ADB ASIAN DEVELOPMENT BANK

Mongolia: Coal to Cleaner Fuel Conversion for Heating in Ger District and Power Generation

Project Name	Coal to Cleaner Fuel Conversion for Heating in Ger District and Power Generation
Project Number	48029-001
Country	Mongolia
Project Status	Closed
Project Type / Modality of Assistance	Technical Assistance
Source of Funding / Amount	**TA 8776-MON: Coal to Cleaner Fuel Conversion for Heating in Ger District and Power Generation** Technical Assistance Special Fund — US$ 350,000.00
Strategic Agendas	Environmentally sustainable growth Inclusive economic growth
Drivers of Change	Governance and capacity development Knowledge solutions Private sector development
Sector / Subsector	**Energy** - Conventional energy generation
Gender Equity and Mainstreaming	No gender elements
Description	The Interim Country Partnership Strategy 2014-2016 underscores the need to (i) address energy security and climate change adaptation challenges, (ii) improve livelihood through emission reduction, and (iii) promote clean energy. The proposed TA will promote the utilization of cleaner fuel using abundant domestic coal resources, therefore, the air pollution and over-dependency on imports of petroleum products will be drastically improved for Mongolia. More job opportunities will be provided during CTL plants construction and operation.

Project Rationale and Linkage to Country/Regional Strategy	Energy security, climate change, and air pollution are major challenges common to most of ADB's developing member countries, especially those with fossil fuel-based economies. Mongolia is one of these countries. Coal is abundant and is the only fossil fuel available in the country. Mongolia depends almost entirely on domestic coal production and imported oil for its energy supply. Energy security concerns are rising because of oil price volatility and its sharp increases in the past. Political instability in major oil-producing countries and the formidable difficulties of transporting oil in landlocked Mongolia have compounded these concerns. The consumption of petroleum products is growing rapidly in parallel with economic growth fueled by the country's mining sector. Every year, Mongolia spends a higher percentage of its foreign exchange reserves on oil imports. It also experiences frequent supply shortages because of vulnerabilities across the supply chain. This is causing a ripple effect on mining and industry_its main economic sectors. Air pollution from conventional fuels is also taking a toll on Mongolians' health. Combustion of solid fuels, such as firewood and coal, in household heating stoves and cooking in Ger District of Ulaanbaatar causes indoor pollution, which leads to respiratory diseases. Solid fuel combustion is also the largest contributor to outdoor particulate matter in Ulaanbaatar. Ger districts are not connected to Ulaanbaatar's district heating system, so ger residents must use coal and wood for heating during the cold winters, which last for 6_8 months. The population of Ger District has been rising because of an influx of migrants from rural areas seeking employment opportunities in Ulaanbaatar. This is increasing the use of conventional fuels, adding to the worsening air pollution problem. A World Bank report attributes about 11% of premature deaths in the city to air pollution, and estimates the social cost at about $177 million_$727 million a year. The World Health Organization (WHO) ranked Ulaanbaatar as the city with the second-worst air pollution in the world. The WHO study found that 60%_90% of the air pollution is caused by raw coal and wood combustion for heating and cooking in Ger District. Most of the electricity demand in Mongolia is met by coal-fired power plants, which have limited flexibility to change their output in timely manner in response to the commands of the grid operator. Although Mongolia has abundant renewable energy resources, such as wind and solar, capitalizing on these sources remains a challenge because the power system lacks the regulating capacity to cope with the power fluctuation from power plants based on renewable energy. In view of these challenges, Mongolia is seeking to explore alternative fuel solutions to (i) decrease dependence on oil imports and thereby improve energy security, (ii) reduce air and soil pollution in Ulaanbaatar caused by coal combustion for heating and cooking in Ger District, and (iii) install regulating capacity such as gas-based power plants in the power system for absorbing renewable energy-based power. One option is to consider CTL technology, which would use domestic coal to produce petroleum products and clean gas fuels. The benefits of CTL are particularly important for Mongolia, with its large reserves of coal and dependence on oil imports. CTL could produce alternative fuel cost-effectively, particularly when international oil prices are consistently high. It can help the country develop strategic gasoline- and diesel-equivalent reserves to overcome frequent supply interruptions. Combined with technology for capturing carbon dioxide emissions from these plants and sequestering them geologically_a process known as carbon capture and storage_CTL plants can reduce associated carbon dioxide emissions by 90%. But such CTL plants, due to their complexity and size, are capital intensive and will require large private investment. ADB has supported Mongolia in reforming its regulatory framework to attract private investment, leading to a successful large scale public_private partnership project in the country's energy sector. The policy and regulatory framework around CTL projects needs to be further examined to remove barriers and create an enabling environment for private investment in this field.
Impact	Improved air quality and energy security in Mongolia due to cleaner fuel supply from CTL

Project Outcome

Description of Outcome	Enabling environment for CTL established by 2016

Progress Toward Outcome	The TA addressed the lack of energy security with full dependency on imported petroleum products, and (ii) severe urban air pollution in Ulaanbaatar. Among the many domestic energy resources assessed, it was identified that indirect coal-to-liquid (ICTL) using coal gasification was the most suitable resource that would address Mongolia's strategic issues. Diesel and dimethyl ether (DME), the product mix form indirect coal-to-liquid (ICTL) facility, were assessed. Diesel was identified as the most needed petroleum product since it is the main imported fuel and heavily relied upon by the mining industry, the backbone of Mongolia's economy. DME was identified as the most suitable clean gas fuel to replace coal and wood, which are currently used in ger households and the primary source of urban air pollution in Ulaanbaatar. The social, environmental, and economic impact of developing a CTL facility in Mongolia were assessed. A phased approach was outlined for developing CTL project to mitigate technical and financial risks. The study revealed that the CTL plant in Mongolia can help address the country's energy security and urban environmental issues. CTL can move energy dependence from the Russia and the People's Republic of China's imported fuels to domestic coal, while supplying the growing demand for petroleum products. The implementation of CTL plant should be encouraged as it is expected to have positive effects in Mongolia, and address the key issues of energy security and urban air pollution. In order for all these to be successful, full support and cooperation from the government of Mongolia, through the implementation and establishment of policies and laws, is needed to aid with financing and adoption of DME in the ger districts. It was recommended that in order to achieve a successful implementation of a CTL project in Mongolia, a legislation supporting the improvement of domestic petroleum production should be established which could create an adequate investment environment including investor protection controls, market protection, financing support and functioning government structure to implement this important project for Mongolia.
Implementation Progress	
Description of Project Outputs	Techno-economic feasibility of CTL established Policy/regulatory environment assessed. CTL implementation plan developed Workshop organized to disseminate TA findings and recommendations.
Status of Implementation Progress (Outputs, Activities, and Issues)	All activities under the TA have been completed, including the final workshop held in Ulaanbaatar in January 2016, except the study tour. The TA was extended until October 2016 to provide sufficient time to prepare for the study tour. The study tour was postponed to a later date due to the shutdown of the plant where the proposed study tour will be undertaken, the time required for securing access permits from the proposed venue, clearances from ADB, and nominations from the government of Mongolia after the elections in June 2016. The study tour is expected to be completed by November 2016.
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	Government officials, the Ulaanbaatar City Council, the National Security Committee, JICA, and other development banks were invited for meetings and consultations for the preparation and finalization of the report.

Business Opportunities

Consulting Services	Recruitment of consultant has just started. A firm with a team of international experts and national consultants will be engaged by ADB in accordance with the ADB's Guidelines on the Use of Consultants (2013, as amended from time to time), to conduct the study using ADB's quality- and cost-based selection method (with a technical_financial weighting of 90:10), following submission of simplified technical proposal. Required international experts include (i) energy economist/team leader, (ii) energy specialist/coal gasification specialist, (iii) financial analyst, and (v) environmental specialist. Required national experts include (i) coal gasification specialist/deputy team leader, (ii) energy economist (iii) environmental specialist, and (iv) urban planning expert.
Procurement	ADB's Procurement Guidelines (2013, as amended time to time) will be followed and shopping method to be used to procure the equipment under the PATA. Equipment will be used by consultants during the implementation and handed over to the executing agency upon completion of the PATA.

Responsible Staff

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Responsible ADB Department	East Asia Department

Responsible ADB Division	Energy Division, EARD
Executing Agencies	*Ministry of Mining and Energy* *L. Radnaasuren, Director, Fuel Policy Department* *radnaasuren@mm.gov.mn* *United Nation's Street -5/2 Government Building II Ulaanbaatar-210646, Mongolia*

Timetable

Concept Clearance	24 Oct 2014
Fact Finding	20 Oct 2014 to 24 Oct 2014
MRM	-
Approval	04 Dec 2014
Last Review Mission	-
Last PDS Update	30 Sep 2016

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Milestones					
Approval	Signing Date	Effectivity Date	Closing		
			Original	Revised	Actual
04 Dec 2014	24 Feb 2015	24 Feb 2015	29 Feb 2016	31 Oct 2016	-

Financing Plan/TA Utilization							Cumulative Disbursements	
ADB	Cofinancing	Counterpart				Total	Date	Amount
		Gov	Beneficiaries	Project Sponsor	Others			
350,000.00	0.00	0.00	0.00	0.00	0.00	350,000.00	04 Dec 2014	297,008.50

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