ADB ASIAN DEVELOPMENT BANK

China, People's Republic of: Qingdao Smart Low-Carbon District Energy

Project Name	Qingdao Smart Low-Carbon District Energy
Project Number	48003-001
Country	China, People's Republic of
Project Status	Closed
Project Type / Modality of Assistance	Technical Assistance
Source of Funding / Amount	**TA 8625-PRC: Qingdao Smart Low-Carbon District Energy** Technical Assistance Special Fund — US$ 600,000.00
Strategic Agendas	Inclusive economic growth
Drivers of Change	Governance and capacity development Knowledge solutions
Sector / Subsector	**Energy** - Conventional energy generation - Renewable energy generation - biomass and waste - Renewable energy generation - solar
Gender Equity and Mainstreaming	
Description	The proposed Qingdao Smart Low-Carbon District Energy Project will demonstrate one of the first coal-free district energy (heating and cooling) systems in the People's Republic of China's (PRC). Instead of coal, the project will use a mix of cleaner and renewable heat sources such as natural gas, waste heat recovery, and solar thermal. It will also demonstrate highly energy efficient low temperature district energy networks with computerized demand-side load management system in Lilun District in Qingdao City. The cleaner source of heat combined with highly energy efficient district energy system will reduce emission of greenhouse gases and other air pollutants in Qingdao City.

Project Rationale and Linkage to Country/Regional Strategy	Qingdao is a large city in Shandong Province, located in the northeastern part of the PRC where winter temperature drops to as low as _17_C, and sub-zero temperatures typically last for 5 months in a year. Heating services is an essential requirement for sustaining the people's livelihood. Like other large cities in the PRC, Qingdao has also been experiencing hazy sky and polluted air in winter. According to local air quality monitoring system, Qingdao's daily particulate matter less than 2.5 micrometers (PM 2.5) concentration ranges from 151 _g/m3_200 _g/m3 ,which is almost six to eight times higher than World Health Organization (WHO) guideline of 25 _g/m3. Similarly, particulate matter less than 10 micrometers (PM10) in Qingdao have been measured as 132 _g/m3, which is more than twice the WHO guideline. It is estimated that 45% of PM 2.5 in the PRC is contributed by coal combustion. Current coal-based heating practice is a major cause of increased outdoor and indoor air pollution during winter months. The poor indoor and outdoor air quality increases the risk of acquiring respiratory and heart diseases, with higher impact on the sick, children, elderly and poor people. Large air pollution in the PRC also increases transboundary air pollution in neighboring countries such as Japan and Korea. A key lesson from the United Kingdom, which experienced the _London Great Smog_ due to serious air pollution in 1952, is that a rapid switch from coal to clean energy consumption (mainly gas) can contribute greatly to pollution reduction. Fuel switching from coal to gas and renewable energy integration in the district energy system is the way forward in major cities in the PRC, including Qingdao, which are facing serious urban air pollution especially during winter season. Qingdao is one of the national low carbon development pilot cities selected by the National Development Reform Commission (NDRC) in December 2012. One third of carbon dioxide (CO2) emission in Qingdao is contributed by the residential and heating sector. One of the key interventions to achieve the low carbon development in Qingdao is to replace coal-based boilers with natural gas and reduce losses in district heating network. In June 2013, the State Council of the PRC issued ten air pollution prevention and control measures, which includes the reduction of coal usage and increasing the utilization of natural gas and renewable energy in district energy. In July 2013, Qingdao Municipal Government (QMG) issued a comprehensive policy for urban air pollution reduction which includes a ban on using coal in district energy in urban areas. In January 2014, the PRC has set new targets for provinces to reduce air pollution by 5%_25%. Under the new regulation, Shandong Province will have to reduce PM 2.5 emission by 20% annually by 2017. Apart from the use of cleaner and renewable heat sources and low-temperature heating, the proposed project will also introduce additional features that will bring the energy efficiency of district energy system to international current best practices. These features include (i) replacing the conventional insulated steel pipes by installing insulated plastic pipes to reduce the heat and water losses, (ii) installing heat storage facility for peak demand shaving, and (iii) installing centralized chillers utilizing waste heat and other clean sources for district cooling during the summer months. The proposed project will not only directly benefit to 450,000 households in the project area (36% of total urban population in Qingdao City) by providing cleaner district energy services and improved air quality, but also indirectly benefit the remaining urban population in downstream districts of Qingdao through improved air quality by removing the polluting sources from the project area. The proposed project is directly responding to the urgent national, provincial, and municipal priorities to develop low carbon cities and reduce urban air pollution (para 4). Upon successful demonstration of the proposed project, the similar technical application can be replicated in other major cities in the PRC. It is closely aligned with ADB's Strategy 2020, where moving developing member countries are moving onto low-carbon growth paths by improving energy efficiency and introducing renewable energy has been identified as one of the key means of achieving environmentally sustainable growth. ADB's Energy Policy (2009) prioritizes energy efficiency and access to energy for all, including district heating. The PRC's country partnership strategy (2011_2015) identified environmental sustainability as one of the three pillars of ADB assistance.
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	Main stakeholders of the project are Qingdao Energy Group Limited, Qingdao Municipal Development and Reform Commission, Qingdao Finance Bureau, heat sources operators, communities, and businesses in the project areas. They have been participating in the project design through consultations and series of review and approval processes. Potentially affected communities have participated in public consultations during the domestic environment impact assessment preparation and will also have an opportunity to engage in project design improvement through potential public consultation meetings and other communication channels that will be set during the project preparation stage as well as project implementation.
During Project Implementation	The environment team of the consulting firm worked with the local design institutes to finalize the EDD reports and parts of the IEE report. The technical team met with the implementing agency and local design instituate to clarify details about the FSR and compile the draft TDD report. Various organizations and institutions in Denmark and Sweden were visited by the representatives of Qingdao province in the second week of September 2015 to obtain first hand knowledge and skills on the various technologies on district heating systems in Europe. The TA completion date was extended until 31 December 2016 to complete the capacity building and knowledge sharing activities which include (i) organizing of in-house technical training for the engineers of the implementing agencies, (ii) participation in local and international knowledge sharing events on district energy, and (iii) a study tour in Japan. The beneficiaries of the TA attended various capacity building, project management, and knowledge sharing activities which include: (i) international best practices and latest and advance district heating technologies familiarization and study tours in Europe(Denmark, Germany, Sweden, and the United Kingdom), (ii) a study tour in Japan, (iii) district heating forum in Beijing, (iv) project management training for the line managers of the implementing agency, and (iv) solar energy utilization workshop in Qingdao, PRC.

Business Opportunities

Consulting Services	The TA will take a two stage approach to use consulting services efficiently. Part 1 (data gathering and preliminary assessment) will require a total of 7.5 person-months of one international and three individual national consultants while Part 2 (detailed assessment) will require a total of 6 person-months of international and 15 person-months of national consulting services through a consulting firm. Part 1 will be implemented while the selection of consulting services of Part 2 is underway. Hiring a small number of individual consultants is more appropriate for the quick mobilization of consulting service and cost-effective than firms to perform the assignment of Part 1. The information collected by the consultants of Part 1 will be carried over to the consultants of Part 2. The expected benefit of this approach may advance the loan processing schedule. As for Part 1, the three individual national consultants will be engaged by ADB in accordance with the Guidelines on the Use of Consultants (2013, as amended from time to time). As for Part 2, a consulting firm will be recruited by ADB in accordance with ADB's Guidelines on the Use of Consultants through quality- and cost-based selection method (with a quality-cost ratio of 90:10 due to importance of technical aspects) using simplified technical proposal.
Procurement	The procurement of equipment by consultants, under the TA, will follow ADB's Procurement Guidelines (2013, as amended from time to time). The proceeds of the TA will be disbursed in line with ADB's Technical Assistance Disbursement Handbook (2010, as amended from time to time). The equipment procured under the TA will be turned over to the executing agency upon TA completion.

Responsible Staff

Responsible ADB Officer	Oi, Teruhisa
Responsible ADB Department	East Asia Department
Responsible ADB Division	Energy Division, EARD
Executing Agencies	*Qingdao Municipal Development & Reform Commission* *Foreign Economic Relations & Trade Div* *No. 11 Xiang Gang Zhong Road*

Timetable

Concept Clearance	-
Fact Finding	-
MRM	-
Approval	04 Mar 2014
Last Review Mission	-
Last PDS Update	15 Mar 2017

TA 8625-PRC

Milestones					
Approval	Signing Date	Effectivity Date	Closing		
			Original	Revised	Actual
04 Mar 2014	20 Mar 2014	20 Mar 2014	29 Feb 2016	31 Dec 2016	-

Financing Plan/TA Utilization							Cumulative Disbursements	
ADB	Cofinancing	Counterpart				Total	Date	Amount
		Gov	Beneficiaries	Project Sponsor	Others			
600,000.00	0.00	100,000.00	0.00	0.00	0.00	700,000.00	04 Mar 2014	516,713.86

Project Page	https://www.adb.org/projects/48003-001/main
Request for Information	http://www.adb.org/forms/request-information-form?subject=48003-001
Date Generated	06 July 2017