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Regional: Promoting Carbon Capture and Storage in the People's Republic of China and Indonesia

Project Name

Promoting Carbon Capture and Storage in the People's Republic of China and Indonesia

Project Number

48282-001

Country / Economy

- Regional
- Indonesia
- China, People's Republic of

Project Status

Closed

Project Type / Modality of Assistance

- Technical Assistance

Source of Funding / Amount

TA 8714-REG: Promoting Carbon Capture and Storage in the People's Republic of China and Indonesia

| Source | Amount |
|---|-------------------|
| Carbon Capture and Storage Fund under the Clean Energy Financing Partnership Facility | US\$ 1.80 million |
| TA 8714-REG: Promoting Carbon Capture and Storage in the People's Republic of China and Indonesia (Supplementary) | |

| Source | Amount |
|---|-------------------|
| Carbon Capture and Storage Fund under the Clean Energy Financing Partnership Facility | US\$ 1.50 million |

Strategic Agendas

- Environmentally sustainable growth
- Inclusive economic growth
- Regional integration

Drivers of Change

- Governance and capacity development
- Knowledge solutions
- Partnerships
- Private sector development

Sector / Subsector

- **Energy** / Energy sector development and institutional reform

Gender

No gender elements

Description

The Country Partnership Strategy 2009-2013 of PRC underscores the need to resolve climate change issues and explore opportunities for clean development mechanisms. The Country Partnership Strategy 2012-2014 of INO explicitly outlines that ADB support to the country will include ongoing dialogue and policy advocacy with the government to promote the scale-up of carbon capture and storage. PRC is the largest emitter of CO₂ in the world, and INO is the 15th largest

The impact of the TA will be reduced CO₂ intensity and increased deployment of CCS technology in PRC and INO.

The outcome of the TA will be a well-established institutional capacity for CCS research and capacity development in areas of technology innovation, policy development and formulation and financial mechanisms.

The TA will have four components. It will (i) conduct research on CCS technology development and deployment with partners; (ii) promote knowledge sharing through conferences, workshops, dialogues, study visits, fellowships, and other forms of regional cooperation; (iii) strengthen collaborative partnerships with centers in and outside the region; (iv) foster leadership in capacity development, including government policy and regulatory system establishment for CCS.

Project Rationale and Linkage to Country/Regional Strategy

The IEA Carbon Capture and Storage (CCS) Roadmap highlighted the significant role that CCS will need to play in achieving an atmospheric CO₂ concentration stabilization of 450ppm by 2050. In the scenario it is based on, CCS will provide approximately 14% of the total CO₂ emissions reductions out to 2050. Achieving this contribution of emissions reductions will require an ambitious CCS growth-path, with 100 projects needed globally by 2020 and over 3,000 by 2050. In both 2020 and 2050 major developing countries, including the People's Republic of China (PRC) and Indonesia (INO), will need to contribute to carbon capture and storage (CCS) deployment.

PRC's continuing economic growth is projected to drive surging energy consumption for the next several decades. With 70% of PRC's primary energy coming from coal, and the expectation that this reliance on coal will persist for decades to come, PRC will likely continue as one of the world's largest GHG emitters for some time. Coal reserves in PRC are vast and account for over 5,500 billion tons, with proven reserves of 189 billion tons that can supply its projected requirements for over 70 years. Therefore, wide deployment of CCS in PRC over the long term will be necessary to significantly reduce national emissions.

Indonesia has a heavily fossil-fuels based economy, consuming coal, oil and gas produced domestically plus imported petroleum. As the world's largest coal exporter and a substantial LNG exporter, and confronted by increasing CO₂ emissions from growing domestic consumption of its indigenous coal and fossil fuels, Indonesia has significant requirements for the deployment of large scale low carbon technology in the long term. Moreover, the Government of Indonesia has been increasingly vocal about climate change and its impacts on the developing world. The government has

pledged to achieve a non-binding commitment to reduce country emissions by 26% in 2020, and has stated that this target would increase to 41% if international financing was to become available.

While CCS-related activities have been going on in PRC and more recently in Indonesia, much still has to be done to speed up the process of moving large-scale CCS from R&D to commercial stage. There are a range of activities underway in both countries, but mostly these are uncoordinated and fragmented in approach; in the main, initiatives have been focused on specific projects or technologies, rather than on a broader strategic view of best technologies, national CCS planning requirements, enabling regulatory and policy environments, environmental and social impacts, and financial mechanisms. Moreover there remains no single source of comprehensive data and information on CCS activities in PRC or INO.

To address this information need and create a stronger strategic architecture for future CCS initiatives, ADB proposes to establish a CCS research program under this R-RDTA that will be administered by two research centers in PRC and one in INO, together forming a new CCS Center for the two countries. With support from the ADB, the CCS Center and its partners will conduct research to develop CCS technologies in the region and organize activities to develop the capacity to enable widespread deployment of CCS in both countries and the region within next decade. Program activities will benefit from strategic direction provided by ADB (through its Energy Community of Practice) and the Clean Energy Financing Partnership Facility. The research scope is to examine issues involved with integration of CCS into the power and industry sectors of both countries, and will be comprehensive, covering key dimensions, economic, policy and technology, aiming to build the level of consensus on the role of CCS as a promising option for addressing greenhouse gas issues from increasing use of fossil fuels.

This program will also enable the center to join forces with partner institutes and centers in the region and to facilitate the creation and functioning of an international network of CCS researchers that will update technology and policy development status. This joint effort will build on the earlier part-time research work by ADB and knowledge partner organizations. One such organization is the UK Carbon Capture and Storage Research Centre at the University of Edinburgh of United Kingdom, which is already active in pursuing partnerships for CCS development in PRC and is involved in design of a demonstration project near Guangzhou (the China Resources Haifeng Power Plant).

The program will form an important part of the knowledge platform that ADB is building with the PRC.

Impact

Reduced CO₂ intensity and increased deployment of carbon capture and storage technology in the People's Republic of China and Indonesia

Project Outcome

Description of Outcome

Well-established institutional capacity for CCS research and capacity development in areas of technology innovation, policy development and formulation, and financial mechanisms.

Progress Toward Outcome

Implementation Progress

Description of Project Outputs

1. Improved R&D activity on CCS in PRC and INO, with three CCS Centers of Excellence established.
2. Increased knowledge sharing through conferences, workshops, dialogues, study visits and other forms of regional cooperation;
3. New collaborative partnerships built with centers in and outside the region
4. Foster leadership in capacity development, including government policy and regulatory system establishment for CCS.

Status of Implementation Progress (Outputs, Activities, and Issues)

Status of Implementation Progress

The TA aims to promote CCUS related activities initially in PRC and Indonesia. The activities supported by the TA were extended to Bangladesh, India, Kazakhstan, and Viet Nam through a change in scope memo approved on 23 June 2017.

Specifically, the TA aims at creating a stronger strategic architecture for accelerating and scaling up CCS development and deployment in the People's Republic of China (PRC), Indonesia and other DMCs in Asia. The TA will address a series of issues associated with the wide range of CCS-related activities currently underway primarily in the PRC and Indonesia and other promising DMCs. These include inter alia a broader strategic view of advanced technologies, national CCS planning requirements, enabling regulatory and policy environments, innovative and robust financial mechanisms, support to pilot projects and compilation of comprehensive and reliable database on CCS activities.

Completed/Ongoing Activities:

The TA has established a regional CCS research program to be administered by two centers of excellence (COEs) in the PRC and one COE in Indonesia, collectively forming a new region-wide CCS knowledge hub and community of practice. The activities of these COEs will help the host countries in adopting CCS technology, create necessary regulations and obtain financial access for developing CCS projects. The COEs are also expected to foster regional cooperation on these aspects and build capacity in the PRC and Indonesia.

Two institutes in the PRC - Energy Research Institute (ERI) of Shanghai Jiao Tong University, contracted in November 2015 and Guangdong Electric Power Design Institute (GEDI), China Energy Engineering Group, contracted in August 2016; and two

institutes in Indonesia - Institute of Technology Bandung and LEMIGAS, contracted in December 2016, have been engaged by ADB to respectively set up the two CCS COEs in the PRC and one CCS COE in INO, and collectively undertake specific tasks for delivering the envisaged outputs of the TA. All activities are carried out with strategic direction, oversight and support from and through the Energy Sector Group, the CCSF, and the Department of Business, Energy and Industrial Strategy of Government of United Kingdom.

Specific achievements of the TA are as follows:

"Three COEs have been established in PRC and INO to research on three capture technologies based on membrane, amine and carbonate;

"CCS related information is increasingly distributed through knowledge portals and nine CCS related workshops have been completed, which includes the consultative workshop on CCS regulation, organized by Indonesia COE in October 2017 where experts from the United Kingdom, International Energy Agency, the United States Department of Energy and CO2CRC attended; and the workshop on 'Way Forward on Carbon Capture Utilization and Storage in the People's Republic of China' held in Xi'An, PRC in September 2018 co-funded by RETA 8018. The workshop brought all the COEs on CCUS together and resulted in exchange of ideas. The workshop adapted Xi'An initiative which will result in creation of international network with universities and research centers;

"Six focused consultation workshops have been supported and further work on this is already planned with the COEs;

"Guangdong COE, Shanghai COE and Indonesia COE have submitted their final reports. They have been reviewed by experts and necessary modifications have been made. These reports will be published on COE's web pages on 2nd quarter 2019.

"The INO COE is providing support to CCS pilot project in Gundih which includes selection of the site for injecting CO₂, checking integrity of the proposed well for CO₂ injection, data collection for Sulphur removal facility, preparing a geological model for the sub surface structure, simulate CO₂ injection, assist in preparation of draft for CCS regulation and coordinate with Pertamina, Battelle as well as DG MFGAS

"Completed a CCS study tour to Canada with participants from PRC, Indonesia, Bangladesh and Viet Nam. The study tour covered participation in a symposium organized by International CCS Knowledge Centre and site visit to CCS plants in Canada;

"Consultants for the 'CCS Ready' study have been engaged and mobilized; and the report is expected to be published by 2nd quarter 2019;

"Current status of CCS in Vietnam was assessed by engaging a local consultant and participation from South East Asia Department. It was concluded that the government is currently working on renewable energy as a route to decarbonize their economy. CCUS is a lower priority for them. It will be useful to revisit the situation when there is more active interest from the government;

"Bangladesh EGR study documents have been submitted to the Bangladesh officials;

"The TA continues to review progress on CCUS in India and has maintained contacts with relevant stakeholders. This should play a role in ADB's larger engagement with India;

"No objection letter is received from Kazakhstan. Process of recruiting a national consultant will be initiated once CWEN finds more conducive environment.

Planned Activities:

The Team is currently working on organizing two CCUS-related events Opportunities for Cooperation on CCUS Research Roundtable and Asia Wakes Up to CCUS Deep Dive Workshops as part of Asia Clean Energy Forum (ACEF) 2019. The events will be held on 20 and 21 June 2019 at the ADB Headquarters in Manila, Philippines. The roundtable and deep dive workshops will bring together experts and stakeholders in CCUS to discuss developments in CCUS and explore possible collaboration to promote low-carbon development through CCUS in Asia.

Additional support will also be extended to the Guangdong Research Institute in the organization of the 5th Guangdong International CCUS Workshop, which will be held on 15 - 16 May 2019 in Shanwei City and Huizhou City, Guangdong Province, PRC. The workshop aims to track and review the CCUS promotion and piloting experience in Guangdong Province, and also to discuss the long-term plan for CCUS deployment.

Geographical Location
Regional

Summary of Environmental and Social Aspects

Environmental Aspects
Involuntary Resettlement
Indigenous Peoples

Stakeholder Communication, Participation, and Consultation

During Project Design
During Project Implementation

Business Opportunities

Consulting Services

1. Three consulting firms (49 person-months of inputs per firm, 147 person months total)
2. Two individual consultants (international, 12 person-months; and national, 24 person-months)

Each consulting firm will require a total of 13 person months of international consulting inputs and 36 person months of national consulting inputs.

Contact

Responsible ADB Officer
Nam, Kee-Yung
Responsible ADB Department
Sustainable Development and Climate Change Department
Responsible ADB Division
Energy Sector Group
Executing Agencies
Asian Development Bank

Timetable

Concept Clearance
18 Jun 2014
Fact Finding
-
MRM
-
Approval
29 Aug 2014
Last Review Mission
-
Last PDS Update
28 Mar 2019

Funding

TA 8714-REG

Milestones

| Approval | Signing Date | Effectivity Date | Closing | | |
|-------------|--------------|------------------|-------------|-------------|-------------|
| | | | Original | Revised | Actual |
| 29 Aug 2014 | - | 29 Aug 2014 | 31 Jul 2017 | 31 Aug 2019 | 29 Apr 2021 |

Financing Plan/TA Utilization

| ADB | Cofinancing | Counterpart | | | | Total |
|------|--------------|-------------|---------------|-----------------|--------|--------------|
| | | Gov | Beneficiaries | Project Sponsor | Others | |
| 0.00 | 3,300,000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3,300,000.00 |

Cumulative Disbursements

| Date | Amount |
|-------------|--------------|
| 17 Jun 2022 | 2,742,887.21 |

Project Page <https://www.adb.org/projects/48282-001/main>

Request for Information <http://www.adb.org/forms/request-information-form?subject=48282-001>

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