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The Global CCS Institute Capacity Assessment Approach

Prepared for the Economic and Social Commission for Western Asia (ESCWA): Expert General Meeting on “Carbon Capture, Utilization and Storage in ESCWA Member States: Enhancing the Sustainability of the Energy System in a Carbon Constrained Development Context”

6 – 7 November 2013

PURPOSE

The purpose of this paper is to outline the Global CCS Institute's (the Institute) approach to undertaking a Capacity Assessment in-country with a view towards developing a tailored Capacity Development Work Program (Work Program). The process has been undertaken by the Institute in partnership with stakeholders in Malaysia, Mexico and less formally for South Africa and India. It is a flexible approach that can be applied at a regional, country or organisational level. For the purposes of this paper it is assumed that assessments will be undertaken at a country level.

THE GLOBAL CCS INSTITUTE

The Institute is an independent, not-for-profit company. The Institute accelerates the development, demonstration and deployment of carbon capture and storage (CCS) globally through our knowledge sharing activities, fact-based influential advice and advocacy, and work to create favourable conditions to implement CCS.



Our Members include national governments, global corporations, small companies, environmental non-government organisations, research bodies and universities. They form part of an influential and collaborative community committed to deploying CCS on a global scale to mitigate climate change and create a future characterised by clean energy security.

CCS CAPACITY ASSESSMENT

The overarching goal of the CCS Capacity Development Program (and the assessment that underpins this) is to work toward creating an “enabling environment” for CCS deployment. Creating an enabling environment will facilitate a country’s movement through the different stages of CCS development, from scoping CCS opportunity to project deployment. An “enabling environment” can be built around the following aspects or areas: policy and regulation, technical expertise, financial and commercial issues; and public engagement issues.

For instance capacity might be developed around:

- government understanding of legal and policy issues and how this applies to legislation and regulation development and application;

- technical knowledge and skills in engineers, geologists, and project managers;
- understanding financial and commercial issues, risks and incentives by policy makers, lenders, and companies; and
- the ability of companies and governments to effectively and genuinely engage with the public and local stakeholders around a specific CCS project.

To undertake a Capacity Assessment, the Institute has developed a suite of analytical ‘tools’ that can be moulded to suit a specific purpose.

PROCESS

It is suggested that the intelligence or input for the Capacity Assessment is sought through a variety of ways:

- Country profile. This is an information gathering exercise purposed toward gaining an understanding of the broader political, economic, social and cultural as well as geological environments that a potential CCS project would be influenced by. It is also an opportunity to develop an understanding of the different stakeholders that may be involved;
- Stakeholder workshop, involving the key CCS-related stakeholders, for instance, government ministries, industry players, academic institutions and research organisations. A good outcome is more likely to be achieved if the process is championed by a ‘host’ organisation in-country, for instance the government ministry responsible for CCS. The aim of the stakeholder workshop is to seek stakeholder views on where the country lies on the ‘CCS Development Lifecycle’ and therefore what sort of capacity development activities might be appropriate and of interest to them;
- One-on-one meetings with relevant stakeholders. These can help fill in the gaps and delve into more detail about the capabilities and interests of key stakeholders.
- Circulate the proposed work program to stakeholders seeking input and comment;
- Finalise agreed work program and distribute.

CAPACITY ASSESSMENT METHODOLOGY

A six step process is applied to assess the country’s current CCS capacity and how it could be enhanced to accelerate the development of CCS.

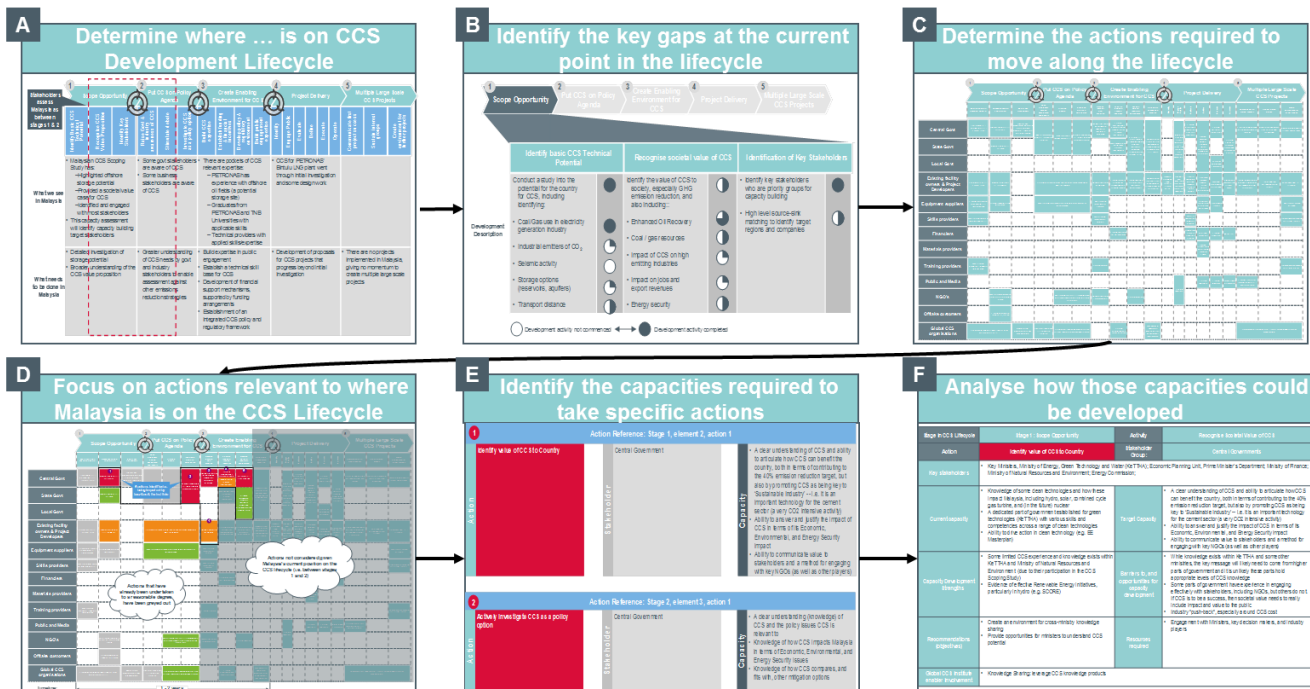
These steps include:

- A. Using the CCS Development Lifecycle (explained below) to understand the development status of CCS within the country.
- B. Assessing what CCS-related activity has been undertaken at each stage of the CCS Development Lifecycle, to help identify key capacity development strengths and opportunities.
- C. Identify the stakeholders who are and who may be involved in CCS and understand the actions they need to take at each point in the CCS Development Lifecycle.
- D. Review and qualitatively assess which actions have been taken, are being taken, or have yet to be taken and prioritise actions.
- E. Determining the capacities required to support those actions.

F. Analyse how those capacities could be developed by capacity development activities; these activities will together consist the Capacity Development Program.

Figure 1 below, outlines this six-step approach, using some of the 'conceptual tools' developed by the Institute for this process.

Figure 1: Six Step Capacity Assessment Process

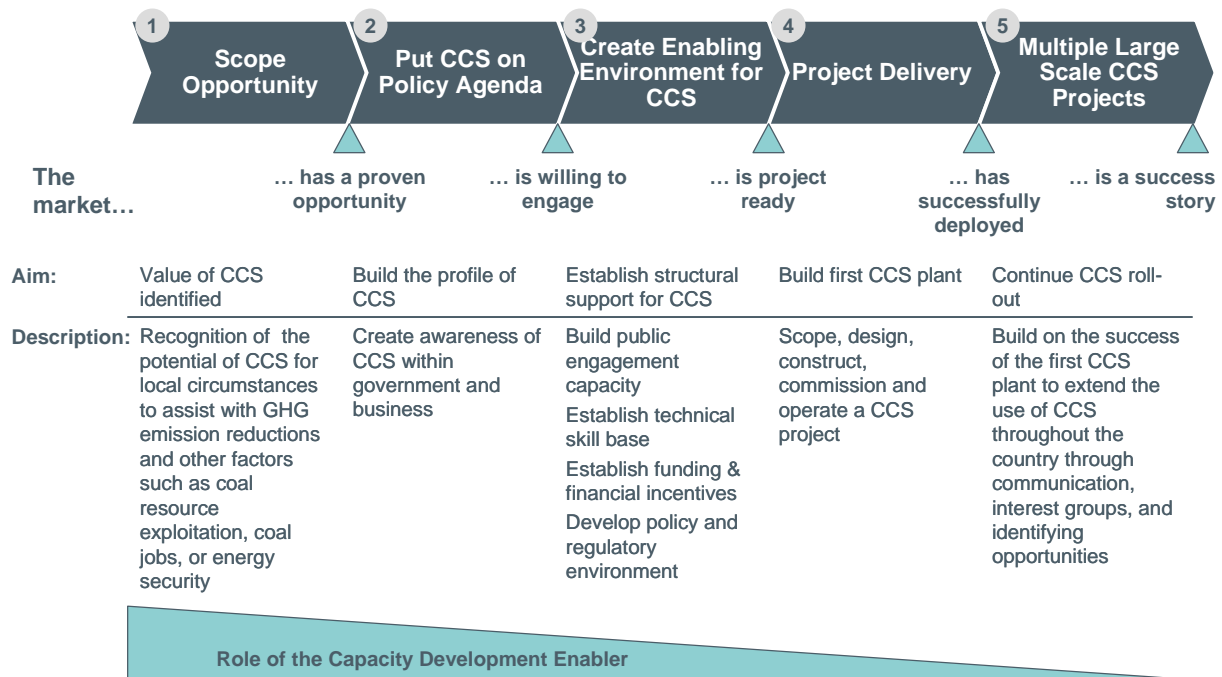


CCS Development Lifecycle

A key tool is the CCS Development Lifecycle; it refers to a country's journey to reach full scale commercial deployment of CCS. Different countries are at different stages of development. For instance, some countries are at the early stages of CCS development (e.g. scoping the opportunity) while others are further along the CCS lifecycle (e.g. creating an enabling 'environment' for CCS).

By providing stakeholders with a series of questions to consider, country stakeholders identify where they think their country sits on the CCS Lifecycle. This helps to identify what appropriate capacity development actions might be, given the country's development.

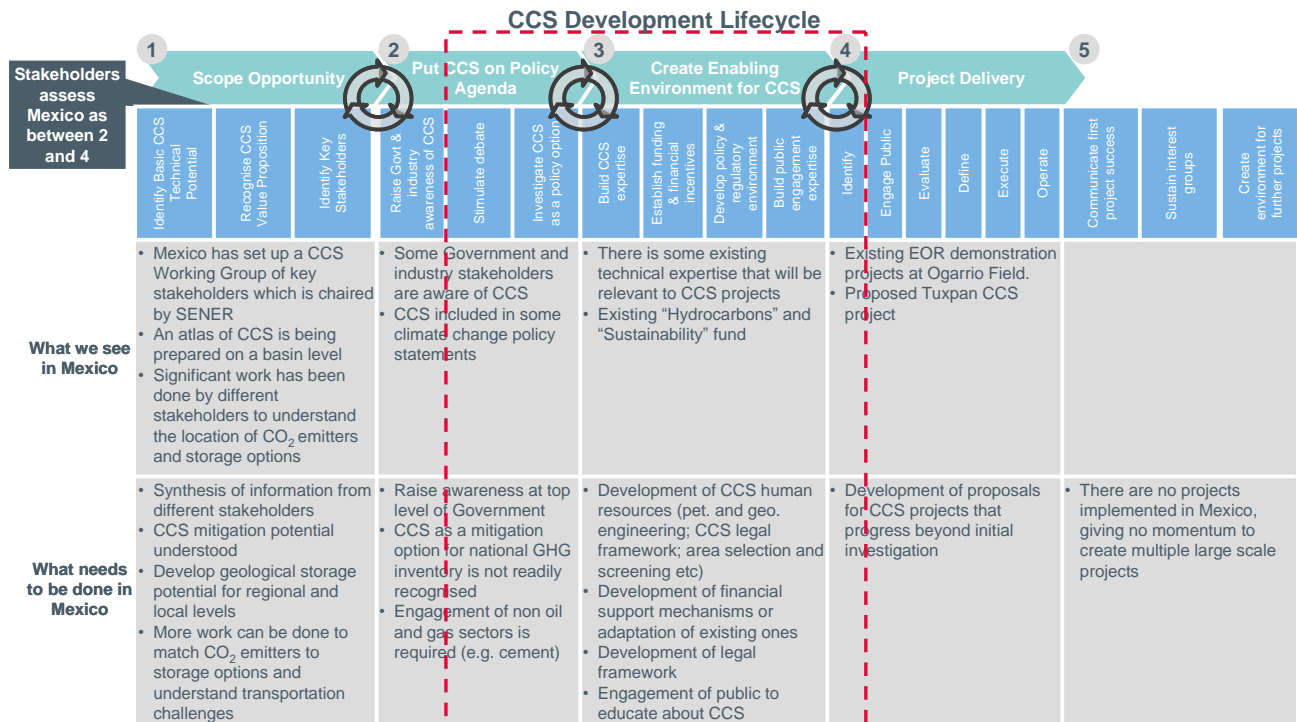
The key stages on the CCS development lifecycle are illustrated in Figure 2 below:

Figure 2: The CCS Development Lifecycle

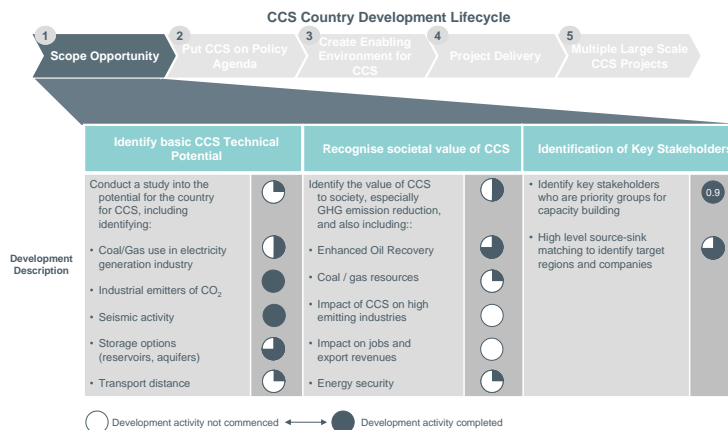
A country has different development priorities at each stage of the CCS lifecycle, and each stage can be dissected into another layer of development steps. It is important to note that countries can, and often are, acting at multiple parts of the Lifecycle at the same time; development is often an iterative, not a linear, process. As such, it is important to identify the specific 'opportunities for capacity development' at relevant points in the Lifecycle.

The CCS Capacity Assessment for Mexico provides a good example of how this can work in action. In September 2011 the Global CCS Institute held two interactive workshops and a series of 'one-on-one' style meetings with key stakeholders in order to obtain their perspective of where Mexico 'sits' on the CCS Development Lifecycle.

At that time stakeholders generally felt that Mexico was between stages 2 and 4 on the Lifecycle with good progress made in some areas, including the identification of key stakeholders and establishment of a CCS Working Group, identification of CO₂ sources and potential storage sites.

Figure 3: Assessment of Mexico's Position on the CCS Lifecycle


As noted above, countries are often at multiple parts of the Lifecycle at the same time. Thus, during this process, it was important to identify areas where no activity had taken place and where some or all development activity is complete. To undertake this analysis, the Institute identifies what type of activities are usually undertaken at different stages along each stage of the CCS Lifecycle, and how much activity has already taken place around this aspect. As can be seen in Figure 4 below, activity is represented in the 'moon diagrams'. The more activity, the more shaded the 'moon diagram'.

Figure 4: Detailed Analysis of Progress Along the CCS Lifecycle for 'Scoping Opportunity' (noting this analysis is done for all six stages)


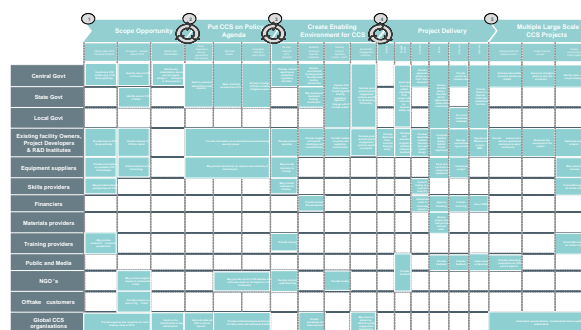
STAKEHOLDERS

It is essential to develop a clear understanding of CCS-related stakeholders, and undertake a 'stakeholder analysis'. Different categories of stakeholders include:

- Central Government
- Local authorities
- Project developers
- Existing facility owners
- Technology equipment suppliers
- Skills providers
- Financing bodies
- Construction materials suppliers
- Training providers
- Local communities
- General public
- Offtake customers
- Global development partners

Different stakeholders have different roles to play at the different stages of development. The Institute has developed another conceptual tool called the 'Delivery Network Map' to help identify which stakeholders would be undertaking what sort of actions at different stages of development (refer below to a schematic of this tool).

Determine the actions required to move along the lifecycle



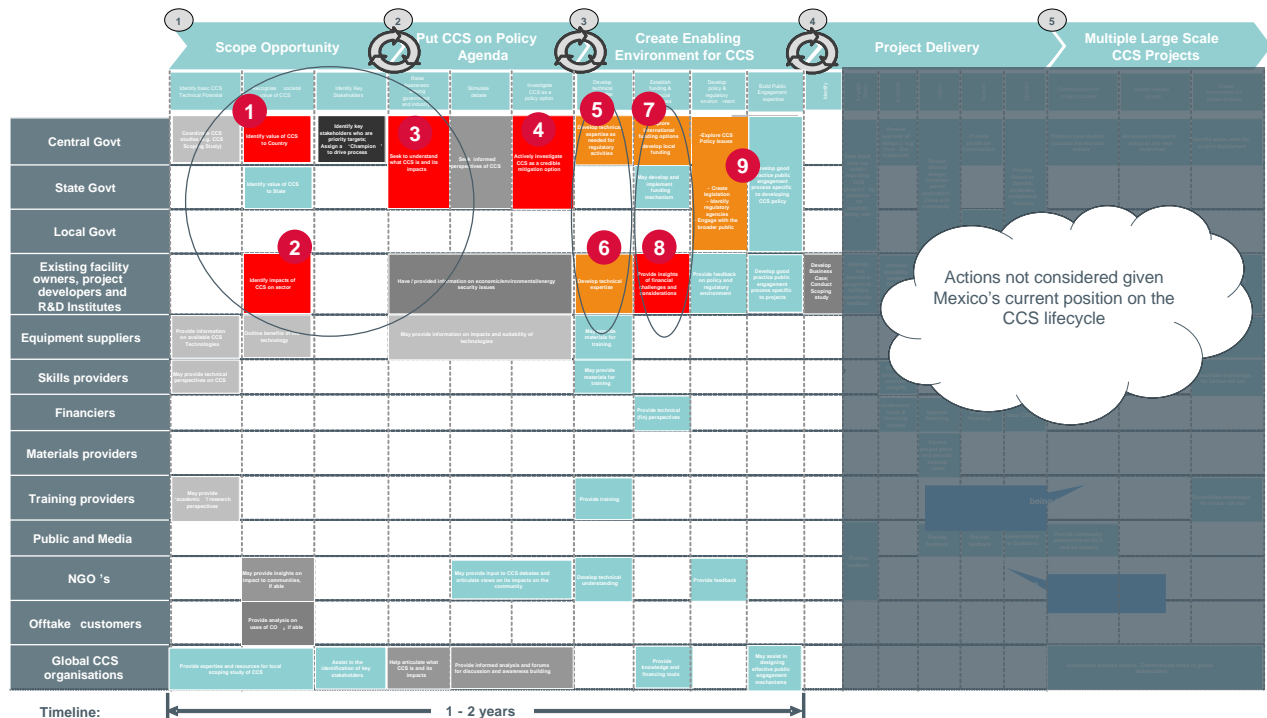
It is useful to consider the relationships and interactions that stakeholders have with each other to understand the power and influence potentially available to influence CCS outcomes.

CAPACITY DEVELOPMENT OPPORTUNITIES

There are many actions that need to be undertaken by many different stakeholders to develop CCS. In most cases, resources (time, effort and funding) demand that actions are prioritised. The Institute uses four criteria (timing, impact, momentum, opportunity) to help prioritise actions in the Delivery Network Map.

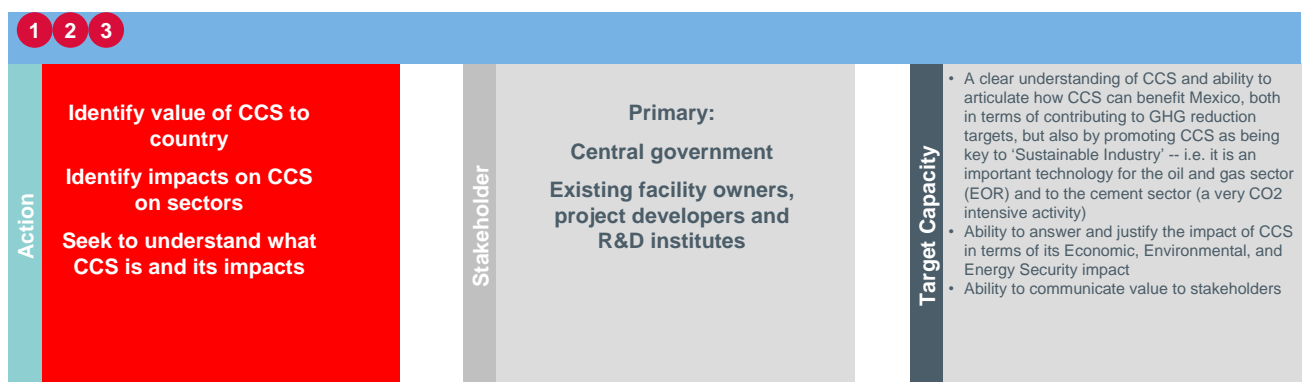
The assessment undertaken for Mexico highlighted nine key actions where capacity development was seen as being most important at this point in time (see Figure 6).

Figure 5: Delivery Network Map with Prioritised Actions



The next step is to clearly articulate what capacities need to be developed to progress the prioritised actions. Figure 6 provides an example of how capacities are linked to actions.

Figure 6: Example of Linking Capacities to Actions



The next step is to brainstorm what capacity development activities can help develop the target capacity. Suggestions are drawn from in-country stakeholders, as well as from the Institute staff, drawing on previous experience. It is likely that actions will again need to be prioritised.

The final step is to develop a high-level 'action plan' for each of the activities that have been selected to form the 'Capacity Development Program'.

Figure 7: Example of high level 'Action Plan'

Capacity Development Opportunity Assessment			
Stage in CCS Lifecycle	Stage 1 and 2	Activity	Recognise the value of CCS and raise awareness of its potential in Mexico with key decision makers
Action	Identify value of CCS to country Identify impacts of CCS on sectors Seek to understand what CCS is and its impacts	Stakeholder Group:	Central government Existing facility owners, project developers and R&D institutes
Key stakeholders	SENER, SEMARNAT, CFE, PEMEX and Ministry of Finance		
Current capacity	While there are some good examples of work done by different stakeholders in the working group, overall understanding of the value of CCS to Mexico has not been comprehensively analysed. There is a lack of understanding within the senior levels of Government, CFE and PEMEX about CCS. While the establishment of the CCS Working Group is a very positive step, the group currently lacks direction beyond the completion of the CCS Atlas	Target Capacity	<ul style="list-style-type: none"> • A clear understanding of CCS and ability to articulate how CCS can benefit Mexico, both in terms of contributing to GHG reduction targets, but also by promoting CCS as being key to 'Sustainable Industry' -- i.e. it is an important technology for the oil and gas sector (EOR) and to the cement sector (a very CO₂ intensive activity) • Ability to answer and justify the impact of CCS in terms of its Economic, Environmental, and Energy Security impact • Ability to communicate value to stakeholders
Capacity Development Strengths	<ul style="list-style-type: none"> • Commitment of a number of key stakeholders to CCS in Mexico • A lead stakeholder (i.e. SENER) supportive of the initiative • A diverse mix of skills within the CCS Working Group 	Barriers to, and opportunities for capacity development	<ul style="list-style-type: none"> • Not all relevant stakeholders understand what CCS is • There could be more Government support for CCS at a top level - not everyone is convinced it's a good idea • CCS project/s are not considered "country priority" projects • EOR is not always linked with CCS
Recommendations (objectives)	<ul style="list-style-type: none"> • Develop country level CCS strategy • Half-day briefing with key Govt decision makers and representatives from CFE and PEMEX to educate about CCS; focusing on need for CCS economics, link to EOR, and "CCS 101" (this could be done via a function at the Australian Embassy) 	Resources required	<ul style="list-style-type: none"> • SENER (to project manage) • Global CCS Institute to provide input and engage external support (including an external party to facilitate, advise and manage strategy development tasks / an external party to prepare workshop materials and facilitate workshop)
Global CCS Institute enabler involvement	Knowledge Sharing and Financial and Commercial: Leverage CCS knowledge products and provide external support to manage and advise on strategy development and workshop preparation and facilitation.		

THE WAY FORWARD

The capacity assessment detailed above provides the foundations for designing, in partnership with stakeholders, a capacity development work program. The work program is designed to "strengthen the knowledge, abilities, skills and behaviour of individuals, groups, organisations and governments" so that they are better readily to take advantage of the benefits of CCS when the right conditions arise.

Design and implementation of the work program is expected to be an iterative process as lessons learned are used to improve and modify the program.

The Global CCS Institute is willing to facilitate a capacity development assessment process using this methodology and can provide further detail on request.

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