



# China, People's Republic of: Integrated Renewable Biomass Energy Development Sector Project (formerly Rural Energy and Ecosystem Rehabilitation (Phase II))

Project Name	Integrated Renewable Biomass Energy Development Sector Project (formerly Rural Energy and Ecosystem Rehabilitation (Phase II))													
Project Number	40682-013													
Country / Economy	China, People's Republic of													
Project Status	Closed													
Project Type / Modality of Assistance	Grant Loan													
Source of Funding / Amount	<table border="1"><tr><td colspan="2"><b>Grant 0202-PRC: Integrated Renewable Biomass Energy Development Project</b></td></tr><tr><td>Clean Energy Fund under the Clean Energy Financing Partnership Facility</td><td>US\$ 3.00 million</td></tr><tr><td colspan="2"><b>Grant 0203-PRC: Integrated Renewable Biomass Energy Development Project</b></td></tr><tr><td>Global Environment Facility Grant</td><td>US\$ 9.20 million</td></tr><tr><td colspan="2"><b>Loan 2632-PRC: Integrated Renewable Biomass Energy Development Sector Project (formerly Rural Energy and Ecosystem Rehabilitation (Phase II))</b></td></tr><tr><td>Ordinary capital resources</td><td>US\$ 66.08 million</td></tr></table>		<b>Grant 0202-PRC: Integrated Renewable Biomass Energy Development Project</b>		Clean Energy Fund under the Clean Energy Financing Partnership Facility	US\$ 3.00 million	<b>Grant 0203-PRC: Integrated Renewable Biomass Energy Development Project</b>		Global Environment Facility Grant	US\$ 9.20 million	<b>Loan 2632-PRC: Integrated Renewable Biomass Energy Development Sector Project (formerly Rural Energy and Ecosystem Rehabilitation (Phase II))</b>		Ordinary capital resources	US\$ 66.08 million
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Ordinary capital resources	US\$ 66.08 million													
Strategic Agendas	Environmentally sustainable growth Inclusive economic growth													
Drivers of Change	Gender Equity and Mainstreaming Partnerships													
Sector / Subsector	Agriculture, natural resources and rural development / Agro-industry, marketing, and trade Energy / Renewable energy generation - biomass and waste													
Gender	Some gender elements													
Description	<p>The project will improve the performance of the biogas subsector through the demonstration of an integrated renewable biomass energy system in the poor rural areas of Heilongjiang, Henan, Jiangxi, and Shandong provinces, where the densities of livestock are almost triple the national average and the pollution problems from livestock farms and agro-enterprises are severe. There are 66 national poverty counties and 131 provincial poverty counties in the four participating provinces, with a poor population of about 9 million. About 43% of the project's subprojects are located in these poor counties.</p> <p>The project consists of four components: (i) sustainable development and demonstration of commercial practices of medium- and large-scale biogas plants (MLBGPs), (ii) effective utilization of biogas sludge in eco-farming, (iii) capacity development for improved sector performance, and (iv) project implementation support.</p> <p>The project will assist about 118 medium-sized and large livestock farms and agro-enterprises in constructing biogas plants, and introduce a new technical specification to the plant design. The new specification involves the installation of high-temperature flares in the MLBGPs to minimize the methane gas emissions during maintenance and emergency. This has been a common standard in developed countries but not yet in the PRC. The project will also demonstrate business models of centralized biogas plant systems to improve their cost-effectiveness, and technical and environmental performances; and assist 25 subprojects to overcome barriers to connect to local power grids to maximize the benefits of biogas power generation. The project will also support subprojects in manufacturing of bio-fertilizers from the biogas sludge and in eco-farming to achieve the government's goal of 'circular economy, which is to reuse and recycle organic waste in rural areas, and improve livelihoods in the project area. Capacity development activities will be carried out to (i) strengthen technical service systems and human resources for biogas plant design, operation, and maintenance in the participating provinces; (ii) demonstrate best design and operational practices of MLBGPs; and (iii) develop a performance monitoring system to improve the subsector performance. The project will also support the MLBGPs in connecting and selling electricity to the local power grids. The revenue of the power sale will help improve the financial viability of the MLBGPs.</p> <p>The project will provide consulting services to assist in the review of subproject preparation and implementation to ensure timely and effective project implementation.</p>													
Project Rationale and Linkage to Country/Regional Strategy	<p>With increasing industrialization and improving living standards, the PRC's overall demand for energy has risen rapidly, posing severe concerns about energy supply and environmental protection. Rural energy consumption is increasing at a rate of 2.6% annually. Meanwhile, livestock breeding and agro-industries have been developing rapidly and are gradually changing from small household farms into medium-sized and large commercialized farms. The number of medium-sized and large livestock farms reached more than 19,740 in 2007, but only about 43% were equipped with waste treatment facilities. It was estimated that livestock waste will reach about 5.21 billion tons by 2010, and 6.76 billion tons by 2020. Because of the high concentration of organic materials in the waste, anaerobic digestion is an effective technology to manage the livestock waste, while generating substantial renewable energy to help relieve energy shortage. According to the 2007 Medium- and Long-Term Development Plan for Renewable Energy in China of the National Development and Reform Commission (NDRC), about 10,000 large-scale biogas plants will be set up on large livestock farms by 2020, and the annual biogas yield from MLBGPs will be as high as 14 billion cubic meters (m<sup>3</sup>) per year. As of 2007, it was estimated that about 1,646 large-scale and 6,930 medium-scale biogas plants had been constructed; and the annual biogas production was reaching 800 million m<sup>3</sup>.</p> <p>The government has established a comprehensive policy and strategic framework on renewable energy development, and has been promoting the construction of biogas plants since the early 1990s to (i) tackle the environmental pollution problems of the livestock farms and agro-industries, (ii) use biogas as an alternative fuel to replace fossil fuel and reduce greenhouse gas (GHG) emissions in rural areas, and (iii) reuse the sludge and effluent from the biogas plants in eco-farming to accomplish a circular economy. The project will adopt a sector loan approach to supporting the government and the four provinces in the expansion of the rural biomass renewable energy system. The project also complements the government's stimulus package on biogas plant development to boost the construction of biogas plants, provide training to biogas engineers and technicians, and increase jobs to maintain social stability in rural areas.</p>													
Impact	Improved rural environmental management and access to biogas energy													
Project Outcome														

Description of Outcome	Improved efficiency of rural biomass renewable energy system and rural social benefits	
Progress Toward Outcome	--The outcome was achieved, so its key performance indicators. The GHG emissions reduction almost doubled at the end of project completion in comparison with the original target.	
<b>Implementation Progress</b>		
Description of Project Outputs	Output 1: Sustainable development and demonstration of commercial practices of MLBGPs Output 2: Effective utilization of biogas sludge in eco-farming Output 3: Capacity development for improved sector performance Output 4: Project implementation support	
Status of Implementation Progress (Outputs, Activities, and Issues)	All the four outputs were delivered. A total of 65 MLBGPs and 6 centralized biogas plants were completed by the end of 2018. The project was completed on 31 December 2018, and the financial account was closed in Jan 2020. The associated two grants (G0202 and G0203) financial accounts were closed on 1 September 2020.	
Geographical Location	Heilongjiang Sheng, Henan Sheng, Jiangxi Sheng, Shandong Sheng	
<b>Safeguard Categories</b>		
Environment		B
Involuntary Resettlement		C
Indigenous Peoples		C
<b>Summary of Environmental and Social Aspects</b>		
Environmental Aspects	The Project is expected to produce a number of environmental benefits. Each year, the Project reduces about 7.44 million tons of livestock and agroprocessing waste; and produce about 77 million m <sup>3</sup> of biogas, which can be used for electricity, cooking, and heating; and replace fossil fuel or fuelwood. The subprojects will also produce about 5.09 million tons of organic fertilizers for eco-farming each year, which will help sequester carbon in the soil humus and improve soil fertility. The Project is estimated to result in an annual GHG reduction of 1 million tons of CO <sub>2</sub> equivalent because of the reduction of methane emissions from livestock farms and replacement of fossil fuel by methane gas. Subprojects that qualify for CDM financing will avail of CER revenues. Only minor construction and operational impacts are expected, which can be mitigated or prevented to acceptable levels by applying adequate construction and maintenance practices. Possible adverse environmental impacts during construction and operation of the subproject facilities including soil erosion, surface runoff and foul odor from application of biogas residues, noise, and fire hazards may arise, but they are expected to be localized and temporary. Mitigation measures, institutional arrangements, environmental monitoring and management mechanisms, capacity development, and public consultations have been proposed. The adverse environmental impacts are assessed to be insignificant.	
Involuntary Resettlement	All subprojects take place within the existing land owned by the agro-enterprises. Hence, no land acquisition and resettlement is required.	
Indigenous Peoples	No subproject is located in a minority autonomous area, and no ethnic minorities were identified in the subproject sites. Therefore, no risks are envisaged to indigenous people.	
<b>Stakeholder Communication, Participation, and Consultation</b>		
During Project Design	The project helps about 69 livestock farms and agro-enterprises improve their waste treatment to meet national standards. In addition, about 65,200 households, of which about 4,500 are poor households, will benefit from improved environmental and health conditions. About 7.0 million tons of waste will be treated, and about 92 million kilowatt-hours of electricity and an equivalent amount of heat energy will be produced and used each year, which will save about 76,000 tons of coal. About 1,500 poor households will have access to cheaper electricity. The project will also contribute to the reduction of methane gas, a GHG, by about 1 million tons of carbon dioxide equivalent each year. About 4,900 temporary jobs will be created during construction, increasing people's income by CNY4,000 on average; and over 1,400 new jobs will be generated during biogas plant operation, with a per capita income of about CNY13,000. About 9,000 poor households will use the organic fertilizers from the biogas plants and benefit from savings on chemical fertilizers and incremental revenue from the sales of organic products from eco-farming. The agro-enterprises' production capacity is also expected to expand after the completion of the biogas plants and will benefit over 27,000 new contract farmers from the sales of livestock to these enterprises. Each contract farmer's annual household income could be as high as CNY44,200, compared with breeding farmers' average household income of CNY16,500. The project will also provide clean energy to about 41,000 households and improve their energy consumption by replacing straw, wood, or coal, which will protect the environment and reduce women's workload and health hazards. Some enterprises plan to supply low-priced electricity and gas to neighboring villagers, which will improve farmers' access to energy.	
During Project Implementation	Public consultation and participation, which have been key elements of the project design, was continued during the project implementation, monitoring, and evaluation. Through continued consultation and participation, the project aims to (i) meet the evolving needs and expectations of the beneficiaries, (ii) increase the awareness of the public about the benefits of the project, (iii) encourage the active involvement of local communities to maximize their support for the project, and (iv) raise the social acceptance of the project.	
<b>Business Opportunities</b>		
Consulting Services	The consultants will be recruited in line with ADB's Guidelines on the Use of Consultants (2007, as amended from time to time).	
Procurement	All procurement of goods and works will be carried out following ADB's Procurement Guidelines (2007, as amended from time to time). Each subborrower will engage the services of a qualified tendering agency to carry out the procurement under the supervision and guidance of the respective PIO.	
Responsible ADB Officer	Lu, Lanlan	
Responsible ADB Department	East Asia Department	
Responsible ADB Division	PRC Resident Mission (PRCM)	
Executing Agencies	Department of Agriculture-Heilongjiang Province Department of Agriculture-Henan Provincial Environ Dept of Agriculture-Foreign Office of Jiangxi Prov Dept of Agriculture-Shandong Provincial Department Ministry of Agriculture and Rural Affairs	
<b>Timetable</b>		
Concept Clearance	06 Mar 2009	
Fact Finding	02 Mar 2009 to 06 Mar 2009	
MRM	04 Jun 2009	
Approval	16 Apr 2010	
Last Review Mission	-	
PDS Creation Date	02 Apr 2009	
Last PDS Update	18 Sep 2020	

## Grant 0202-PRC

Milestones					
Approval	Signing Date	Effectivity Date	Closing		
			Original	Revised	Actual
16 Apr 2010	30 Jun 2010	27 Oct 2010	30 Jun 2016	31 Dec 2018	01 Sep 2020

Financing Plan			Grant Utilization			
	Total (Amount in US\$ million)		Date	ADB	Others	Net Percentage
Project Cost		3.00	Cumulative Contract Awards			
ADB		0.00	17 Jun 2022	0.00	1.57	52%
Counterpart		0.00	Cumulative Disbursements			
Cofinancing		3.00	17 Jun 2022	0.00	1.57	52%

Status of Covenants						
Category	Sector	Safeguards	Social	Financial	Economic	Others
Rating	-	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory

## Grant 0203-PRC

Milestones					
Approval	Signing Date	Effectivity Date	Closing		
			Original	Revised	Actual
16 Apr 2010	30 Jun 2010	27 Oct 2010	30 Jun 2016	31 Dec 2018	01 Sep 2020

Financing Plan			Grant Utilization			
	Total (Amount in US\$ million)		Date	ADB	Others	Net Percentage
Project Cost		9.20	Cumulative Contract Awards			
ADB		0.00	17 Jun 2022	0.00	6.17	67%
Counterpart		0.00	Cumulative Disbursements			
Cofinancing		9.20	17 Jun 2022	0.00	6.17	67%

Status of Covenants						
Category	Sector	Safeguards	Social	Financial	Economic	Others
Rating	-	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory

## Loan 2632-PRC

Milestones					
Approval	Signing Date	Effectivity Date	Closing		
			Original	Revised	Actual
16 Apr 2010	17 Jun 2010	15 Oct 2010	30 Jun 2016	31 Dec 2018	21 Jan 2020

Financing Plan			Loan Utilization			
	Total (Amount in US\$ million)		Date	ADB	Others	Net Percentage
Project Cost		76.86	Cumulative Contract Awards			
ADB		66.08	17 Jun 2022	50.21	0.00	100%
Counterpart		10.78	Cumulative Disbursements			
Cofinancing		0.00	17 Jun 2022	50.21	0.00	100%

Status of Covenants						
Category	Sector	Safeguards	Social	Financial	Economic	Others
Rating	-	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory

Request for Information

<http://www.adb.org/forms/request-information-form?subject=40682-013>

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