle East and Africa (EMEA), there appears to be a clear distinction between many of the European Member States (MSs) and other countries in the region, most notably those in the Middle East and Africa.

The development of a common legal framework in the form of the EU Storage Directive, together with the transposition of its requirements in the form of national legislation, has largely resulted in many MSs receiving higher scores in the Indicator. An exception to this general trend is observed, however, where MSs have chosen to limit or prohibit CCS activities in their territory.

In order to undertake an accurate assessment of the regimes in Canada and the United States, a pragmatic method of assessment was adopted when considering the range of legal and regulatory approaches adopted at the federal and state/provincial levels. Both countries received higher scores in the assessment exercise, reflecting their comprehensive and largely sophisticated models of law and regulation. Lower scores have been awarded for many other countries in the Americas region however, which is indicative of the absence of CCS-specific legislation and other applicable laws and regulations.

The assessment results for the Asia Pacific region are similar in many ways to those observed in the EMEA and Americas regions. Australia's state and federal legal regulatory regimes were rated the most comprehensive models of regulation across the project lifecycle and as such, received the Indicator's highest total assessment score. Elsewhere in the region, however, many countries received lower assessment scores. These results reflect the nascency of legal and regulatory activity and the technology's deployment, in many countries across the region.

Opportunity for development

The assessment exercise has also demonstrated that there are significant opportunities for further legal and regulatory development in many countries worldwide. It is positive to note that even for those jurisdictions which have received lower assessment scores, there are aspects of their legal and regulatory regimes that may offer a foundation for further development and expansion. This perspective is likely to be borne out in several countries, where scoping exercises and preparatory activities are already underway.

Countries that have received higher assessment scores, including the five listed in the section above, may also benefit from further improvements to their legal and regulatory regimes. The Indicator's results demonstrate that no country's legal regime offers a complete model for the regulation of CCS across the project lifecycle. The individual national assessments, developed during the preparation of the Indicator, highlight several discrete areas where even the most advanced legal and regulatory frameworks may be strengthened or improved.

Consistency

The development of the Indicator required challenging judgements when considering the scope and exhaustiveness of the legal and regulatory regimes of countries which have a number of national and sub-national frameworks. In these instances a holistic and constructive approach to the national model was adopted.

The largely consistent legal and regulatory frameworks adopted in the state and commonwealth regimes in Australia support the more positive approach adopted in the assessment model. A less optimistic view of the scope and scale of models developed in some of the North American regimes, however, may have resulted in lower assessment scores being awarded to these countries.

Introduction

The development of a legal and regulatory framework remains an intrinsic aspect of a national government's response to supporting the deployment of Carbon Capture and Storage (CCS). In recent years, several national and sub-national governments have developed framework legislation for the technology, with some governments going as far as to suggest that they have now completed their models to support the deployment of large-scale integrated projects.

The Global CCS Institute ('the Institute') has continued to track the development of these legal and regulatory frameworks and in recent years, many of these emerging national and regional models have been considered in successive issues of the Institute's annual Global Status of CCS Report.

As part of its ongoing commentary and analysis of law and regulation for the technology, the Institute has developed an indicator to assess and compare national legal and regulatory regimes across a number of jurisdictions worldwide. The CCS Legal and Regulatory Indicator will be published by the Institute on a regular basis and it is intended to be an indispensable source of information for the Institute's membership and the broader CCS community.

The Institute's CCS Legal and Regulatory Indicator aims to:

- Highlight to a global audience of policymakers, regulators and project proponents, informative examples of law and regulation for the technology
- Determine the 'comprehensiveness' of an individual jurisdiction's legal and regulatory framework for the deployment of CCS projects
- Generate a clearly-defined methodology for undertaking a regular assessment and comparison of national legal and regulatory developments
- Enable the Institute to track the progress of legal and regulatory developments, as well as identify gaps and opportunities, across a number of jurisdictions worldwide
- Offer a further Institute contribution to the global debate on the development of policy, law and regulation for CCS

The CCS Legal and Regulatory Indicator is strongly complemented by the Institute's two further knowledge products, which are aimed at assessing global geological resources available for storage and policy support for the technology. Updated versions of the *Global Storage Readiness Assessment* and *CCS Policy Indicator* (CCS-PI) have also recently been published by the Institute.

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Assessment Methodology

Several of the countries included in this assessment have adopted a range of legislative approaches to the development of national and sub-national legal and regulatory frameworks for the technology. This has resulted in a high degree of disparity, particularly when examining many of the early CCS-specific regimes which have been established. In other jurisdictions, however, there has been little CCS-specific legal and regulatory activity to date, save for the completion of preliminary scoping studies and assessments of national legal and regulatory capacity.

2.1

Development of assessment criteria

The Indicator aims to facilitate a comparison between the various models and contrasting national circumstances, to determine the 'comprehensiveness' of an individual jurisdiction's legal and regulatory framework for the deployment of CCS projects. In recognising the challenges posed by making an assessment of this nature, the project team have developed an assessment methodology that allocates individual countries both quantitative and qualitative rankings, based upon the efficacy and extensiveness of a particular country's CCS regime.

The legal and regulatory regimes of each of the 55 countries, considered during the preparation of the Indicator, were assessed against a number of individual criteria. These criteria were developed by the project team and are designed to reflect the core elements of a comprehensive legal and regulatory model for the technology. The criteria address issues which are likely to be of significance throughout the project lifecycle and include administrative arrangements and potential permitting pathways for CCS projects, as well as allied issues such as environmental impact assessment and public consultation provisions.

Five overarching primary criteria provide the foundation of this assessment. These primary criteria are set out in Table 1 below.

Table 1: Primary Assessment Criteria

1	The clarity and efficiency of the administrative process under the CCS legal framework to apply for, and obtain, regulatory approval for CCS projects
2	The comprehensiveness of the legal framework in providing for all aspects of a CCS project , including siting, design, capture, transport, storage, closure and monitoring for potential releases of stored CO ₂
3	The extent to which the CCS legal and regulatory framework provides for the appropriate siting of projects and adequate environmental impact assessment processes
4	The extent to which the CCS legal and regulatory framework provides for and incorporates meaningful and effective stakeholder and public consultation
5	The way in which laws and regulations deal with long-term liability for closure, monitoring and accidental releases of CO₂

In addition to each of the five primary criteria, several further sub-criteria were developed. A scoring system, which is discussed in the section below, was then used to score a jurisdiction against each of the individual sub-criteria. A full version of the assessment template, including both the primary and sub-criteria, is provided within Appendix I of this report.

2.2

Scoring of individual jurisdictions

An extensive review of each country's national and sub-national legal and regulatory regimes was conducted as a part of the assessment process. A database of each country's national legal and regulatory regimes, as they would apply to CCS, was compiled and then used as a basis for the assessment process.

The scoring scale set out in Table 2 below was used to score each of the jurisdictions against the various sub-criteria, which sit below the five primary assessment criteria. Scores awarded across all of the assessment criteria have resulted in a composite score which has provided the basis for each country's total score in the Indicator.

Table 2: Scoring scale for assessment

3	Clearly and unequivocally capable of satisfying the criterion
2	Moderately capable of satisfying the criterion, subject to conditions or limitations
1	Capable of satisfying the criterion only in some minor respects
0	Largely incapable of satisfying the criterion

The table in Section 3 of this report presents the results for 2015 and includes the over-arching total score awarded for each of the countries considered in the assessment. Appendix II contains a more detailed breakdown of the scores awarded for each of the five primary assessment criteria, in each of the individual countries.

2.3

Further categorisation of individual regimes

Three broadly-defined bands have been used to further characterise the individual country models. Upon concluding the scoring process and a closer qualitative assessment of the national legal and regulatory models, each of the individual countries has been assigned to one of the following three bands:

- **BAND A:** CCS-specific laws or existing laws that are applicable across most parts of the CCS project cycle
- **BAND B:** CCS-specific laws or existing laws that are applicable across parts of the CCS project cycle
- **BAND C:** Very few CCS-specific or existing laws that are applicable across parts of the CCS project cycle

Assessment 2015

COUNTRY (in alphabetical order)			TOTAL SCORE (out of a possible 87)					
BAND A								
CCS-specific laws or existing laws that are applicable across most parts of the CCS project cycle								
	Australia	67		Denmark	62		United States of America	64
	Canada	65.5		United Kingdom	65			
BAND B								
CCS-specific laws or existing laws that are applicable across parts of the CCS project cycle								
	Belgium	40.5		Hungary	48		New Zealand	36.5
	Bulgaria	48		Italy	56.5		Norway	40
	Croatia	59		Japan	36		Poland	45
	Cyprus	56.5		Korea	37.5		Portugal	46
	Czech Republic	47.5		Lithuania	49.5		Romania	42
	Finland	43.5		Luxembourg	53.5		Slovakia	47.5
	France	46.5		Netherlands	56		Slovenia	36
	Germany	56		Malta	51		Spain	42.5
	Greece	56		Mexico	41.5		Sweden	51
BAND C								
Very few CCS-specific or existing laws that are applicable across parts of the CCS project cycle								
	Algeria	32		India	23.5		Saudi Arabia	10.5
	Austria	N/A ¹		Indonesia	30		South Africa	35.5
	Botswana	19.5		Ireland	21.5		Switzerland	N/A ²
	Brazil	30		Latvia	32		Thailand	21.5
	China	28		Malaysia	34.5		Trinidad and Tobago	33
	Egypt	27		Oman	23		United Arab Emirates	13
	Estonia	31		Philippines	26		Vietnam	22.5
	Iceland	24		Russia	33			

¹ Austria has passed legislation which does not allow CCS activity within its territory, save for some limited research purposes. The legislation does however fulfil Austria's transposition requirements under the EU CCS Directive (Directive 2009/31/EC).

² CCS is currently excluded from the scope of national legislation regarding CO₂ reduction in Switzerland.

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Analysis

The assessment process and the Indicator's final total scores, reveal a number of important findings with regard to the status of legal and regulatory regimes globally. The following sections consider the various country results in greater detail, as well as highlight some broader qualitative conclusions as to the current status of CCS law and regulation.

4.1

Global perspective of law and regulation

A preliminary assessment of the Indicator's results reveals both the scale and level of comprehensiveness of the CCS-specific legal and regulatory development undertaken by some jurisdictions in recent years, as well as the significant opportunity for progress and improvement in many others. Perhaps most noticeable of all are the small number of countries that have been assigned to Band A, and are able to demonstrate a national framework of CCS-specific laws or existing laws that are applicable across most parts of the CCS project lifecycle.

The total assessment scores awarded to the five countries, which have been included in Band A, reflect both the sophistication and extensive nature of their legal and regulatory frameworks for CCS. The detailed review of the legal regimes in each of these countries, as a part of the assessment process, revealed that all have made significant progress in addressing the critical legal and regulatory aspects and novel challenges posed throughout the CCS project lifecycle.

In many instances this has been achieved through amendments to existing resource legislation, or by modifying familiar concepts and mechanisms found in existing environmental and energy law. One example of this approach, the UK government's *Energy Act*, which together with a suite of accompanying Regulations, adapts the UK's pre-existing offshore oil and gas model to regulate offshore storage activities and implement the EU's Storage Directive.

In part, these scores are also validated by the leadership role these particular countries have taken historically, in championing the development of effective legal frameworks for the technology. Over the past ten years the United Kingdom, United States, Australia and Canada, in particular, have all remained strong proponents of CCS and the development of legislation at the national, regional and international levels.

The Indicator's primary and sub-assessment criteria sought to address a range of legal and regulatory issues beyond simply the availability of a permitting model for CCS activities. In assessing a country's regime for the technology, a wider range of legal and regulatory elements were considered, which will likely be important across a project's lifetime.

Despite their inclusion in Band A however, none of the five countries' regimes fully addressed all of the core elements of a legal and regulatory model for the technology, as embodied in the project team's primary assessment criteria. These results clearly demonstrate that while these countries have developed regimes that address these elements, none of them had developed a legal and regulatory model able to satisfy all of the assessment criteria in an unequivocal manner.

Clear from the Indicator however, is that the majority of countries have limited or very few CCS-specific laws or existing laws, which are applicable across parts of the CCS project lifecycle. While in some instances the composite score awarded in Section 3 may belie the fact that a particular country has comprehensively addressed one or several assessment criteria, the assessment suggests that further legal and regulatory framework development may be necessary in many countries.

A lower Indicator score will likely prove a concern to those jurisdictions with a strong policy commitment to the technology and CCS projects in the pipeline. The absence of supportive national legal and regulatory regime may result in infeasible delays to project deployment or the realisation of national policy commitments to CCS. The Legal and Regulatory Indicator, however, does not include an assessment of a country's inherent policy interest in the technology, nor does it expressly consider whether projects have been proposed or are underway in an individual jurisdiction. Individual countries should note therefore, that while the development of a comprehensive legal and regulatory framework is undoubtedly a critical aspect for supporting project deployment and achieving national mitigation objectives, it remains only one element of a range of factors to be considered and addressed by policymakers³.

4.2

Regional assessments

4.2.1 Europe, Middle East and Africa

In Europe, the Middle East and Africa (EMEA) the assessment results appear to reveal a disparity between many of the European Member States (MSs) and other countries across the region. One possible explanation for the MSs performance may be the development and implementation of the 'EU Directive on the geological storage of carbon dioxide', which entered into force in June 2009. The near-complete transposition of the EU CCS Directive by the European MSs, together with the recent consultation and review of the Directive, has resulted in several countries achieving total scores that are towards the higher end of the Indicator's spectrum.

The Netherlands, Croatia, Italy, Germany and Greece have all implemented the Directive and have been assessed as demonstrating relatively comprehensive legal and regulatory models, which deal with many of the key issues throughout the CCS project lifecycle. Legal regimes in other European MSs have been rated less highly, despite the transposition of the Directive. One explanation for this is the decision by some MSs to exercise their rights under the Directive, to limit or prohibit CCS operations in their territory. While the Directive affords a common legal framework for the MSs, several countries in the EU have chosen to prohibit aspects of the CCS process in their legal and regulatory regimes, in line with the discretion afforded them by Article 4 of the EU Storage Directive. Latvia, Slovenia, Estonia, Finland, Luxembourg, Austria and Ireland have all prohibited or limited storage in their territories, save for research activities in some instances. As a consequence, these jurisdictions have all received lower total assessment scores on the basis that a comprehensive legal framework cannot exclude any one aspect of the project lifecycle.

Many countries in the Middle East and Africa have received total scores at the lower end of the Indicator's spectrum, suggesting that they currently have only a few CCS-specific or existing laws that are applicable across parts of the CCS project lifecycle. Despite their categorisation as Band C countries, these assessments would also appear to be in line with the nascent stage of policy deployment and/or interest in the development of CCS in many of these jurisdictions.

4.2.2 The Americas

Developing precise assessments for both the United States and Canada has proven especially challenging, since both federal and state/provincial legal and regulatory regimes need to be considered. In an effort to address the challenge of providing an 'overall' assessment for each country, the project team adopted a pragmatic and constructive approach in each instance. To this end, the United States' assessment focuses upon the federal legal and regulatory regime, with consideration also given to the regimes in the five states of Texas, Montana, North Dakota, Illinois and Wyoming. In Canada, the assessment considered the three provinces of Alberta, British Columbia and Saskatchewan.

³ For a comparison of countries' relative policy support for CCS, please refer to the Institute's *CCS Policy Indicator 2015 Update*.

The United States' legal and regulatory regime for CCS addresses many of the criteria in the assessment model in a comprehensive and co-ordinated manner. Federal-level legislation developed under the existing Underground Injection Control framework and the Safe Drinking Water Act, which is aimed at protecting underground sources of drinking water, has resulted in a robust legal and regulatory foundation, when coupled with broader and established health and safety and environmental frameworks. Despite this Federal focus and the several state-level legal and regulatory developments that have gone some way towards addressing remaining gaps, CCS is not dealt with in a fully-integrated, comprehensive manner at either the federal or state level.

In Canada the development of frameworks for the regulation of CCS activities across the project lifecycle has predominantly taken place in each of the provinces. While the Canadian assessment addressed the regimes of Alberta, Saskatchewan and British Columbia, the over-arching qualitative assessment draws heavily upon the comprehensive regime promulgated in Alberta. Clear from the assessment is the strength of the legal and regulatory regime in managing the administrative processes and long-term liability aspects of the CCS project lifecycle. Nationally however, there are considerable opportunities for improving the legal and regulatory model. The development of comprehensive and cohesive CCS legislation across the other provinces, together with the strengthening of Environmental Impact Assessment (EIA) provisions, are two examples where the overall regime may be improved.

Elsewhere in the Americas, countries have received assessment scores at the lower end of the Indicator's spectrum. Once again, these findings largely reflect the absence of a coherent and CCS-specific model of law and regulation in each jurisdiction. However, it is worthwhile to note that Mexico is currently actively engaged in CCS regulatory framework development, which is considered an important part of the country's energy reform activities.

4.2.3 Asia Pacific

The assessment scores for the Asia Pacific region reflect the dichotomy observed elsewhere in the world, with Australia included in Band A by virtue of its sophisticated and cohesive legal and regulatory framework. Elsewhere, countries have received assessment scores at the middle to the lower end of the Indicator's spectrum. These results are again indicative of the status of CCS-specific law and regulation, and the technology's deployment more broadly, in many countries in the region.

The Australian regime received the highest total assessment score of all of the countries considered in the development of the Indicator and was adjudged to represent the most comprehensive of all the CCS regimes, in terms of coverage and effectiveness at all stages of the CCS project lifecycle. In a similar manner to the United States and Canada, both the federal government and states have developed and enacted legislation to regulate CCS activities across most parts of the project lifecycle. The approach to developing legislation has noticeably differed across the various jurisdictions, with the emergence of stand-alone dedicated CCS legislation; amendments to existing petroleum regimes to incorporate CCS activities; and the adoption of project-specific legislation.

All of the regimes draw heavily upon existing models (many of which are primarily found in oil and gas legislation) and adapt several familiar legal and regulatory concepts and procedures. Regulators have been particularly successful at revising these models to address some of the analogous aspects of the CCS project lifecycle. Notwithstanding the success of both federal and state-level regulators, Australia's overarching legal and regulatory approach is not harmonised or uniform across the various jurisdictions. At times, therefore, the approaches adopted to particular issues appear discordant. One example is the treatment of long-term liability and indemnification, which some states have treated differently in their legislation, when compared to the Commonwealth's model.

4.3

Consistency between national and sub-national jurisdictions

Assessing consistency between the legal and regulatory frameworks at the national and sub-national levels has proven an important consideration when reviewing countries' regimes. It has proven particularly challenging when seeking to make a comparison between these countries and those that do not have sub-national regimes. As suggested previously, however, a pragmatic and optimistic approach to assessing a country's national and sub-national frameworks has been adopted. Consequently, in many instances an individual assessment has been based upon a holistic view of all of the legal and regulatory frameworks in a particular country.

Examples of consistency in the approach adopted between national and sub-national jurisdictions are clearly evident in some of the legal and regulatory models developed around the world. Save for some specific instances, to be found between the state and commonwealth regimes, the overarching Australian model of law and regulation for CCS is largely consistent in many aspects. In Canada however, there are marked differences in the scale and scope of the legal and regulatory models adopted by the provinces. The Alberta government's comprehensive approach to developing a CCS-specific regulatory framework, stands in contrast to the scale of the legal and regulatory models found in Saskatchewan and British Columbia. It should be noted therefore, that a less constructive approach to the assessment of consistency between national and sub-national regimes would likely to result in a much lower total score being awarded to some countries included in the Indicator.

4.4

Opportunity for further development

Notwithstanding the categorisation of many countries in the Indicator's lower Bands, a closer qualitative assessment of some of their legal and regulatory frameworks has revealed a number of opportunities for further development. This is particularly noticeable for many of the jurisdictions which have previously been hailed as 'second generation' regulators in the Institute's Global Status of CCS reports. The development of marine permitting models in both Japan and Korea offer two good examples where preliminary legal and regulatory regimes may be expanded or developed further.

These opportunities are not limited to those countries at the lower end of the Indicator's spectrum. For many of the more developed regimes, including those included in Band A, there is potential for improving their legal and regulatory regimes. Greater consistency in national and sub-national regimes, the strengthening of existing processes and greater clarity around long-term liability provisions, all offer further opportunities for development.

Appendix I: Assessment Methodology and Criteria

1

The Clarity and efficiency of the administrative process under the CCS legal framework to apply for, and obtain, regulatory approval for CCS projects

CRITERION	ASSESSMENT OUT OF 3	INDICATORS
		An assessment of 3 means that the CCS legal framework for applying for and obtaining regularly approval for CCS projects meets the following Indicators clearly and unequivocally, to a very high degree
Regulatory roles and responsibilities of government and agencies		Roles and responsibilities of the respective governments and government agencies are defined at all stages of the CCS project in the legislation and in any accompanying regulations
Approvals process for CCS projects		Approval processes are required for material / commercial ⁴ CCS projects, with timely reviews and approvals for CCS applicants
Project operator and regulator roles at each CCS project stage		Distinction between the roles of the project operator and the regulator in the regulatory framework at each stage of the CCS project cycle
National protocols and guidelines		Assessments and approvals processes consistent with agreed national protocols and guidelines for CCS-specific projects, and other national protocols and guidelines for similar infrastructure / energy projects
TOTAL	/12	

⁴ We note that some CCS projects may be research-focused or small-scale, and may be subject to exemptions from approval.

The Comprehensiveness of the legal framework in providing for all aspects of a CCS project, including siting, design, capture, transport, storage, closure and monitoring for potential releases of stored CO₂

CRITERION	ASSESSMENT OUT OF 3	INDICATORS
		An assessment of 3 means that the CCS legal framework clearly and unequivocally meets the Indicator, in all aspects of a CCS project, to a very high degree
Integrated manner		<p>CCS-specific legislation, or a number of amendments to existing regulations (e.g. planning or petroleum regulations)</p> <p>Legal and regulatory framework deals with all aspects of CCS in an integrated manner, including all elements of the CCS project cycle</p> <p>Supplements and refers to the development or implementation of existing laws, regulations and / or policies, including with agreed national protocols and guidelines for CCS-specific projects, and other national protocols and guidelines for similar infrastructure / energy projects</p> <p>Clarity of the legal responsibility for CO₂ at different stages of the project cycle</p> <p>Legislation deals with existing users including issues in respect of competing land uses, priorities, incompatibility with other activities, and fee provisions</p>
Classification of CO₂		Classification of CO ₂ , including explicit definition of the “CO ₂ stream” and instances where CO ₂ is exempted or explicitly carved out.
Ownership regime for sub-surface storage		Defines ownership of the sub-surface geological surface area, including through a legal regime (either legislative or common law) that provides explicit ownership, including by allocating property interests, tenements and / or rights over the sub-surface area, in respect of the stored CO ₂ , and the allocation / management of CO ₂ .
Design standards for CCS projects		<p>Planning legislation, pollution control laws and occupational health and safety requirements dealing with new plants for CO₂ capture or retrofitting of existing plants</p> <p>Regulatory requirements in respect of design elements such as size and pressure which should be reviewed against latest scientific information and latest building codes</p> <p>Minimum standards for pipeline design through a CCS-specific review process, which includes design standards and requirements for CO₂ pipelines and additional assessments in respect of the composition of CO₂ streams for capture, transport and injection of CO₂.</p>

Trans-boundary movement of CO2	Legislation deals with the national (and where applicable, sub-national) trans-boundary movement of CO2, during the capture, transportation and storage of CO2
Directives and Guidelines	The use of directives and guidelines for CCS-specific projects, and other national protocols and directives and guidelines for similar infrastructure / energy projects
Surface access and reclamation	Surface access and reclamation CCS activities regulated on substantially the same basis as other natural resources (such as oil, gas and mining) with monitoring, measurement and verification procedures in place
Leakage provisions	Measures for the mitigation, identification and accounting of actual or potential leakages of CO2, including sanctions or provisions relating to leakage, remediation and/or liability, to be borne by an operator or proponent throughout the operational phase of the project, under law.
Transportation of CO2	<p>Transportation provisions in place for the safe transportation of CO2, and which are consistent with agreed national protocols and guidelines for CCS specific projects, and agreed national protocols and guidelines for similar infrastructure / energy projects</p> <p>Risk management systems in place for transport of CO2, subject to environmental assessments</p> <p>A regulated pipeline system in place to ensure capture operators have access to storage opportunities and minimise the environmental impact of the pipeline system, including through third party access</p>
Monitoring and verification requirements	Monitoring and verification requirements and standards, producing publicly accessible information that can be used to manage the risks of CCS projects
Storage and siting	<p>Provisions dealing with investigation, assessment and selection of suitable sites for storage, including storage formation and proponent space requirements</p> <p>Mechanisms for proponents to obtain approval to undertake CCS projects on suitable gas storage sites and for feasibility studies in respect of the injection of CO2</p> <p>A tenure regime between proponents and regulators in respect of the injection of CO2 at specific sites, for CCS activities</p>
Closure	A closure regime in place that provides for closure period obligations on the project proponent, and addresses liability during the post-closure period (including any possible transfer of responsibility provisions)
TOTAL	/36

3

The extent to which the CCS legal and regulatory framework provides for the appropriate siting of projects and adequate Environmental Impact Assessment (EIA) processes

CRITERION	ASSESSMENT OUT OF 3	INDICATORS
<p>An assessment of 3 means that the CCS legal framework clearly and unequivocally deals with the siting of projects and provides for environmental impact assessment processes in each Indicator, to a very high degree</p>		
<p>EIA capture / transport laws</p>		<p>EIAs and approvals processes in place for the capture of CO₂, with mitigation requirements for identified environmental risks and effects</p> <p>EIAs and approvals processes in place for the transport of CO₂, with mitigation requirements for identified environmental risks and effects</p> <p>Legislation imposes an EIA regime that gathers information on the CCS project</p> <p>Terms of reference for EIA are developed with reference to existing legislation and based on established environmental and occupational health and safety requirements</p> <p>A regulated pipeline system in place to ensure capture operators have access to storage opportunities and minimise the environmental impact of the pipeline system, including through third party access</p>
<p>EIA siting and storage laws</p>		<p>Detailed and transparent assessment of the environmental impact of selecting particular storage sites</p> <p>Regulated storage and injection of CO₂ regime, with processes in place, including multiple schemes, dealing with CO₂ issues in respect of site selection</p> <p>Proper site selection legislation on a site-specific case by case process, with appropriate risk analysis requirements in place</p>
<p>Project proponent responsibilities</p>		<p>Responsibility and reporting requirements imposed on the project proponent for evaluating the project's environmental impacts, and providing necessary information to regulators</p>
<p>Government discretion</p>		<p>Government discretion to determine if the proposed CCS activity warrants further environmental assessment due to the potential environmental impacts (even if CCS activities are either on mandatory lists, or carved out by explicit exemptions)</p>

Mitigation and risk management

Requirement to consider appropriate mitigation and remediation scenarios to address potential environmental impacts arising at all phases of the CCS project cycle

Set out proposed regime for monitoring, measurement and verification activities, based on consultancy and other experts reviews of the potential environmental, health and safety impacts

Requirement for EIA plans to be submitted when applying for approval to undertake CCS projects

Technical information and technology development

Requirements for projects to demonstrate compliance with approved CCS technology standards

Technical and scientific information requirements for all EIAs

SCORE**/18**

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Stakeholder and public consultation

CRITERION	ASSESSMENT OUT OF 3	INDICATORS
		An assessment of 3 means that the CCS legal framework clearly and unequivocally provides for stakeholder and public consultation for all stages of the CCS project in each Indicator, to a very high degree
Public engagement		Regulatory framework provides for early and long term public engagement and communication with stakeholders such as land owners, residents, occupants and municipalities
Notification requirements		Public engagement and stakeholder notification requirements, articulated through guidelines and / or directives for similar infrastructure / energy projects
Dispute resolution mechanisms		Dispute resolution mechanisms in place in the event of conflict and / or non-agreement between stakeholders, including recourse to judicial systems
SCORE	/9	






Liability - closure, monitoring and accidental releases of stored CO₂

SCORE	ASSESSMENT OUT OF 3	INDICATORS
		An assessment of 3 means that the CCS legal framework clearly and unequivocally deals with long-term liability to a very high degree, with specific provisions for closure, monitoring and accidental releases of stored CO₂, in each Indicator
Closure of CCS project		<p>Regulatory processes in place for project for proponents of CCS sites to follow on completion of the CCS project</p> <p>A closure regime in place to deal with the closure of sites and for the transfer of long-term liability (only if project proponents have met the regulatory requirements such as monitoring of CO₂), including dealing with post-closure liabilities that might arise or have arisen during the operation of the CCS project</p> <p>Storage liability regimes in place including provisions for long-term liability</p>
Risk assessment framework		Risk assessment framework in place specifically dealing with closure issues, including a monitoring, measurement and verification process for CCS projects arising on closure
Localised effect liability		In respect of the long-term localised effects and liability arising as a result of CCS projects (including leakages), liability provisions dealing with damage to the environment and human health risks. This includes the availability of corrective and / or remediation measures by the operator and by recourse to existing domestic laws
Climate change-related liabilities		<p>Measures in place to deal with the long-term climate change related liabilities which arise from CCS projects</p> <p>National climate-change legislation that establishes liability for the release of greenhouse gas into the atmosphere from activities that may include parts of the CCS project cycle, such as under an ETS</p>
SCORE	/12	

Appendix II: Assessment Results









Band A











CCS-specific laws or existing laws that are applicable across parts of the CCS project cycle










Country	Criteria					Total score (87)
	1 (12)	2 (36)	3 (18)	4 (9)	5 (12)	
 Australia	11	26	15	6	9	67
 Canada	11.5	26	11.5	5	11.5	65.5
 Denmark	8	24	14	8	12	62
 United Kingdom	9.5	26	14	6	9.5	65
 United States of America	9.5	24	15	6	9.5	64

Band B

Very few CCS-specific or existing laws that are applicable across parts of the CCS project cycle








Country	Criteria					Total score (87)
	1 (12)	2 (36)	3 (18)	4 (9)	5 (12)	
 Belgium	3.5	16	11.5	4.5	5	40.5
 Bulgaria	6.5	19	9	6	7.5	48
 Croatia	10	25	10.5	5.5	8	59
 Cyprus	6.5	22	12.5	7	8.5	56.5
 Czech Republic	8	18.5	11	4.5	5.5	47.5
 Finland	6.5	18	12.5	3.5	3	43.5
 France	7	21	10	4	4.5	46.5
 Germany	8	21	13.5	7.5	6	56











	Greece	7	21	13	7.5	7.5	56
	Hungary	8.5	20	8	4	7.5	48
	Italy	7	25	10	6.5	8	56.5
	Japan	7.5	13.5	9	1.5	4.5	36
	Korea	7	13	9.5	3	5	37.5
	Lithuania	6	20	10.5	5	8	49.5
	Luxembourg	7.5	20	12.5	5	8.5	53.5
	Netherlands	9.5	20	12	7	7.5	56
	Malta	7.5	18.5	11.5	3.5	10	51
	Mexico	4	16	10.5	6	5	41.5







	New Zealand	3.5	14	8	5.5	5.5	36.5
	Norway	8	12.5	10	4.5	5	40
	Poland	6.5	16	11.5	2.5	8.5	45
	Portugal	7.5	18	8	4	8.5	46
	Romania	7	17	9	3.5	5.5	42
	Slovakia	8	15.5	11.5	5.5	7	47.5
	Slovenia	6.5	10.5	7	5.5	6.5	36
	Spain	7	18.5	6	4.5	6.5	42.5
	Sweden	8	20	12	4	7	51

Band C

Very few CCS-specific or existing laws that are applicable across parts of the CCS project cycle

Country	Criteria					Total score (87)
	1 (12)	2 (36)	3 (18)	4 (9)	5 (12)	
 Algeria	6	11	3	4.5	7.5	32
 Austria	N/A	N/A	N/A	N/A	N/A	N/A
 Botswana	1.5	7	4	5	2	19.5
 Brazil	4.5	11.5	8	3	3	30
 China	3.5	13.5	5	3.5	2.5	28
 Egypt	3.5	7.5	9.5	3.5	3	27
 Estonia	7	8.5	9	4	2.5	31

	Iceland	1	7	9	4.5	2.5	24
	India	2.5	8	6	4.5	2.5	23.5
	Indonesia	4.5	14	6.5	3	2	30
	Ireland	5	5.5	6	4	1	21.5
	Latvia	5	9	11.5	3.5	3	32
	Malaysia	3.5	13.5	6	6.5	5	34.5
	Oman	2.5	9	6	2	3.5	23
	Philippines	2	10.5	6	5	2.5	26
	Russia	6	9.5	10	4.5	3	33
	Saudi Arabia	1	3.5	4.5	1.5	0	10.5

	South Africa	5.5	13.5	9	4	3.5	35.5
	Switzerland	N/A	N/A	N/A	N/A	N/A	N/A
	Thailand	2.5	7.5	7	2	2.5	21.5
	Trinidad and Tobago	5	12.5	8	5.5	2	33
	United Arab Emirates	1.5	5.5	5.5	0	0.5	13
	Vietnam	2.5	6.5	8.5	1.5	3.5	22.5