

**Biomass-based Grid-Connected Electricity
Generation Project in China**

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The Japan Research Institute, Limited

1. Description of the project

The proposed project activity is located at Guanxian, in the west of Shandong province. The longitude is 115°26'17" and the latitude is 36°28'28'. Dingyuanzhai village which is 20km to the east of Guanxian downtown area and is basically located in the middle of fuel-supply area. The project 's east is adjacent to Majia River, north is adjacent to National Highway of 309 and south is adjacent to Zhangwa village.

Figure 1.The map of Shandong Province

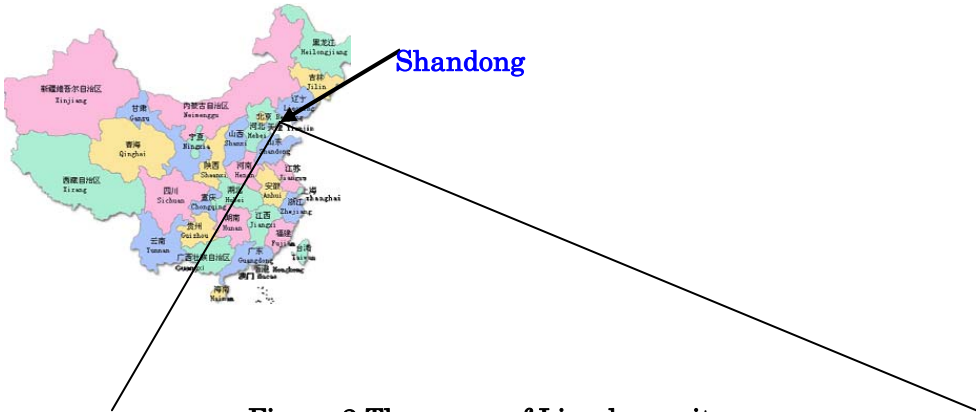
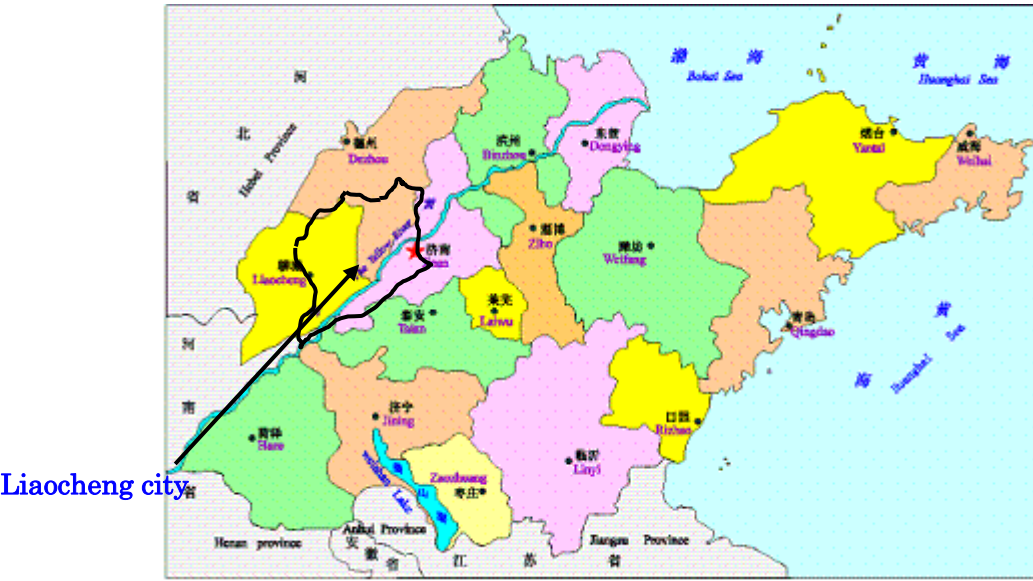


Figure 2.The map of Liaocheng city



Liaocheng city in Shandong province

The Shandong Guanxian Biomass Power Plant Project (hereafter, the proposed Project) developed by China Guodian Corporation (hereafter referred to as the Project Developer) is a biomass collection and utilization project to be constructed at the site of a demolished brick factory located at Guanxian, Liaocheng city, Shandong Province, P.R.China. The proposed project will generate electrical power using a 2x15MW generator unit by directly combusting biomass fuels such as wheat stalks and corn straws etc. No heat supply is considered in the proposed project activity due to less heat users and less heat demands at present and in the near future around the project site.

The electricity produced by the proposed project shall be supplied to the public North China Power Grid (NCPG) system through Shandong provincial power grid. The project will replace the power generated by coal-fired power plants connect to the grid. The proposed project will reduce the greenhouse gas emissions from biomass caused by natural decay and uncontrolled burning and emissions related to the burning of fossil fuel for power production as well.

Guanxian, Liaocheng City, Shandong, the project site is an agricultural county with an abundant biomass resources produces from a 75,000 hectare cultivated acreage. The biomass residues would be left for decay, dumped or uncontrolled burning at the fields if the proposed project were not implemented. The decay or uncontrolled burning of biomass residues causes a serious environmental pollution and a waste of reusable energy recourses.

The total amounts of biomass fuels to be used annually in the proposed project are 172,700 tonnes, which are collected from farmers' fields in 15 km radius from plant and transport to the plant by heavy trucks. The annual power net output to the grid is 139GWh and the annual estimated amount of greenhouse gas emissions reduction is 151,717 tonnes of CO₂e.

China is under a situation of a perpetual shortage of energy and highly dependent on the coal-fired power generation and this is making a various problems of environmental pollution. China is aiming at a goal of 15% share of renewable energy in total power generation by 2020. Thus, the proposed project shall contribute to the goal's realization and more specifically

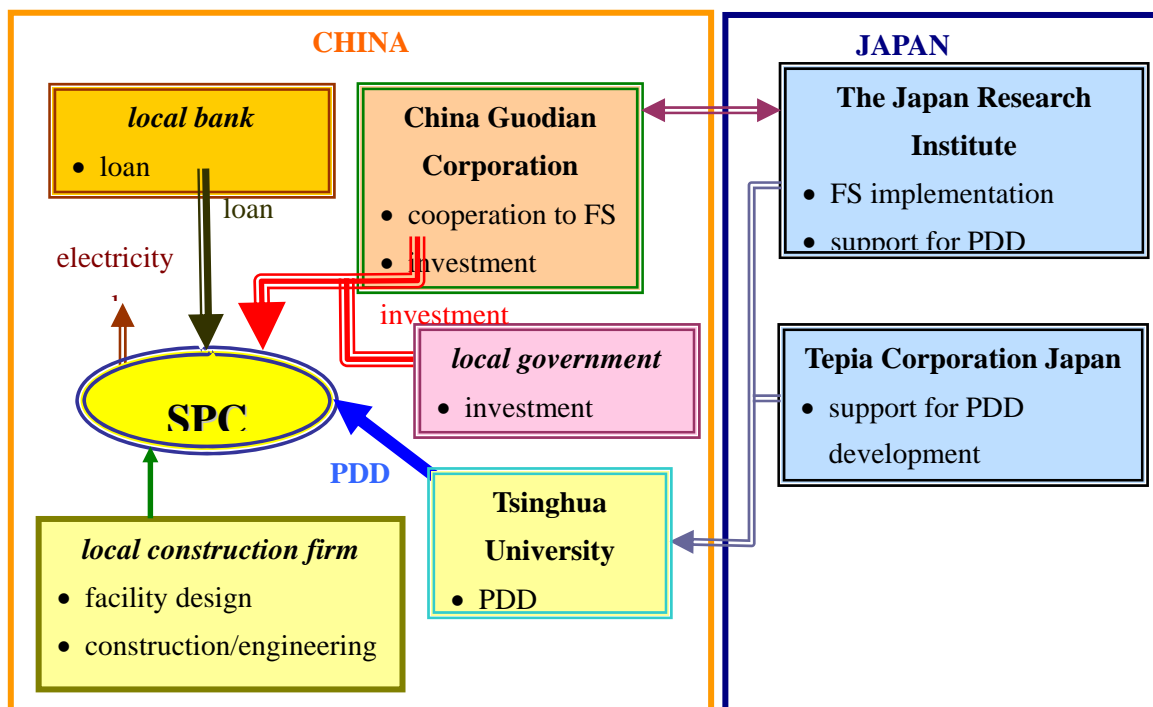
- provides a new renewable energy resource instead of the traditional coal fired power generation which is usually causes a serious environmental problem such as air pollution.
- provides new opportunities of more than two hundred direct employments and other indirect employments in the area of the proposed project site.
- provides an attractive business chance for local farmers to sell the almost unused biomass resources, which were usually burnt in an uncontrolled manner or decayed in the field without any management.
- provides a valuable chance for local government to promote a development of clean and highly efficient technology in local power plants

2. Project participants

Japan Research Institute, Co., Ltd. (JRI) is a leading company of the consulting services in the economy, energy, environment and IT area. Headquarter is located in Tokyo, Japan.

Tepia Corporation Japan, Co., Ltd. (TEPIA) is a company which headquarters is located in Osaka, Japan. TEPIA has been developed CDM projects in China from 2005 and has contributed actively to emission reduction through industrial energy efficiency improvement and renewable energy utilization projects all over China.

China Guodian Corporation, one of the five largest nationwide power generation groups approved by the State Council of China in the power industry restructuring. It is a pilot state holding enterprise approved by the State council to carry out the state-authorized investment and established in 2002 with the registered capital of 12 billion RMB Yuan (equivalent to 1.5 billion US Dollar). The power sources owned by China Guodian cover 29 provinces (autonomous regions and municipalities) with the total generation assets of 188billion RMB Yuan (equivalent to 23.5 billion US Dollar).



3. Application of a baseline and monitoring methodology

The Project is mainly based on two complementary activities as following:

- The collection and acted as biomass resources for power generation
- The generation and supplying of electricity to the regional grid system, thus displacing a certain amount of fossil fuels used for electricity generation

Therefore, this Guanxian Biomass power plant project obviously belongs to the Greenfield Power Projects, which listed in the first of the four activities on the methodology ACM0006. Also, the proposed project can meet the applicability criteria of the baseline methodology (ACM0002), therefore, the methodology is applicable to the proposed project.

Based on the ACM0006, realistic and credible alternatives should be separately determined regarding:

- How **Power** would be generated in the absence of the CDM project activity;
- What would happen to the **Biomass** in the absence of the project activity;

The most realistic and credible alternative for power generation is the generation of power in the grid (P4). For the use of biomass, the most realistic and credible is the biomass residues are dumped or left to decay under mainly aerobic conditions. This applies, for example, to dumping and decay of biomass residues on fields (B1) and the

biomass residues are burnt in an uncontrolled manner without utilizing it for energy purposes (B3).

Scenario	Project Type	Baseline Scenario		
		Power Generation	Use of biomass	Heat Generation
2	Power Greenfield Project	P4	B1, B3	No Heat

Step 1 Identification of alternatives to the project activity consistent with current laws and regulations

Scenario 2 is clearly consistent with the prevailing laws and regulations, since there in the North China Grid is a demand for new power addition to ensure the growing industrial and commercial purposes in this area.

As for biomass use, related policies and regulations have been issued, such as Renewable Energy Promotion Law and Renewable Energy.

Step 2 Investment analyses

The financial indicators (FIRR) without revenues from CERs are 6.97% is lower than the benchmark rate 8%. Account into the CERs revenue, the FIRR of the proposed project is increased to 11.38%, higher than the benchmark and the financial attraction will be dramatically improved.

Step 3 Common practice analyses

There are seven similar projects in Shandong Province listed as in Table 6 and all of them are supported by CDM except Boxing, Binzhou City, which is an only one under construction without any CDM support. However, Boxing, Binzhou City is a foreign –owned enterprise and nor permitted to implemented as CDM project by the regulations of Chinese DNA. It can be easily known that the proposed project is NOT an activity of business as usual (BAU).

4. Project emission reductions

	Baseline emissions	Project emissions
Unused biomass baseline emission	11,649t	
Electricity generation baseline emissions	143,205t	
GHG emissions from biomass transportation to the power plant		2,306t
GHG emissions from biomass transportation to the power plant		524t
GHG emissions from fossil fuel		307t
Total emissions	154,854t	3,137t
Project emission reduction		151,717t

5. Length of the first crediting period

7 years, renewable

6. An environmental impact

The main sources of pollution are waste gas, waste water, solid wastes including fly ash and noise. The proposed project has been approved by Shandong Environmental Protection Bureau on 31/8/2006. The basic conclusions on environmental impact assessment of the proposed project are implement of the proposed project will comply with Chinese environmental rules and laws and give out a co-benefit effect for both power plant and farmers.

7. Comments by local stakeholders

In conclusion, the public accepts the project, as a contributable undertaking to the local economy as the surveyed results of other CDM projects registered.

Table Questionnaire results of survey

Item	Responses	Q'ty	Percentage (%)
Knowledge of the Shandong Guanxian Biomass Power Plant Project	Know very well	3	5.00
	Know	13	21.67
	Know but not sure	36	60.00
	Don't know	8	13.33
Source of information for knowledge of the project	Mass media	7	11.67
	Internet	3	5.00
	Intruduction on site	31	51.67
	Others	19	31.67
Most fearful pollutants? (one or more choices)	Waste gas	12	20.00
	Waste water	3	5.00
	Pollution of underground water	14	23.33
	Noise	25	41.67
	Piled up or discharge of fly ash	6	10.00
To be noteworthy facts? (one or more choices)	Waste gas treatments measure	13	21.67
	Waste water drainage	3	5.00
	Protection of underground water pollution	15	25.00
	Noise protection	22	36.67
	Solid waste treatment	7	11.67
Beneficial to local resident, especially to farmers' income plus?	Beneficial	58	96.67
	No affect	2	3.33
	Unbeneficial	0	-
The project necessary?	Very necessary	29	48.33
	necessary	31	51.67
	Unnecessary	0	-
Acceptable if any unfavorable impact on the environments? (even the project meets national standard demand)	Acceptable without doubt	25	41.67
	unacceptable	0	-
	acceptable	35	58.33
Attitude to the project	Necessary	56	93.33
	Unnecessary	0	-
	Not sure	4	6.67