inFocus CCS Carbon Capture & Storage

What is Capacity Building?

Carbon capture, utilization and storage (CCUS) technologies are increasingly viewed by international experts as an essential control strategy for human-generated carbon dioxide (CO_2) emissions.

Developing and widely deploying these technologies globally in a timely fashion will be critical to their eventual effectiveness and success. But so too will be efforts to create the information, tools, skills, expertise and institutions required to implement CCUS demonstrations and move them rapidly into commercial operation, particularly in emerging economies. These activities are collectively known as "capacity building," and are a primary focus of the Carbon Sequestration Leadership Forum (CSLF), a ministerial-level international initiative aimed at marshalling worldwide CCUS resources. CSLF operates its capacity building initiatives in collaboration with the Climate Group for the Global e-Sustainability Initiative, the World Bank, the Global CCS Institute (GCCSI), and other organizations.

Overview

CCUS can make a significant contribution toward meeting global greenhouse gas (GHG) mitigation targets. In recent years, numerous developed nations — most particularly the United States, European Union, and several Asian countries — have undertaken significant CCUS research, development and demonstration (RD&D) programs. This research has focused on improving technology efficiencies and costs while demonstrating the safety, reliability and permanence of geologic storage.

Did You Know?

Countries and organizations such as the CSLF have allocated or contributed hundreds of millions of dollars to current and future CCUS capacity building activities in developing countries.

Source: Global CCS Institute

In the current era of slower global economic growth, it is increasingly difficult for many nations, particularly developing countries, to devote resources to often costly CCUS RD&D, where the risks can be high and the results uncertain. Because climate change is a global issue, however, it is imperative that emerging economies, as well as industrialized nations, play a role in implementing potential solutions like CCUS. A key element in this regard is undertaking substantial efforts to exchange knowledge about all aspects of CCUS; sharing policies, procedures and best practices for overcoming barriers and effective implementation; and encouraging worldwide demonstrations and deployment.

That is where capacity building comes in.

In the most basic sense, capacity building enhances capacity and capabilities in people by developing and sharing information, skills, experiences and knowledge across all key CCUS areas. Because the technology is relatively new and the capacity to widely implement it is not yet adequate in either emerging or industrialized economies, a special focus is needed on not only CCUS processes, but also on policy, legal and socioeconomic barriers and challenges.

While specific needs may vary by nation, the **CSLF's Capacity Building Program** has identified four basic tasks that most economies will require to implement CCUS:

- Identifying, characterizing and matching CO_2 sources to potential reservoirs;
- Analyzing and formulating policy and legal/ regulatory frameworks;
- Conducting pre-feasibility, feasibility and regulatory studies to evaluate and support decisions about proposed projects; and,
- Implementing projects through planning, financing, construction, operation and monitoring.

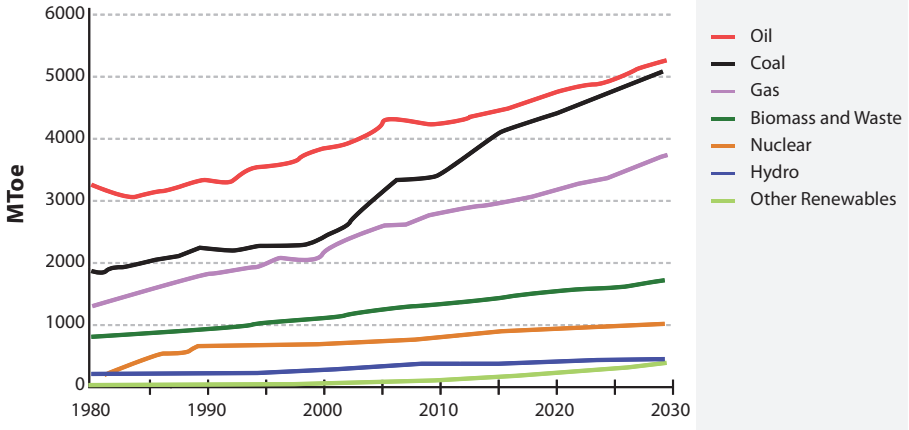
Why is Capacity Building Necessary?

The International Energy Agency (IEA) considers implementation of **CCUS technologies** globally, including in developing countries, **essential** for the long-term **reduction of atmospheric CO_2 emissions**. The IEA has estimated the most cost efficient portfolio of mitigation technologies to achieve emissions reductions by 50 percent below 2005 levels by 2050; under this scenario, CCUS accounts for 19 percent of total reductions.

Essentially, in-country capacity must be built in major areas to create the **body of information** and **expertise** that not only makes possible implementing CCUS demonstrations, but also moving them rapidly into commercial operation. As the Global CCS Institute notes, capacity building **strengthens the understanding, knowledge, abilities** and **skills** of individuals, organizations, industry and governments to enable them to facilitate CCUS deployment.

For example, capacity might be developed around such areas as government understanding of legal and policy issues and how this applies to regulatory application; technical knowledge and skills for engineers, geologists, project managers and others essential to the implementation process; understanding financial and commercial issues, risks and incentives by policymakers, lenders and companies; and the ability of companies and governments to effectively and genuinely engage the public and local stakeholders around a specific CCUS project. (see Global CCS Institute, http://www.globalccsinstitute.com/community/blogs/authors/alicegibson/2011/05/27/so-what-ccs-capacity-development).

Projected Energy Demand



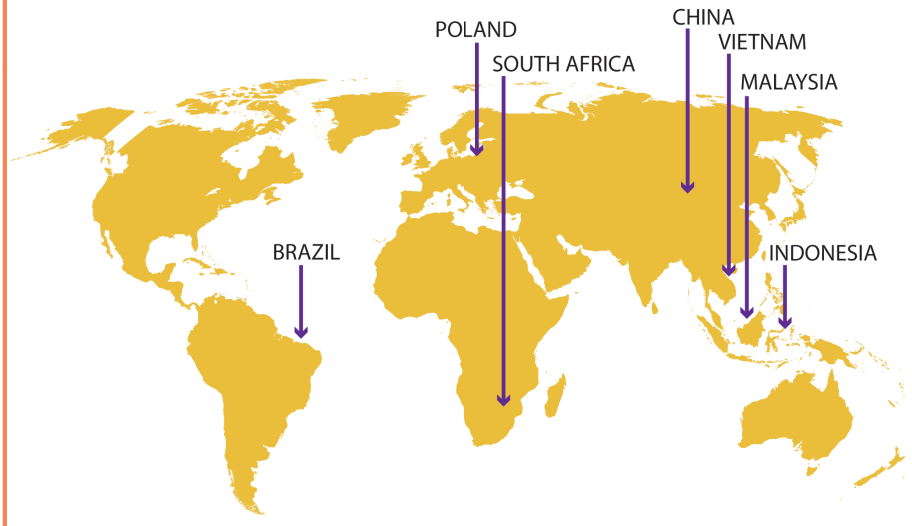
IEA projects energy demand will grow by nearly 40 percent by 2030, mostly in developing economies.

The bottom line is creating information and tools to define, evaluate and realize CCUS opportunities; providing the skills and expertise to plan, implement and regulate deployments; and marshalling the public and private resources and institutions—such as CO_2-emitting and service industries, financial institutions, government agencies and academic/research facilities—to make widespread commercialization possible in practical terms. According to the Global CCS Institute's *Capacity Development Issues Brief 2011*, organizations and governments are **increasingly aware of these needs** and becoming more involved in capacity building activities.

In this regard, the CSLF program is focused on building capacity in emerging economies by: (1) disseminating practical information through workshops, targeting specific issues, developing informational materials and creating problem-solving networks; (2) facilitating exchanges among government agencies and international organizations to share experiences and compare approaches to similar problems; and (3) supporting the building of CCUS academic and research institutions.

What Kinds of Capacity Building Activities are Underway?

A number of capacity building activities have been initiated around the world, mostly taking place in the countries of **Brazil, China, Indonesia, Malaysia, Poland, South Africa** and **Vietnam**, as well as broader efforts aimed at the Asia Pacific Region, Southern Africa, and developing economies elsewhere. The key funding mechanisms for capacity building activities as a whole are provided primarily by **Asia Pacific Economic Cooperation; Asian Development Bank; EuropeAid; the World Bank Group; the Global CCS Institute; and CSLF**. Many of these activities have focused on raising CCUS awareness and understanding, and identifying country-specific concerns, barriers and potential solutions regarding challenges to deployment. According to the Global CCS Institute, "workshops have brought together relevant stakeholders such as government officials, researchers and industry representatives to raise awareness of CCUS and to discuss concerns. For the most part, the content of these workshops has been high level and includes presentations and discussions on technical expertise, policy, storage and financial and environmental issues" (*Capacity Development Issues Brief 2011*).



A number of capacity building activities have been initiated around the world. Those countries indicated on the map have had CCS capacity development activities within the past 18 months, according to the Global CCS Institute. In addition to country specific activities, there have also been initiatives targeted to regions, especially Asia and Southern Africa.

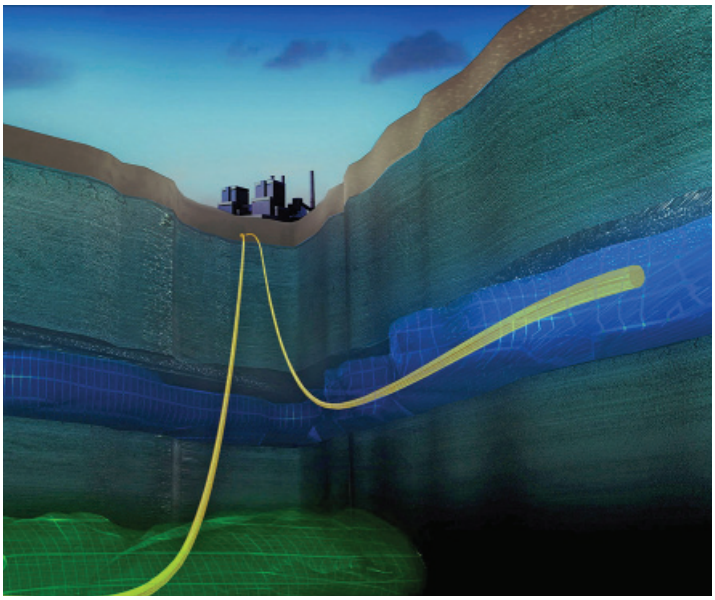
CCUS schools are run by **IEA's Greenhouse Gas Research and Development Program** and **CO2CRC** and focus on students from related CCUS disciplines, such as geology, engineering, economics and early stage professionals. According to the Global CCS Institute, participants are from developed and developing countries and teaching sessions include such topics as capture, transport, storage, economics, health and safety, risk assessment, legal and regulatory requirements, monitoring and verification, community consultation and in-depth storage technology.

In the United States, **Regional Carbon Sequestration Training Centers** established and funded under the American Recovery and Reinvestment Act of 2009 have undertaken extensive training and education activities to help meet the need for a significantly expanded workforce trained in the various specialties that widespread CCUS deployment will require. These seven centers, provided about $1 million each through 2012, have provided instruction to more than 700 participants and distributed more than 1,500 professional development hours. They also augment and supplement outreach activities already underway in the **U.S. Department of Energy's Regional Carbon Sequestration Partnerships** initiative.

How is the CSLF Capacity Building Program Structured?

The CSLF Capacity Building Program was approved by the organization's **Policy Group** in 2009 and endorsed the following year by CSLF Ministers. Its goal is to help CSLF members develop the knowledge, tools, expertise and institutions necessary to implement CCUS demonstrations and then move the technology rapidly into the marketplace.

Capacity building program activities follow **five guiding principles**: (1) using a country-led process in which each nation defines its own needs; (2) sharing information and tools, creating skills and expertise, and building institutions; (3) tailoring capacity building to the individual needs of each member; (4) taking advantage of existing resources and avoiding duplication; and (5) to the extent possible, working with partners and leveraging resources.



Capacity building activities reflect these principles and focus on: workshops; personnel exchange programs; technical assistance to planned pilot CCUS activities; information exchanges; facilitation of technology transfer; training programs; study tours on regulations and standards; summer school programs; information and knowledge sharing programs; support for feasibility studies; and providing opportunities for engineers to work on CCUS demonstration projects.

CSLF's efforts are led by a **Capacity Building Task Force**, which is part of the organization's Policy Group, with the Secretariat providing administrative support. The Task Force develops and proposes capacity building activities to the Policy Group, with the program managed by the Secretariat. CSLF collaborates with the Global CCS Institute in the management of its program and also coordinates with the capacity building activities of the World Bank. Various other industrial and academic institutions in member countries take part in the organization's capacity building projects.

The CSLF established a Capacity Building Fund, administered by the Secretariat. As of July 31, 2011, contributions committed to the fund totaled slightly more than **$3 million** (U.S. dollars), with **more than $1.12 million** committed to projects. A total of nine capacity building projects in five countries (Brazil, China, India, Mexico and South Africa) have been approved thus far and will be conducted by the CSLF. Two remaining requests are being considered by the **Capacity Building Fund Governing Council** and are under discussion with the requesting members.

Further information on the CSLF Capacity Building Program can be obtained at: http://www.cslforum.org/publications/documents/pg_CapacityBuildingProgramPlan10091.pdf.

carbon sequestration leadership forum

Sources for Additional Information

- United Nations Intergovernmental Panel on Climate Change, http://www.ipcc.ch/
- International Energy Agency, http://www.iea.org/
- World Coal Institute, http://www.worldcoal.org/
- The World Bank, http://www.worldbank.org/
- Zero Emissions Platform, http://www.zeroemissionsplatform.eu/
- Global CCS Institute, http://www.globalccsinstitute.com/

Other inFocus Factsheets:

- Is Geologic CO_2 Storage Safe?
- Underground CO_2 Storage: A Reality?
- Why Carbon Capture and Storage?
- CO_2 Transportation — Is it Safe and Reliable?
- CO_2 Capture – Does it Work?
- What is Carbon Utilization?
- 10 Facts About CCS