ASIAN DEVELOPMENT BANK

Regional: Tianjin Integrated Gasification Combined Cycle Power Plant (Additional Financing)

Project Name	Tianjin Integrated Gasification Combined Cycle Power Plant (Additional Financing)
Project Number	42117-024
Country	Regional
Project Status	Closed
Project Type / Modality of Assistance	Technical Assistance
Source of Funding / Amount	**TA 8499-REG: Tianjin Integrated Gasification Combined Cycle Power Plant Project (Additional Financing)** Carbon Capture and Storage Fund under the Clean Energy Financing Partnership Facility — US$ 800,000.00
Strategic Agendas	Environmentally sustainable growth Inclusive economic growth Regional integration
Drivers of Change	Governance and capacity development Knowledge solutions
Sector / Subsector	**Energy** - Conventional energy generation
Gender Equity and Mainstreaming	
Description	A regional project preparatory technical assistance (R-PPTA) of $800,000 will in part A address essential due diligence requirements, including (i) technical due diligence of the CCUS plant design, including an assessment whether and how the implementation of the CCUS pilot project will impact on the performance of the IGCC power plant; (ii) EIA and environmental audit of oilfield; (iii) storage site assessment; (iv) design of institutional set-up for continuous operation of the pilot project; (v) monitoring and verification of the CO2 sequestration sites; and (vi) economic and financial due diligence. It will also provide capacity building for the implementing agency in ADB Procurement Guidelines (2013, as amended from time to time) and ADB's Safeguard Policy Statement (2009). Part B of the proposed R-PPTA will capitalize on the unique lessons learned from the due diligence under part A and the pilot project implementation and shall facilitate best practice knowledge sharing and dialogue with policy makers, power generators, regulators, donors and other stakeholders from ADB DMCs through (i) organization of regional knowledge sharing workshops; (ii) development of essential knowledge products, such as development of guidelines for (a) preparing EIAs, and (b) monitoring and verification for CO2 storage sites; and (iii) other knowledge products. This concept for the support to the Tianjin IGCC CCUS pilot project will complement previous and ongoing efforts of ADB address the need for strengthening the capacity, create awareness and understanding of major actors on key issues concerning CCUS, an essential climate change mitigation technology in the PRC and among focus DMCs of the region. It also allows for an exchange of early movers on CCUS in the Region, especially the PRC and Indonesia, another country which ADB strongly supports in CCUS development. Moreover, it follows so-called Recommendation 5 of the CCUS Action Group under the Clean Energy Ministerial that in particular early mover projects supported by public funding should support and encourage the development of best practice knowledge sharing.

Project Rationale and Linkage to Country/Regional Strategy	1. The Asian Development Bank (ADB) approved the original project on 8 February 2010 which aims at reducing greenhouse gas (GHG) emissions from coal-fired power plants and was designed to demonstrate climate change mitigation effect of the new integrated gasification combined cycle (IGCC) power plant technology deployed. The original project was planned to support the construction of the 250 megawatt IGCC power plant at Tianjin, and creating adequate operation and maintenance capacity. The IGCC power plant was constructed and is officially in operation since December 2012. It is the first near commercial-scale IGCC plant in the Asia Pacific Region. The Government of the People's Republic of China (PRC) has requested ADB's consideration of additional financing through a grant to finance an additional output establishing a pre-combustion carbon capture and utilization (CCUS) pilot project at the Tianjin power plant The PRC is one of the world's largest emitter of carbon dioxide (CO2). About 50% of the country's CO2 emissions from fuel combustion come from the power sector. Faced with alarming local air pollution, hazardous climate change risks, serious environmental degradation and the trend that coal will continue to dominate the fuel mix in the power sector at least up to 2035, the only near-commercial solution to attain 80% to 90% cuts in carbon dioxide (CO2) emissions from coal-fired power plants will be to demonstrate and deploy the CCUS technology. However, CCUS has not been demonstrated on commercial scale power plants. Potential widespread deployment of CCUS will require owners and operators of power plants to learn new processes and methods, adopt new safety protocols and engage in new types of business cooperation. Also, all of the currently available capture technologies for separating a concentrated CO2 stream from a large thermal power-generation plant entail a significant increase in both capital as well as operating costs, when compared with technologies without CCUS. To enhance experiences, realize effective cost degressions and develop economic methods of CCUS, it is essential to implement pilot and demonstrate projects of the various available technologies. A key driver for the IGCC technology is the innate capability of gasification technology to separate and capture CO2 most effectively, compared to other available capture technologies, notably oxy-combustion or post combustion. Coal gasification units could be modified to separate CO2 generated from the syngas before combustion and thus effectively reduce GHG emissions. Therefore, IGCC has been viewed as the most cost-effective platform deploying CCUS technologies for coal-fired power plants. The proposed CCUS pilot project for additional financing will not only be the first and only pre-combustion CCUS project attached to an IGCC power plant in Asia and the Pacific Region, but will also be the first project where a power generation company will collaborate with an oil company for enhanced oil recovery (EOR). It will also be one of the first to be supported by a multilateral development bank. Therefore, the implementation of the CCUS pilot project at the Tianjin IGCC thereby offers unique learning experiences, which are not only valuable for the PRC, but for all countries from Asia and the Pacific Region with plans to expand their coal-based power generation capacity. It is of strategic importance to develop knowledge products and will therefore become a model on how to optimally structure the support to CCUS pilot and demonstration projects, derive policy recommendations, for example on required environmental standards, and widely disseminate the experiences and knowledge accrued. The implementation of the CCUS pilot project at the Tianjin IGCC thereby offers unique learning experiences, which are not only be valuable for the PRC, but for all countries from Asia and the Pacific Region with plans to expand coal-based power generation capacity. The proposed focus DMCs includes India, Indonesia, Kazakhstan, Malaysia, Pakistan, Thailand, and Vietnam. These ADB DMCs either have a large, coal-based power generation sector or plans to significantly expand their power generation capacity with coal-fired generation. Representatives from relevant DMCs will be invited to participate in the workshop and will be asked to share their respective country's status on CCUS pilot testing, demonstration, and deployment experiences during the workshop. They will be further asked to support disseminating best practice guidelines in their respective countries.
Impact	

Project Outcome

Description of Outcome
Progress Toward Outcome
Implementation Progress
Description of Project Outputs
Status of Implementation Progress (Outputs, Activities, and Issues)
Geographical Location

Summary of Environmental and Social Aspects

Environmental Aspects
Involuntary Resettlement
Indigenous Peoples
Stakeholder Communication, Participation, and Consultation
During Project Design

During Project Implementation	The consultants' inputs have been completed.

Business Opportunities

Consulting Services	Part A of the R-PPTA will require approximately 11 person-months of international consultants and 21 person-months of national consultants input in the following critical areas (i) technical due diligence of the CCUS pilot, including the capture, compression and liquefaction plant, (ii) due diligence of EOR and CO2 geological sequestration plans, (iii) EIA of the CCUS pilot project, (iv) environmental audit of the oilfield, (v) institutional set-up for CCUS operation and monitoring and verification structure, (vi) economic and financial due diligence, and (vii) financial management and procurement capacity assessment. Specifically, the following international experts shall be engaged (i) pre-combustion carbon capture expert (3 person-months), (ii) environment expert (6.0 person-months), and (iii) environmental auditor (2 person-months). In addition, the following national CCUS experts shall be engaged (i) pre-combustion carbon capture expert (3.0 person-months), (ii) expert for EOR (4.0 person-months), (iii) expert for geological sequestration of CO2 (4.0 person-months), (iv) environment expert (4 person-months), (v) economist (2.0 person-months), (vi) financial analyst (2.0 person-months), and (vii) procurement specialist (2.0 person-months). The due diligence of a CCUS pilot project is an innovative, complex and highly specialized assignment. As this will be the first CCUS pilot project for a coal-fired power plant to be supported by a multilateral development bank, it is essential that the quality of the due diligence will be excellent and will have model character. Particularly the environmental safeguards need to be ensured in this complex project. Therefore, ADB will select and engage consultants through a consulting firm in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time) using the quality- and cost-based selection method (with a quality-cost ratio of 90:10). The consulting firm will be required to submit a simplified technical proposal covering all aspects of the terms of reference. For the due diligence of the EOR and the carbon sequestration plan ADB will engage the Petroleum University of China through the single source selection method in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time) as the university and has exclusive access to the data. The way of engagement of the University, either as a subcontract to the selected firm or with a direct contract with ADB will be firmed up. A peer review of the EOR and storage site due diligence by an international expert will be organized. For Part B of the R-PPTA resource persons will be engaged to support the knowledge dissemination workshop. They will present lessons learned and good practice guidelines based on the experiences gained from the CCUS pilot project implementation. The resource persons are likely to be the same consultants as engaged under part A and who developed important knowledge products of experiences

Responsible Staff

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Timetable

Concept Clearance	-
Fact Finding	-
MRM	-
Approval	31 Oct 2013
Last Review Mission	-
Last PDS Update	28 Sep 2016

TA 8499-REG

Milestones					
Approval	Signing Date	Effectivity Date	Closing		
			Original	Revised	Actual
31 Oct 2013	-	31 Oct 2013	31 Dec 2015	-	-

Financing Plan/TA Utilization							Cumulative Disbursements	
ADB	Cofinancing	Counterpart				Total	Date	Amount
		Gov	Beneficiaries	Project Sponsor	Others			
0.00	800,000.00	0.00	0.00	0.00	0.00	800,000.00	31 Oct 2013	308,310.89

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