

China  
**Shanxi Gas Utilization Project**

**Resettlement Action Plan**

**Shanxi Provincial Guoxin Energy Development  
Group co., LTD**

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## Executive Summary

### A Project Background

1. As a province of rich coal resources, Shanxi, with an over high proportion of coal consumption within its energy structure, faces great environment protection, energy saving and emission reduction tasks. The abundant coal bed methane resources it is endowed with, as well as the coal bed methane resources transiting through the realm, provide exceptional advantage for development of clean energy. In 2010, Shanxi provincial government put forward a strategy to improve the utilization of its richly endowed gas, comprising coal bed methane, coke oven gas, natural gas from coal and transit natural gas as a much cleaner energy in Shanxi. The final target is for coverage of 119 counties and regions in the whole province, greatly improving the use of clean energy in industries and people's living. Shanxi Guoxin Energy Development Group (hereinafter called Guoxin Energy) ranks among the top in gas energy development and pipeline network establishment.

2. The proposed Shanxi CBM/Natural Gas Utilization Project consists of 6 components. Two of them are power and heat cogeneration plants in Xiyang and Baode Counties; and the remaining four are gas pipeline network components in Changzhi, Xiangyuan, Tunliu, and Qingxu counties. The Guoxin Energy is the main borrower of the World Bank loan. The 6 components will be implemented by 3 different companies and all of them are subsidiaries of Guoxin Energy. They include Shanxi Natural Gas Incorporated Corporation (for two power and heat cogeneration components), Shanxi CBM (Natural Gas) Pipeline Company (for the 3 gas pipeline networks in Changzhi, Xiangyuan and Tunliu), and Qingxu Kaitong Gas (for the pipeline network in Qingxu county). The implementation of the two power and heat cogeneration plants will meet the growing power need during local socioeconomic development, and provide central heating for newly developed urban areas in two county towns, which will contribute in improving local environment. The implementation of 4 gas pipeline networks will contribute in adjusting the regional energy consumption structure in four counties, enhancing local environment, and improving the health and living standard among local residents, especially women in these regions.

3. The project site for the CHP plant in Xiyang lies 500 meters away from the north of Houzhuang village, Dazhai town, Xiyang County, Jinzhong Municipality, and 2.5 kilometers from the Xiyang county town. The CHP plant includes construction of a 120MW CBM-fueled heat supply unit with 5500 hours of power generation each year, and an annual heat load of 55.12MW or 1.1 million square meters of heating areas for the heating period of 149 days. The gas of the power plant is supplied via the CBM/natural gas transmitted through the pipeline from Yangquan, Pingding to Xiyang by the Shanxi Natural Gas Company.

4. The CHP plant in Baode County locates at Gucheng village of Yangjiawan town, Baode County, Qin Zhou Municipality. Gucheng village is located in the southwest of Baode County, 9 kilometers away from the county town. In the plant, a 120MW 2-on-1 CBM-fueled heat supply unit will be built, with annually 5500 power generating hours, 33.6MW heat loading, 0.7 million square meters of heating areas, and 149 heating days. The fuel gas comes from the Baode gas station by Shanxi Natural gas, 7 kilometers from the power plant.

5. The scope of two CHP components in Xiyang and Baode consist of construction of plant site, access road, water supply pipeline, gas supply pipeline, power transmission lines, heating transmission line, heat exchange station, pump house and inspection well. Among these facilities, the heating pipeline and heat exchange station will be financed by the county Housing and Rural-Urban Development Bureau. The construction of these two CHPs and related facilities will involve permanent acquisition of 220.21 mu of land areas and temporary occupation of 540.46 mu of land areas. No house demolition and relocation will be involved.

6. The gas pipeline network component in Changzhi refers extension by 2020 in the short term and 2030 in the long term. It includes construction of 52.7km hypo-high pressure pipeline within 10 villages and towns of this region, benefiting 30,800 households with annual gas supply of 89.73 million cubic meters. The gas sources from the CBM transmission pipeline from Jincheng to Changzhi built by the Sanjin New Energy Development Company. The transmission pipeline has been connected to the Hongdong-Anze-Zhangzi pipeline built by Shanxi Natural Gas. Both lines can provide gas in case of contingency.

7. The gas pipeline network component in Xiangyuan refers the extension by 2020 in the short term and 2030 in the long term. It includes construction of 83.2km hypo-high pressure pipeline in 11 villages and towns of this region, benefiting 88,100 households with supply of 62.95 million cubic meters of gas. The gas can either use the natural gas from the Hongdong-Anze-Zhangzi pipeline built by Shanxi Natural Gas, or use the local CBM from the Tunliu-Xiangyuan pipeline build by the Shanxi Coalbed Methane (Natural Gas) Pipeline.

8. The gas pipeline network component in Tunliu refers extension to 2020 in short run and 2030 in long run. It includes construction of 86.4km hypo-high pressure pipeline in 8 villages and towns of this region, benefiting 12,210 households with annual gas supply of 84.84 million cubic meters. The gas can either use the natural gas from the Hongdong-Anze-Zhangzi pipeline built by Shanxi Natural Gas, or use the local CBM from the Tunliu-Xiangyuan pipeline build by the Shanxi Coalbed Methane (Natural Gas) Pipeline. The two gas sources can back up for each other.

9. The gas pipeline network component in Qingxu refers extension to 2015 in short term and 2020 in long term. It includes construction of 31.7km hypo-high pressure pipeline within Ji Yi Town, benefiting 6,500 households with

gas supply of 6.62 million cubic meters. The gas sources from the natural gas from the Taiyuan–Pingyao pipeline built by Shanxi Natural Gas, or from the CBM transmitted in the Kongcun-Gujiao pipeline for contingencies. The construction of these 4 gas network components will involve only temporary land occupation, which is estimated at 2960.7 mu of land areas. No house demolition and relocation is required.

10. In order to address potential land acquisition impacts, following the national laws and regulations, and requirement of the World Bank, a resettlement action plan (RAP) has been prepared by Guoxin Energy under the assistance of Shanxi Academy of Social Science, Sociology Research Institute.

11. In addition, since all 6 components will be provided with gas through related gas station or gas pipeline facilities built recently, they are considered as linkage components. For Xiyang gas CHP component, the gas will be supplied from the Pingding-Xiyang gas pipeline built by Shanxi Compressed Natural Gas Company. For Baode CHP component, gas will be supplied from Baode gas station built by Shanxi Natural Gas. For Changzhi Xiangyuan and Tunliu gas network components, the gas will be directly supplied through Changzhi, Xiangyuan, and Tunliu gas portal stations built by Shanxi CBM (Natural Gas) Pipeline Company. For gas network component in Qingxu, the gas is supplied through Xugou and Kongcun gas portal stations built by Qingxu Kaitong Natural Gas Company, as well as the gas pipeline connecting the two portal stations. The land acquisition for these facilities had already completed or being completed. Based on the requirements of World Bank, Guoxin Energy has conducted a due diligence review on land acquisition for these facilities. According to the review, all compensations for the related facilities had been paid to affected parties, and affected people were satisfied with compensation and rehabilitations with no problems reported. The report of due diligence review is included as Annex of the RAP.

## **B Scope of Impacts**

12. According to the RAP, the 6 components of the proposed Project are located in 6 different counties: Xiyang, Baode, Changzhi, Xiangyuan, Tunliu and Qingxu, under jurisdiction of 4 municipalities: – Jinzhong, Xinzhou, Changzhi, and Taiyuan, involving 35 towns and 163 villages. According to the impact survey, the Project will involve permanent acquisition of 220.21 mu land areas (mainly for the 2 CHP components), of which 140.92 mu or 64% are dry land. A total of 3501 mu land is required temporarily for the construction of related facilities, with 2229 mu as dry land, accounting for 64%.

13. The land acquisition will affect 1245 households and 4549 persons. Among them, 60 households and 197 persons from three villages will be affected by permanent land acquisition; and 1185 households and 4352 persons will be affected by temporary land occupation based on preliminary estimation. All affected land, trees and other properties will be compensated based on replacement value.

14. The construction of the 6 components will not involve with acquisition of natural protection zone or forestry land. No house will be removed, and no residents or companies will be required for relocation. There is also no impact upon special facilities, such as bridges, water irrigation facilities, power facilities, telecommunication facilities, and culture heritages.

### **C Resettlement Policies and Compensation Standards**

15. For those people who will be affected by the Project due to land acquisition, the objective of resettlement is to ensure their income and livelihood will be restored and improved after compensation and rehabilitation in accordance with *Land Administration Law*, and the *World Bank Operational Policy on Involuntary Resettlement (OP4.12)*. Shanxi Guoxin Energy ensures that any people losing their land, properties, or income source will be compensated, to the extent of restoring their income and living standard.

16. Based on the laws and regulations of the state and Shanxi province, as well as the local policies of project sites, the compensation standards are identified in the RAP. For the Houzhuang village of Dazhai town where Xiyang CHP is located, the compensation standard for all categories of permanent land acquisition is set at CNY70,000 per mu. For the Gucheng village of Yangjiawan town where the Baode CHP is located, the compensation for permanent land acquisition is set at: CNY65,000 per mu for irrigated land, CNY32,000 per mu for dry land, and CNY5,000 per mu for unused land. For temporary land acquisition, the compensation is set at CNY1,000 – 1,500 yuan/mu for dry land, CNY3,000 per mu for vegetable land, CNY1,000 per mu for garden land, and CNY200 - 1,000 per mu for unused land. For affected rural earth roads, the compensation is set at CNY1,000 – 1,500 per mu; for affected rural concrete roads, the compensation is set at CNY53333.6 per mu; and affected wood land, the compensation is set at CNY6794 per mu; and for affected urban street, the compensation is set at CNY10,000 per mu. The temporarily affected land areas will be restored to its original status by the construction company; otherwise the restoration deposit will be used for the purpose. The restoration deposit is set at CNY18 per m<sup>2</sup> for farmland, and CNY7.5 per m<sup>2</sup> for unused land.

### **D. Resettlement and Rehabilitation**

17. Of total affected people, 55 households and 181 persons in three villages will permanently lose part of their farmland, averaging 25.7%. Among them, there are 8 households and 31 persons who will lose less than 10% of their current land holding, accounting for 14.5% of total affected households by permanent land loss; 25 households and 85 persons will lose 10 to 30% of their current land holding, accounting for 45.5% of total affected households; 18 households and 57 persons will lose 30 to 50% of their current land holding, accounting for 32.7% of total affected households, and 4 households and 8 persons will lose over 50% of their current land holding, accounting for 7.3% of total affected households. In general, permanent land acquisition for the two plants will cause certain impacts upon the income of those affected households.

18. For the households affected by land loss, adequate compensation will be provided as major rehabilitation measure. Most of the compensation can be used as production investment, thus, restoring the income and livelihood for the affected people. Among total affected land areas for 6 components, 94% is for temporary land occupation. The affected families will get sufficient compensation for lost yield. The project owner will be responsible for restoring the affected land to its original conditions. During the construction, many temporary jobs will be created, and the affected residents will be employed with priorities, especially those vulnerable people, so that they can obtain some cash income during project construction.

## **E Information disclosure, public participation and consultation**

19. During the process of identifying project impact and formulating compensation policies and RAP, the project owner and the personnel from the Sociology Research Institute conducted extensive public consultations in the project affected areas. The survey shows that about 96.7% of residents support this project, and 96.7% believe the project will be beneficial to them.

20. During the implementation of the RAP, all project management offices will try their best to encourage more participation by affected people, such as raising awareness and involvement by villagers on the use of remaining land compensation funds owned collectively by the villages. The use of such compensation fund needs to be agreed upon by all villagers, monitored by relevant county and town agencies, and audited by auditing department of county government.

21. Following the laws and regulations in China, and World Bank policies, efforts had been made by the project sponsor to disclose the contents of this RAP, including the scope of project impacts, compensation policies, and rehabilitation program, as well as grievance procedures. On September 2 2013, the RAP had been disclosed on the web site of Guoxin Energy, and RAP documents had been placed in the offices of PMO and offices of concerned town governments to be reviewed by concerned people. The disclosure details had also been published on local newspaper between September 4 and 11 2013 to inform the public in the project areas and enable them to review and comment. In the end September, the RAP has been revised to address comments by the World Bank, which was updated in the company website. A copy of revised RAP has been placed to affected villages by CHP component in early October 2013. For four gas connection component, a copy of updated RAP has been placed in relevant town and county government resettlement offices in early October 2013. After approval, the RAP will also be disclosed by the World Bank.

22. To timely and effectively settle the complaints from the affected people, each subproject management office has established grievance procedures in the project counties. If an affected person is not satisfied with the compensation standard or the resettlement measure, he or she can complain either orally or in the written form to the village committee or to the resettlement office under the PMO. If his complaint is not settled in two weeks

or he is not satisfied with the result, he can appeal to the county resettlement coordination team for administrative arbitration. The arbitration decision should be made within 10 days. If he is still not satisfied with the arbitration result, he can appeal to the civil court. The affected residents will be informed of the above appealing options through conferences, pamphlets, and bulletins for a full knowledge of their appealing rights and measures.

## **F Vulnerable group**

23. Vulnerable group refers to families with their average annual income lower than the local poverty threshold, families with disabled member, families of only one lonely senior member, and families with woman as the head of the household. According to the survey, among those affected by permanent land acquisition by two CHPs, there are 21 vulnerable persons, accounting for 8.2% of the total. For the four gas network components, according to sample household survey along the future pipeline route, about 4.8% of them are considered as vulnerable groups. During RAP implementation, actual number of vulnerable groups will be determined based on detailed survey and census. The project owners promised to provide additional financial support (CNY2000 per household) for those vulnerable groups affected by permanent land acquisition and also promised to give priority for providing temporary and permanent employment opportunities to them during project implementation.

## **G Institutional Arrangement**

24. The project owner and the local government are responsible for implementation of the RAP. To ensure smooth implementation, a resettlement coordination team is established in each project county, and the members of the team consist of the deputy county governor and the leaders from related departments. The team is mainly to strengthen management over the project, set up policies for resettlement actions, and coordinate between different levels of resettlement offices. A resettlement leading team is also formed in Guoxin Energy, in charge of formulation and implementation of the RAP. A resettlement office is set up under the leading group, made of resettlement staff from relevant companies, which will be responsible for: 1) coordinating and supervising the commissioned institutions for conducting impact survey, keeping resettlement data, and developing and implementing the RAP; 2) conducting resettlement trainings for related personnel; and 3) engaging a monitoring and evaluation team for the Project and reviewing the implementation of monitoring works.

25. The PMO of each component sets up a resettlement division to be responsible for the following jobs:

- Participate in project survey;
- Organize public participation;
- Implement, inspect, monitor and record all resettlement actions;
- Handle complaints of affected people;
- Sign compensation agreements with the affected counties and villages;

26. The project management office in Guoxin Energy will closely cooperate with the PMO of each component. A resettlement management office will be set up in the affected county to coordinate with the implementation of the RAP.

#### **H. Monitoring and Evaluation**

27. To ensure smooth implementation of the RAP and to restore livelihood of affected people, implementation of the RAP will be monitored from start to end both internally and externally. The resettlement unit in each PMO of the component is responsible for internal monitoring, and the resettlement office in each town will participate in internal monitoring. Internal monitoring is to monitor the implementation process of RAP, to ensure all entitlements are delivered as indicated in the RAP approved by the World Bank, and to safeguard interests of affected people. The monitoring will cover all respects of resettlement actions. The monitoring report will be submitted to the World Bank along with the project progress report.

28. Guoxin Energy will hire an eligible and independent institution for external monitoring and assessment. As an outsider, it will periodically monitor and assess land compensation and resettlement actions to ensure the target of resettlement are reached. The monitoring team will monitor the whole process of resettlement implementation, conduct assessment on livelihood restoration of affected people, provides early warning for the project management office on RAP implementation, and acts as a channel of comments and complaints for affected people.

29. To monitor the implementation process of RAP and assess income changes of affected people, the monitoring team will combine sampling survey with rapid appraisal. The main monitoring indices are listed as follows:

- 1) Progress of RAP implementation;
- 2) Economic conditions of households before and after the resettlement;
- 3) Quality of resettlement compensation;
- 4) Employment comparison before and after resettlement;
- 5) Working and living conditions before and after the resettlement;
- 6) Satisfying degree of affected people;

30. External monitoring and evaluation are done once every year since the start of RAP implementation, based on which a resettlement monitoring and evaluation report needs to be prepared and submitted to Guoxin Energy and the World Bank. Resettlement implementation will begin in 2014, and complete in 2018. The monitoring and evaluation will be carried out at least five times during this entire implementation period.

#### **I Resettlement Budget and Implementation Schedule**

31. The cost of land acquisition and compensation is included in the total project cost. The total resettlement cost for the Project is estimated at CNY93.26 million, including CNY33.03 million for purchase the land use rights,

and CNY8.21 million for compensation of temporary land occupation and CNY36.39 million as land restoration security deposit. In the total budget, the compensation paid to affected households is CNY20.57 million. Land acquisition and resettlement actions will be completed in 2018. The total resettlement budget includes a 10% of contingency.

32. According to the compensation standards and policies regulated in the RAP, the project company of each component will sign a temporary land occupation compensation agreement with each affected village. The county Land Resources Bureau will sign a permanent land acquisition compensation agreement with each affected village. The compensation fund from the project company or the county Land Resources Bureau will be disbursed as earmarked to the affected village and households via the related town. Compensation for ground attachments will be paid directly to affected individuals. To ensure efficient, eligible and legal using of compensation fund, the related government agency will perform auditing over compensation fund using by affected village every year.

33. The implementation of RAP and land compensation progresses as construction goes. Land acquisition for the 2 CHP plants will be completed at least one month prior to commencement of construction. The progress of RAP implementation shall follow the following principles: (1) have the affected households fully understand the degree of impacts and their compensation entitlements; (2) timely deliver all compensations as indicated in the RAP; and (3) provide support during the process of resettlement and rehabilitation.

# 1. Overview

## 1.1 Project Overview

Shanxi Coalbed Methane (Natural Gas) Utilization Project consists of 6 components. Two of them are CHP plants, and four of them are gas pipeline networks. As the borrower, Guoxin Energy is responsible for fund raising, project construction and personnel allocation to ensure smooth implementation of project. The 6 components have 3 construction companies, and all of them are subsidiaries of Guoxin Energy. They are Shanxi Natural Gas Incorporated Corporation and Shanxi Coalbed Methane (Natural Gas) Pipeline, and Qingxu Kaitong Gas controlled by Shanxi Natural Gas Incorporated Corporation.

**Table 1.1-1 Overview of Shanxi Coalbed Methane (Natural Gas) Utilization Project**

| Name of component                     | Construction company                          | Construction scale                                  |
|---------------------------------------|---|---|
| Xiyang CHP plant                      | Shanxi Natural Gas Incorporated Corporation   | 120MW CBM-fueled heat supply unit                   |
| Baode CHP plant                       |   |   |
| Changzhi county gas pipeline network  | Shanxi Coalbed Methane (Natural Gas) Pipeline | Annual gas supply of 89.7271 million m <sup>3</sup> |
| Xiangyuan county gas pipeline network |   | Annual gas supply of 62.9502 million m <sup>3</sup> |
| Tunliu county gas pipeline network    |   | Annual gas supply of 84.8362 million m <sup>3</sup> |
| Qingxu county gas pipeline network    | Qingxu Kaitong Gas                            | Annual gas supply of 6.6247 million m <sup>3</sup>  |

In June 8, 2013, Shanxi Development and Reform Committee (DRC) issued Circular No. 1121 to approve the mentioned project.

The total investment of the project amounts to CNY1.58 billion RMB in investment, of which \$100 million - 40% of the total - is financed by the World Bank. The 2 heat and power plants totals CNY1.39 billion, and the 4 pipeline networks need CNY190 million. Except the World Bank loan, the other fund will be raised by the project company, with the construction period lasting 2 years.

## 1.2 Overview of Project Owner

Founded in 1981, Guoxin Energy is a big diversified and modern state-owned enterprise with gas, coal transportation and sales, and trade as its main business. It is ranked as the main force by the Shanxi provincial government in its policy of improving natural gas utilization in Shanxi. In 2010, its operation income broke through the mark of 10 billion. In 2011, it ranked among top 500 enterprises in China for the first time. In 2012, it ranked No. 409 in the list of

top 500 enterprises in China, No. 125 among the top 500 service enterprises, and No. 31 among the top 100 coal enterprises. At the end of 2012, Guoxin Energy's total assets amount to 16 billion RMB, with 44 subsidiaries and 50 million tons of annual coal transportation. Now it has exclusive right in operation of 10 billion cubic meters of natural gas, and leading right in operation of 20 billion cubic meters of mixed gas.

### **1.3 Process of RAP Formulation**

Commissioned by the project company, the Sociology Research Institute of Shanxi Academy of Social Science and Macroeconomic Research Institute of Shanxi DRC set up a RAP team to help the project company to formulate the RAP for the Project.

Since project identification in November, 2012, the key staffs of the RAP team have conducted project site surveys along with World Bank mission team many times. From April to May of 2013, the RAP team did an overall socioeconomic survey in project sites for all 6 components, with the assistance of three project companies: Shanxi Natural Gas, Shanxi Coalbed Methane (Natural Gas) Pipeline, and Qingxu Kaitong Gas, as well as project management offices (PMOs) of all components. Public participation and consultations were conducted to intensively seek the opinions and comments of the affected people regarding the Project. Continuous discussion were also made with the project owner, and the parties who were responsible for the preparation of Project Technical Feasibility Report and the Environment Assessment Report, to understand the progress of these studies, and to obtain valuable comments and opinions regarding project design, so that completed project design could minimize potential land acquisition impacts and enhance social benefits for the local population. Based on these works, Guoxin Energy formulated the RAP of this project.

### **1.4 Project Background and Significance**

#### **1.4.1 Project Background**

Among its overall primary energy consumption, the coal consumption of Shanxi accounts for 94.7%, 26% higher than the average level in China. Therefore, as a province richly endowed with coal resources, Shanxi faces a heavy task of energy saving and emission reduction. It is urgent for Shanxi to develop clean energy.

Shanxi has particular advantage in developing clean energy. It is endowed with rich CBM, accounting for 1/3 of total reserve in China. It qualifies as the base of CBM development and utilization, with promising prospect. In addition, 5 national natural gas pipelines transfers through the province. Therefore, exploiting CBM (natural gas) is the most realistic option for Shanxi to optimize its energy consumption structure. It is statistically meaningful to fasten the development of the CBM (natural gas) industry, improve the percentage of gas

consumption among primary energy consumption, adjust the energy and industry structure, develop new sectors, protection the environment, improve people's life, encourage energy saving and emission reduction, address climate change, and maintain sustainable socioeconomic development.

In recent year, Shanxi highly emphasizes on comprehensive development and utilization of CBM and natural gas. It formulated the *Planning of Shanxi CBM (Natural Gas) Development in the Eleventh 5-Years* and the *Planning of CBM Industry in the Twelfth 5-Years*, to fasten the progress of the gas industry.

There are altogether more than 10 big domestic and foreign enterprises that have entered the CBM development and utilization sector, and an initial industrialized and commercialized system covering exploration and extraction, compression, liquefaction, collection and transmission for civil gas use, industrial gas fuel, and CBM power generation has come into being. Shanxi has also formulated an implementation solution to fasten the development of CBM power generation. It defines that during the twelfth 5-years period, 21 CBM power generation projects will be conducted, targeting 300 MW installed capacity and 1.8 billion kW/h electricity, with the Qinshui, Hedong and Luan regions as the focus of development. A special fund will be set up as source of subsidiaries for establishment of CBM power plants and research on manufacture technology of CBM power equipment, and preferential treatment will be given in case of project land acquisition, exploration, tax, and government subsidy.

The development of natural gas sector in Shanxi has been accelerating. Since the eleventh 5-years, consumption of natural gas throughout the whole province has kept a growth pace at average 62% annually, much higher than the national growth pace of 16%. Natural gas is widely used in cities, towns, and some villages for purposes such as living fuel, heating and refrigeration, and car and industrial fuel. Natural gas has entered a new phase of fast development, encouraging rapid development of pipeline networks. The gas market has become mature, with steady gas supply, complete sales and marketing system, robust and safe operation system.

In 2010, Shanxi provincial party committee and government put forward a strategy to improve the utilization of its richly endowed gas, comprising coalbed methane, coke oven gas, natural gas made from coal and transit natural gas, as a much cleaner energy in Shanxi. It meant to implement coverage of 119 counties, so as to optimize rural and urban economy and to improve the percentage of using clean energy in people's life. By 2015, the total gas consumption will reach 10 billion m<sup>3</sup>, equivalent to 50 million tons of coal, reducing emission of CO<sub>2</sub> 22.6 million tons, SO<sub>2</sub> 54 thousand tons, NO<sub>2</sub> 64 thousand tons, dust 1.98 million tons, and fly ash 12.6 thousand tons. This is significant for Shanxi to be able to clear the label of "Big Energy Consumer" and "Polluted Province", and to establish a world-class low-carbon energy demonstration base. Using gas in Shanxi is not only industry engineering, but also ecological engineering that will benefit all people.

Gas source stability and pipeline network establishment are the basics to

implement the new policy of provincial government. Guoxin Energy has played a leading role in gas source exploration and pipeline network establishment. Now it has exclusive right in operation of 10 billion cubic meters of natural gas, and leading right in operation of 20 billion cubic meters of mixed gas source. It has set up a 3004-Km-long natural gas pipeline network running from north to south and starting from Datong in the north and ending at Yuncheng in the south. The network covers 11 cities and 95 counties (regions) throughout the whole province, benefiting 3 million households, 10 million residents, 1079 towns, 371 enterprises, and 7000 commercial and institutional users, and providing gas for 80000 CNG/LNG cars and trucks. 91 counties (regions) are using its service. Presently, 27.7% of residents in Shanxi are using gas, much higher than the national average level of 14%.

### **1.4.2 Necessity and Meaning of Project Construction**

The project ensures power supply for the whole province, especially for regions where the 6 components are located. It is significant in saving coal resources, improving ecological environment, and uplifting quality of local residents' life.

#### **1) Power and heat cogeneration component**

The two components in Xiyang and Baode are very important to the two counties.

Viewed from the perspective of power supply, Jinzhong city that governs the Xiyang County, mainly has its power supplied through the external network. In 2013 and 2015, Jinzhong will need 233MW and 1064MW from the external network. With the growing load, the shortage expands year by year. After the two plants put into production, the power to be produced will mainly meet the need of Jinzhong.

Presently Baode does not have any public power plant, and the required power comes from the main network through a 110kV transformer station. During the twelfth 5-years period, the need for power keeps growing. It is expected to reach 126MW in 2013, and 170MW in 2015. After the plant is put into production, the power produced can meet the growing need in Baode.

Viewed from the perspective of heat supply, phase I of central heating in Xiyang is supplied by Anping CHP plant. The supply scope is the central part of the old urban area. The residents of surrounding urban area, including urban villages and the new urban areas mainly use small heating boilers. The boilers deliver low heating efficiency, and are not equipped with dust removing devices. This increases air pollution during the heat supply period in winter, and also increases quantity of ash and slag. It is a great waste of coal resource. The air monitoring data of recent years provided by the County Environment Protection Bureau shows, the air quality in the county during the non-heat supply period is excellent, better than national level grade II. After implementing Phase I central heating supply, the air quality in the central part of the old urban area has been greatly improved. However, as the border area of the old urban area and the new urban areas are not supplied with central heating, the overall air quality in the county is still poor, with PM10 and SO<sub>2</sub>

above the standard. The air is also severely polluted with TSP and dust.

There are 2 heat supply modes in Baode. The west urban area use central heat supply by a county heating company; and partial residents in the eastern urban area are supplied by several boiler houses. Some resident also uses their own small coal burning boilers. As these boilers, whether in boiler houses or households, cannot burn the coal completely, they cause resource waste and cause great environmental problem. If the new western urban area under construction will continue use small coal burning boilers for heat supply, air pollution in Baode would become more severe.

Two 120MW CHP plants are to be built in the 2 counties. Each year, 2.5 million tons of CO<sub>2</sub> would be prevented from emitting into the air. The establishment of the two plants will address the need for central heating for the new urban areas in the two counties, and will play an important role in ensuring safe operation of central heating. The implementation of the 2 components will not only bring the benefit of energy saving and emission reducing, but also enhance the stability and reliability of power network, functioning for peak shaving and in case of emergencies.

## **2) Gas pipeline network components**

The establishment of 4 gas pipeline networks is significant in energy saving and emission reducing, improving investment environment and life quality of local residents.

In Changzhi, Xiangyuan, Tunliu and Qingxu where the 4 components preside, urban residents use gas made from coal, liquefied petroleum gas, or electricity for cooking and heating. The residents in counties or towns mainly use coal, and liquefied petroleum gas and electricity play subsidiary roles. Industrial and commercial enterprises and other institutions mainly use coal. The coal-leading energy structure and backward combustion technology cause great energy waste and environment pollution. To protect environment, improve air quality, uplift life quality and health standard of the public, and implement sustainable development, the county government greatly support the work of Shanxi Coalbed Methane and Shanxi Coalbed Methane (Natural Gas) Pipeline. They have been granted with exclusive operation right of natural gas in the project counties, and are provided with all sorts of conveniences. The support from the government and the tasks of environment protection, energy saving and emission reducing lay a solid foundation for them to develop gas users and expand the gas market.

The construction of gas pipeline networks will play powerful role in optimizing regional energy structure, promoting regional economic development, and improving ecological environment. Residents, switching from use of gas made from coal, liquefied petroleum gas and coal to use of natural gas, can save expenditure for energy consumption. The safety is greatly improved, and the household sanitary conditions are better. Women are much relieved in housework, and life quality of residents are greatly improved.

## 1.5 Project Overview and Construction Contents

### 1.5.1 CHP Plants

#### 1) Xiyang CHP plant

The Xiyang CHP plant lies 500 meters away from the north of Houzhuang village, Dazhai town, Xiyang County, Jinzhong Municipality, and 2.5 kilometers from the Xiyang county town. Houzhuang village is in the north of Dazhai town.

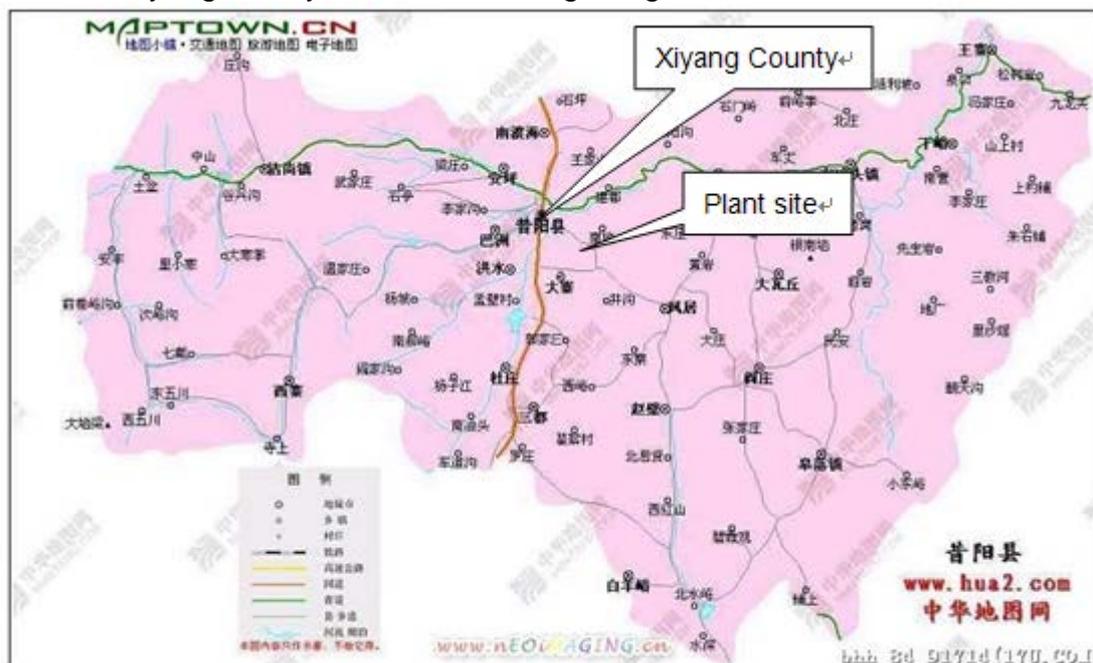


Figure 1.5-1 Location of Xiyang CHP plant

In this component, a 120MW CBM-fueled heat supply unit (two on one) will be built, targeting at 5500 power generating hours annually. An annual heat load of 55.12MW, 1.1 million m<sup>2</sup> of heating areas, and 149 heating days are designed. The gas of the power plant is supplied via the coalbed methane (natural gas) transmitted through the pipeline from Yangquan, Pingding to Xiyang built by the Shanxi Natural Gas Company.

The construction consists of plant area, construction site, access road, water supply pipeline, gas supply pipeline, power transmission line, heating pipeline, heat exchange station, pump room, and inspection well. Within the above items, the heating pipeline and heat exchange station, as auxiliary of this project, will be financed by the local Housing and Rural-Urban Development Bureau. These construction items are described as follows:

#### a. Plant area

The layout of plant area falls into two parts:

West part: The regulator station, integrated water pump house, gas turbine unit, steam turbine workshop, air-cooling platform, water purification station, 220 kV indoor power distribution unit, and network relay communication room are arranged in turn from southwest to northeast.

East part: Front area of plant, chemical water treatment facilities, inspection and maintenance room of material warehouse, cooling tower of auxiliary unit, and cycling water pump room are arranged in turn from southwest to northeast.

The plant occupies 79.23 mu in area, and no further expansion is considered now.

**b. Construction site**

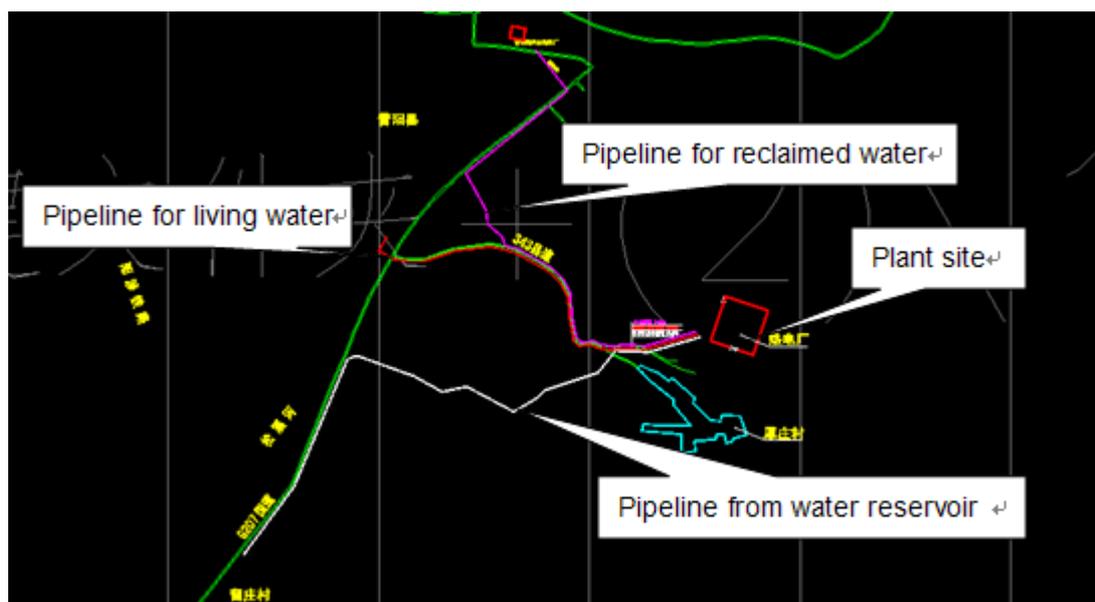
The construction site lies closely on the southwest of the plant area, about 45 mu in area. It consists of living area of construction staffs, office area of construction staffs, equipment assembly and stock area, and warehouse.

**c. Access Road**

The access road starts at the end of Houzhuang’s village road. It leads to two directions at the southwest corner of the plant, one leading to the main passageway from the south of the plant area, and the other leading to the freight passageway from northwest of the plant area. The access road, 1084 meters long and 9 meters wide, takes 14.63 mu in area.

**d. Water Supply pipeline**

The supplementary water sources from the Xiyang water treatment plant, which lies on the northwest of the plant, 1.5 Km away. The pipeline, 2.5 Km long, for the reclaimed water uses DN200 PE pipe with steel wire frame. The living water is supplied by the Xiyang water supply network. The living water supply pipeline, 1.9 Km long, uses DN100 seamless pipeline. The backup water sources from the Guzhuang reservoir, which lies in Liuzhuang – on the southwest of the plant. The water pipe uses DN200 PE pipe with steel wire frame, 2.9 Km in length. The construction of the 3 pipelines will take 64.1 mu, considering the pipelines can share one passageway when they are parallel with each other. For details, refer to the figure below.



**Figure 1.5-2 Distribution of water supply pipeline for Xiyang CHP plant**

### e. Gas supply pipeline

The natural gas pipeline (Yangquan - Pingding - Xiyang) built by Shanxi Compressed Natural Gas lies on the northwest of the plant area, where the gas is connected to the plant with 1km-long pipe. During the construction, 10.5 mu land is required for temporary use. For leading direction of the pipeline, please refer to Figure 1.5-3.

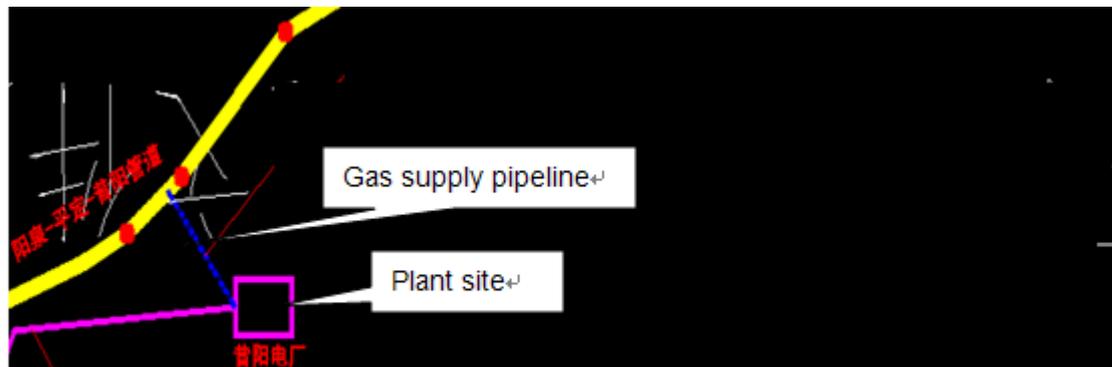


Figure 1.5-3 Distribution of gas supply pipeline for Xiyang CHP plant

### f. Power supply line

The power supply line consists of temporary construction line and new supply line. The temporary construction power line is led from Xiyang substation. The 5 km-long line requires 0.45 mu land temporarily during construction.

A new 220kV transmission line will be built from CHP and connect to 220kV Huangyan Substation. The new 15km-long transmission line requires 7.2 mu permanently for the construction. For direction of the line, please refer to the following figure.



Figure 1.5-4 Distribution of power line for Xiyang CHP plant

### g. Heating pipeline

The heating pipeline will provide heat for phase 2 and 3 of central heating in Xiyang County town. It comes from northwest of the plant, and then connects to the heat supply network of the county. The new heating pipeline extends 5.088km, and requires 38.16 mu land temporarily during construction. For details, refer to Figure 1.5-4.

### h. Heat exchange station

Altogether 14 heat exchange stations will be built, all of which lie at the outer ring of the new urban areas. Each station takes about 200M<sup>2</sup>. 14 stations take

4.2 mu. These stations are generally built in the residential community or institution, where space is usually reserved. Therefore, no land acquisition is required. For layout of stations, please refer to the following figure.

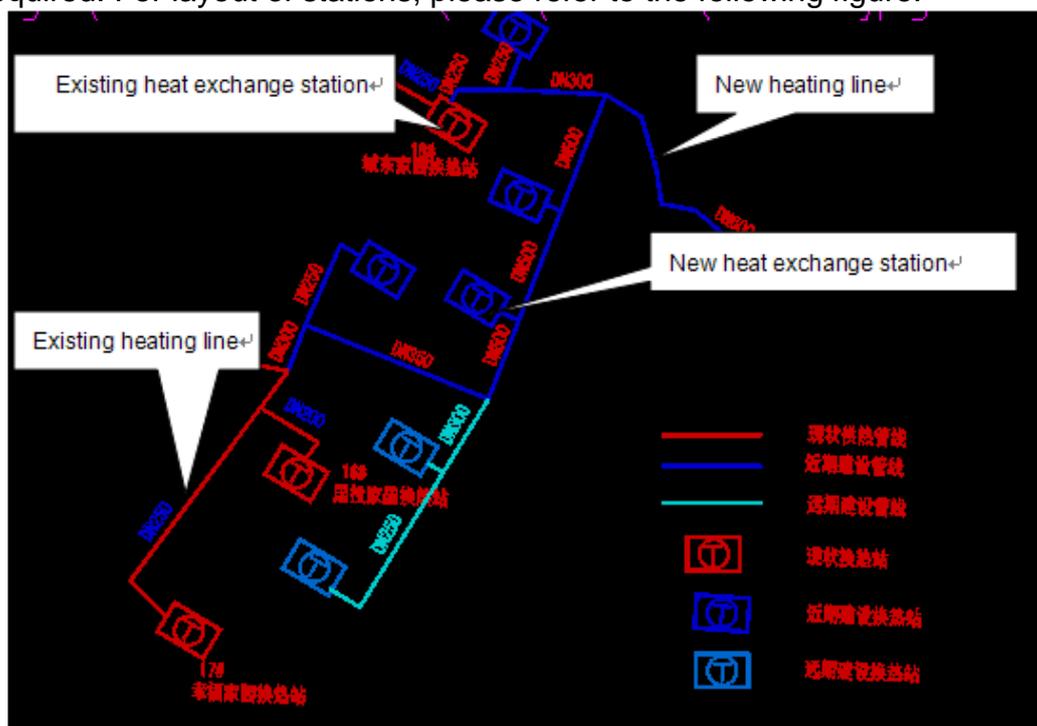


Figure 1.5-5 Location of heating lines and exchange stations for Xiyang CHP plant

**i. Pump house**

A pump house is built in the water treatment plant, not requiring any land use.

**j. Inspection well**

An inspection well is built, requiring 0.006 mu land.

For items in the Xiyang CHP plant and their technical and economic indices, refer to Table 1.5-1.

**2) Baode CHP plant**

The construction site lies at Gucheng village of Yangjiawan town, Baode County. The village seats in the northwest of Yangjiawan Town, and in the south west of Baode County. The village is 9km away from the county, outside the urban planning area. The plant site is closely located next to No. 249 national highway, to the west of which flows the Yellow River. The Wubao (Wutai Mountain – Baode) highway runs 300m away from the south border of the plant.

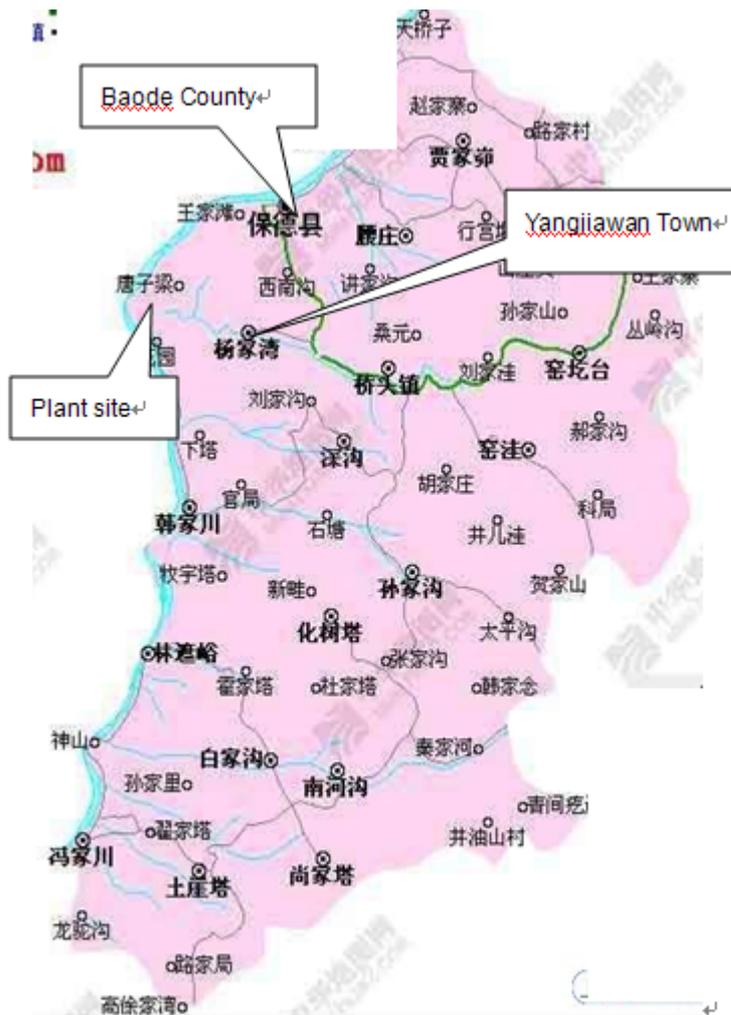


Figure 1.5-6 Location of Baode CHP plant

In the component, a 120MW 2-on-1 CBM-fueled heat supply unit will be built, with annually 5500 power generating hours, 33.6MW heat loading, 0.7 million M<sup>2</sup> of heating areas, and 149 heating days. The fuel gas comes from the Baode gas station by Shanxi Natural gas, 7km from the power plant.

The construction consists of plant area, construction site, access road, water supply piping, gas supply piping, power supply lines, heating pipeline, heat exchange station, pump room, and inspection well. Within the above items, the heating pipeline and heat exchange station, as auxiliary of this project, will be financed by the local Housing and Rural-Urban Development Bureau. These construction items are described as follows:

**a. Plant area**

The layout of plant area falls into three parts:

North part: The chemical water treatment facilities, water purification station, integrated water pump house, and cooling tower of auxiliary unit are arranged from southeast to northwest in turn.

Middle part: The 110kV outdoor power distribution unit, network relay communication room, air cooling platform, steam turbine workshop and gas turbine unit are arranged in turn from southeast to northwest.

South part: The multi-function building, inspection and maintenance room of warehouse, regulator station, water treatment facilities are arranged from southeast to southwest.

The plant occupies 70.7 mu of land area, and no further expansion is considered now.

#### b. Construction site

The construction site adjoins closely with the plant area in the north, taking 45mu in area. It consists of living area of construction staffs, office area of construction staffs, equipment assembly and stock area, and warehouse.

#### c. Access road

The access road connects to No. 249 national highway, about 700m long. It is reconstructed through expansion based on an existing village road, about 42.17 mu land (including slope protection) in area.

#### d. Water supply pipeline

The water supply pipeline connects to the reclaimed water for production and the backup water. The reclaimed water sources from Baode water treatment plant, and the backup water sources from Baode irrigation pipeline (lies between the water treatment plant and No. 259 national highway). The water treatment plant locates at Lixianling, Dongguan town, Baode County, to the northeast of the power and heat plant. Both the pipelines use DN200 PE pipe with steel wire frame, about 6km long. They are buried together, temporarily taking 63 mu. For the direction of lines, refer to the following figure.

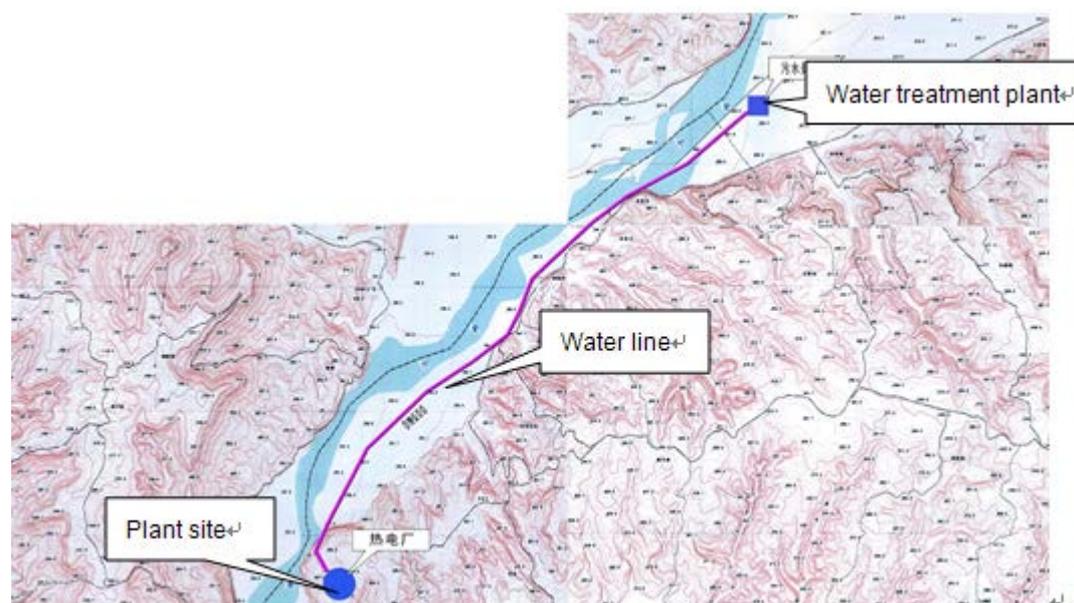


Figure 1.5-7 Distribution of water line of Baode CHP plant

#### e. Gas supply pipeline

The feeding gas comes from the Baode station built by the Shanxi Natural Gas, about 7km away from the southeast side of the plant. The Baode station lies in Shantou village, Yangjiawan town. The gas pipeline is 8.1km long, with diameter being D219.1. The construction of it requires 85.05 mu land

temporarily. For the direction of pipeline, refer to Figure 1.5-8.

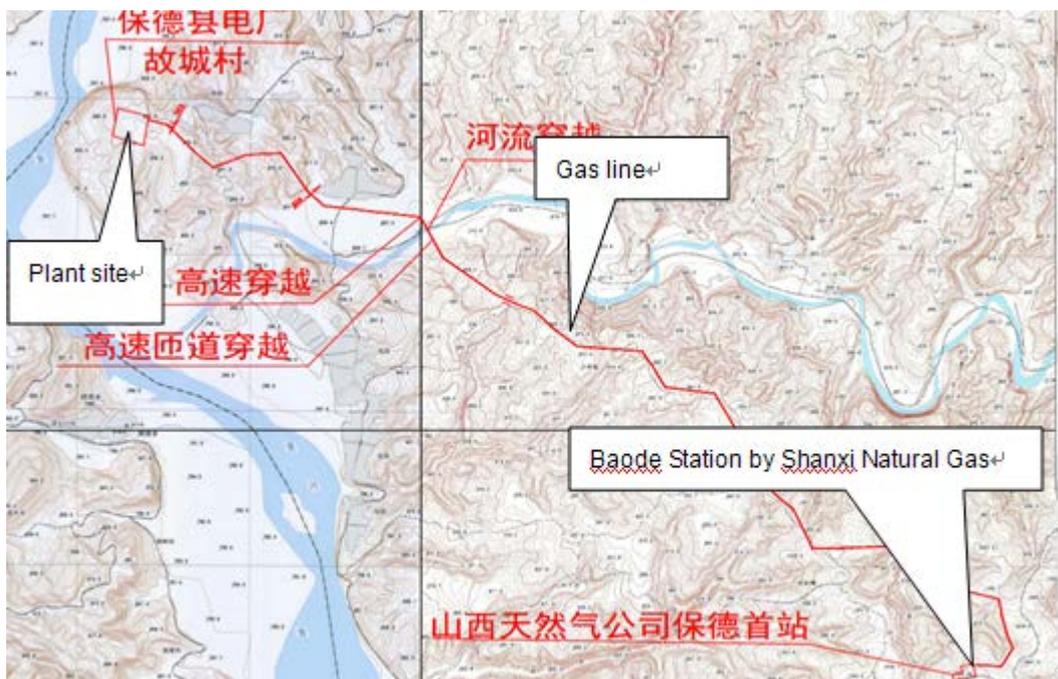


Figure 1.5-8 Distribution of gas line of Baode CHP plant

f. Power supply line

The power supply line consists of temporary construction line and new supply line.

The temporary construction power line is led from Baode transformer station. The 6km-long line requires 0.55 mu land temporarily during construction.

A new line is led from the northeast of the plant, and then connected to the 110kV Dongguan transformer station with one-loop line. The new 10km long line requires 2.5 mu for the tower base of the line. For direction of the line, please refer to the following figure.

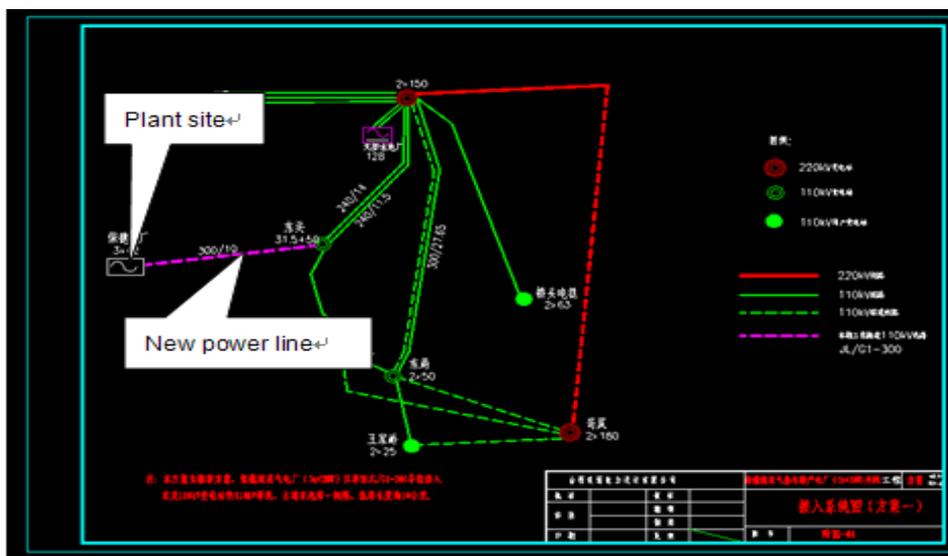


Figure 1.5-9 Distribution of power line for Baode CHP plant

**g. Heating pipeline**

The new heating pipeline, 25.14km long, is led from the west side of the plant. Required pipelines' specifications are listed as follows:

| Category | Length (km) |
|----------|-------------|
| DN500    | 19.83       |
| DN450    | 0.50        |
| DN400    | 1.32        |
| DN350    | 0.82        |
| DN300    | 0.38        |
| DN250    | 2.30        |
| Total    | 25.14       |

The pipeline needs 188.55 mu land temporarily for the construction. For direction of the line, refer to Figure 1.5-10.

**h. Heat exchange station**

Altogether 8 heat exchange stations will be built. With each station requiring 200m<sup>2</sup>, the 8 stations need 2.4 mu. Generally such stations are built in residential community, where space has already been reserved. Therefore, no land requisition is required. For the locations of stations, refer to the following figure.



Figure 1.5-10 Distribution of heating line and exchange stations of Baode CHP plant.

**i. Pump house**

A new pump house is going to be built, taking 3.75 mu space.

**j. Inspection well**

Three inspection wells are to be built. With each taking 2m\*2m, 3 wells take 0.018 mu.

For items of the component, and technical and economical indices, refer to Table 1.5-1.

**Table 1.5-1** Construction items of two CHP plants and main technical and economical indices

| SN       | Construction items and main technical and economical indices | Unit         | Quantity         |                 | Remarks  |
|----------|--|--------------|------------------|-----------------|--|
|          |  |              | Xiyang component | Baode component |  |
| <b>1</b> | <b>Land acquisition indices</b>                              |              |                  |                 |  |
| 1.1      | Total area   | Mu           | 259.28           | 501.4           | Land acquisition   |
| 1.2      | Permanent  | Mu           | 101.07           | 119.14          |  |
| 1.2.1    | Plant area   | Mu           | 79.23            | 70.7            | Permanent  |
| 1.2.2    | Entrance road  | Mu           | 14.63            | 42.17           | Permanent  |
| 1.2.3    | Pump house   | Mu           | 0                | 3.75            | Permanent  |
| 1.2.4    | Inspection well  | Mu           | 0.006            | 0.018           | Permanent  |
| 1.3      | Tower base   | Mu           | 7.2              | 2.5             | Permanent  |
| 1.4      | Temporary  | Mu           | 158.21           | 382.25          |  |
| 1.4.1    | Water supply pipeline  | Mu           | 64.1             | 63.1            | Temporary  |
| 1.4.2    | Gas supply pipeline  | Mu           | 10.5             | 85.05           | Temporary  |
| 1.4.3    | Heating pipeline   | Mu           | 38.16            | 188.55          | Temporary  |
| 1.4.4    | Power supply pipeline  | Mu           | 0.45             | 0.55            | Temporary  |
| 1.4.5    | Construction site  | Mu           | 45               | 45              | Temporary  |
| <b>2</b> | <b>Construction indices</b>                                  |              |                  |                 |  |
| 2.1      | Length of entrance road                                      | km           | 0.95             | 0.7             |  |
| 2.2      | Length of water pipeline                                     | km           | 7.3              | 6               | 3 lines for Xiyang;<br>2 lines for Baode                     |
| 2.3      | Length of gas pipeline                                       | km           | 1                | 10.6            |  |
| 2.4      | Length of heating pipeline                                   | km           | 5.088            | 25.14           | Financed by local Housing and Rural-Urban Development Bureau |
| 2.5      | Number of inspection wells                                   |              | 1                | 3               |  |
| 2.6      | Pump house   |              |                  | 1               |  |
| 2.7      | Heat exchange station  |              | 14               | 8               | Financed by local Housing and Rural-Urban Development Bureau |
| <b>3</b> | <b>Technical and economic indices</b>                        |              |                  |                 |  |
| 3.1      | Static investment  | Million yuan | 709.0            | 694.9           |  |
| 3.2      | Total Investment   | Million yuan | 731.4            | 716.4           |  |
| 3.3      | Availability hours of generator                              | h            | 5500             | 5500            |  |

|     |                       |                       |       |      |  |
|-----|-----------------------|-----------------------|-------|------|--|
| 3.4 | Annual heating load   | MW                    | 55.12 | 33.6 |  |
| 3.5 | Heat supply days      | day                   | 149   | 149  |  |
| 3.6 | Heat supply area      | 10,000 m <sup>2</sup> | 110   | 70   |  |
| 3.7 | Annual power capacity | (GWh)                 | 605   | 602  |  |
| 3.8 | Annual heat capacity  | (10,000 GJ)           | 47    | 61   |  |

## 1.5.2 Gas Pipeline Network Components

The 4 gas pipeline network components are to lay long pipelines to provide CBM or natural gas for residents and industry users within the defined regions.

### 1) Changzhi component

The gas pipeline network component in Changzhi refers extension by 2020 in the short term and 2030 in the long term. It includes construction of 52.7km hypo-high pressure pipeline within 10 villages and towns of this region, benefiting 30,800 households with annual gas supply of 89.73 million cubic meters. The average daily gas supply amounts to 253,100 m<sup>3</sup>.

The gas sources from the CBM transmission pipeline from Jincheng to Changzhi built by the Sanjin New Energy Development Company in the Changzhi city. The transmission pipeline has been connected to the Hongdon-Anze-Zhangzi pipeline built by Shanxi Natural Gas. Both lines can provide gas in case of contingency. The total investment of this component amounts to CNY59.9 million, where the construction cost is CNY7.9 million, other construction fee CNY13.8 million, basic preliminary cost CNY5.2 million.

This component contains the following 2 items:

#### a. Gas pipeline network

The network needs 52.7 km pipelines, temporarily requiring 578.4 mu land during construction. The pipelines consist of the following categories:

| Category     | Length (km) |
|--------------|-------------|
| DN350        | 11.2        |
| DN300        | 4.6         |
| DN250        | 2.2         |
| DN150        | 14.4        |
| DN100        | 20.3        |
| <b>Total</b> | <b>52.7</b> |

#### b. Regulator (Measuring) facilities

When the main pipeline of the network is led to a county or to an industry user, a special regulator is required to meet the need of different users or different using capacity. Altogether 12 special regulators are needed, occupying altogether 0.72 mu.

For the distribution of pipelines and regulators, refer to Figure 1.5-11.

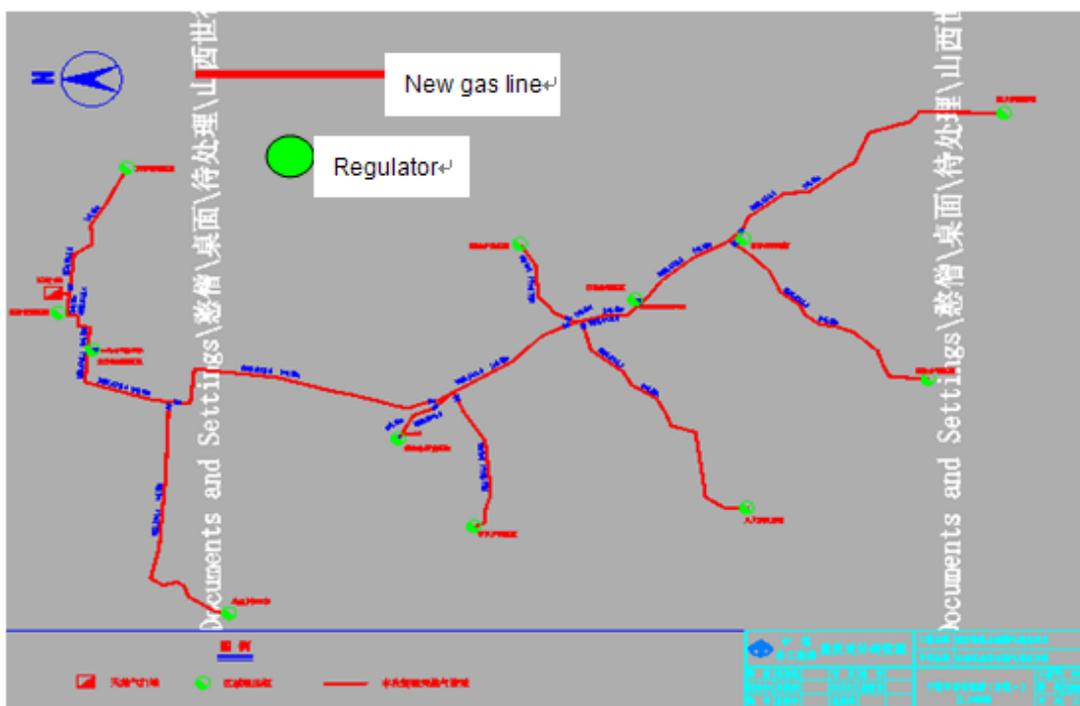


Figure 1.5-11 Distribution of gas line and regulators in Changzhi pipeline network

## 2) Xiangyuan component

The gas pipeline network component in Xiangyuan refers the extension by 2020 in the short term and 2030 in the long term. It includes construction of 83.2km hypo-high pressure pipeline. It will benefit 88.1 thousand households, among which 66,000 live in the county town (including Guhan, Wangqiao and Houbao), 9,300 live in towns, 12,750 live in the village. It can annually supply 62.9502 million cubic meters, with an average daily supply of 175100 cubic meters. The gas can either use the natural gas from the Hongdon-Anze-Zhangzi pipeline built by Shanxi Natural Gas, or use the local CBM from the Tunliu-Xiangyuan pipeline that is still in build by the Shanxi Coalbed Methane (Natural Gas) Pipeline.

The total investment of this component amounts to CNY63.2 million, where the construction cost is 5.1 million, other construction fee 14.1806 million, and preliminary cost 5.5183 million.

The construction of this component contains the following 2 items:

### a. Gas pipeline network

The network needs 83.2km pipelines, temporarily taking 1019.09 mu land during construction. The pipelines consist of the following categories:

| Category     | Length (km) |
|--------------|-------------|
| DN250        | 10.5        |
| DN200        | 8.11        |
| DN150        | 30.3        |
| DN100        | 34.3        |
| <b>Total</b> | <b>83.2</b> |

**b. Regulator (Measuring) facilities**

When the main pipeline of the network is led to a county or to an industry user, a special regulator is required to meet the need of different users or different using capacity. Altogether 10 special regulators are needed, taking 0.6 mu. For the distribution of pipelines and regulators, refer to Figure 1.5-12.

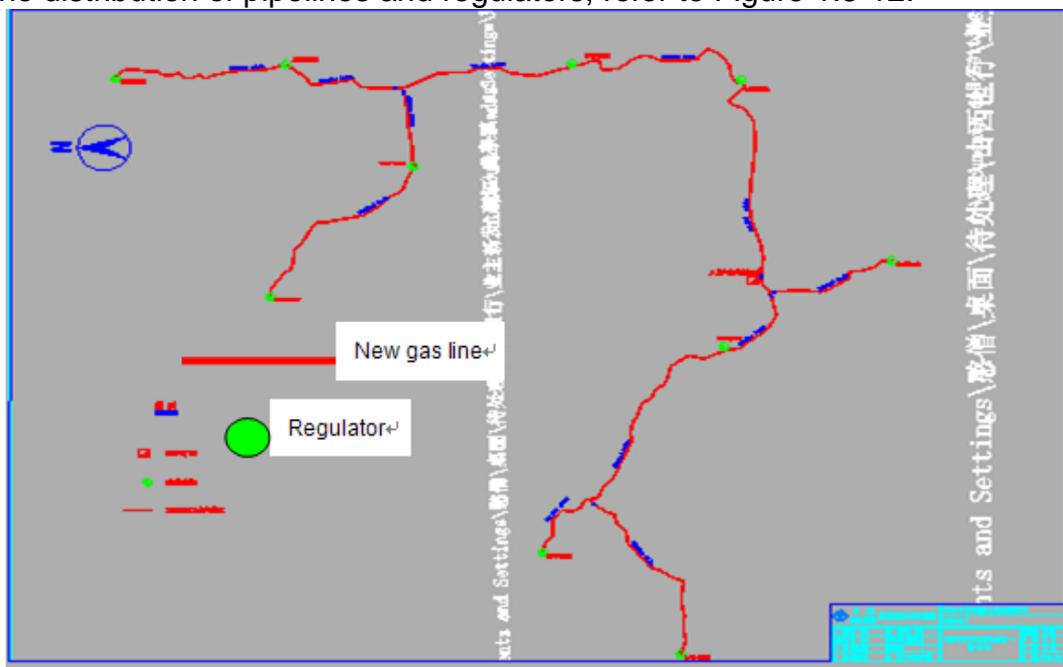


Figure 1.5-12 Distribution of gas line and regulators in Xiangyuan pipeline network

**3) Tunliu component**

The gas pipeline network component in Tunliu refers extension to 2020 in short run and 2030 in long run. It includes construction of 86.4km hypo-high pressure pipeline. It will benefit 12.21 thousand households, among which 7200 live in adjacent towns, 5010 live in villages, with an annual supply of 84.8362 million cubic meters and an average daily supply of 241100 cubic meters. The gas can either use the natural gas from the Hongdon-Anze-Zhangzi pipeline built by Shanxi Natural Gas, or use the local CBM from the Tunliu-Xiangyuan pipeline that is still in build by the Shanxi Coalbed Methane (Natural Gas) Pipeline. The two sources can back up for each other.

The total investment of this component amounts to CNY58.8 million, where the construction cost is 9.0 million, equipment cost 3.9 million, installation cost 28.7 million, and preliminary cost 5.1 million.

| Item              | Cost (Million) |
|-------------------|----------------|
| Construction cost | 8.9685         |
| Equipment cost    | 3.8564         |
| Installation cost | 28.6693        |
| preliminary cost  | 5.0661         |
| <b>Total</b>      | <b>55.7267</b> |

The construction of this component contains the following 2 items:

**a. Gas pipeline network**

The network needs 86.4 km pipelines, temporarily taking 992.70 mu land during construction. The pipelines consist of the following categories:

| Category     | Length (km) |
|--------------|-------------|
| DN300        | 30.8        |
| DN150        | 17.1        |
| DN100        | 38.5        |
| <b>Total</b> | <b>86.4</b> |

**b. Regulator (Measuring) facilities**

When the main pipeline of the network is led to a county or to an industry user, a special regulator is required to meet the need of different users or different using capacity. Altogether 8 special regulators are needed, taking 0.48 mu. For the distribution of pipelines and regulators, refer to Figure 1.5-13.

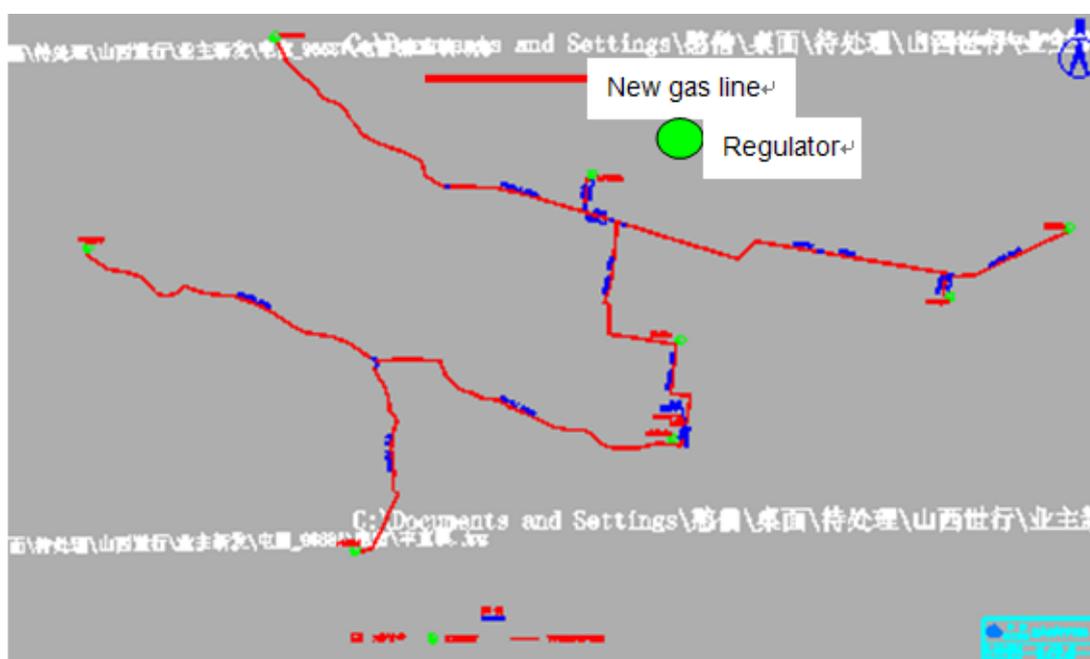


Figure 1.5-13 Distribution of gas line and regulators in Tunliu pipeline network

**4) Qingxu component**

The gas pipeline network in the Qingxu County refers extension to 2015 in short run, to 2020 in long run. Altogether 31.7 km hypo-high pressure pipeline will be built, benefiting 6500 households with annual supply of 6.6247 million cubic meters and average daily supply 18500 cubic meters. The gas sources from the natural gas from the Taiyuan–Pingyao pipeline built by Shanxi Natural Gas, or from the CBM transmitted in the Kongcun-Gujiao pipeline for contingencies.

The total investment amounts to 14.8 million, where the construction cost accounts for 3.8 million, other construction fee 3.8 million, and preliminary cost 1.3 million. .

The network needs 31.7 km pipelines, temporarily taking 370.5 mu land during construction. The pipelines consist of the following categories:

| Category     | Length (km) |
|--------------|-------------|
| De200        | 6.7         |
| De160        | 5.8         |
| De110        | 10.2        |
| De90         | 9.0         |
| <b>Total</b> | <b>31.7</b> |

For pipeline distribution, refer to Figure 1.5-14.

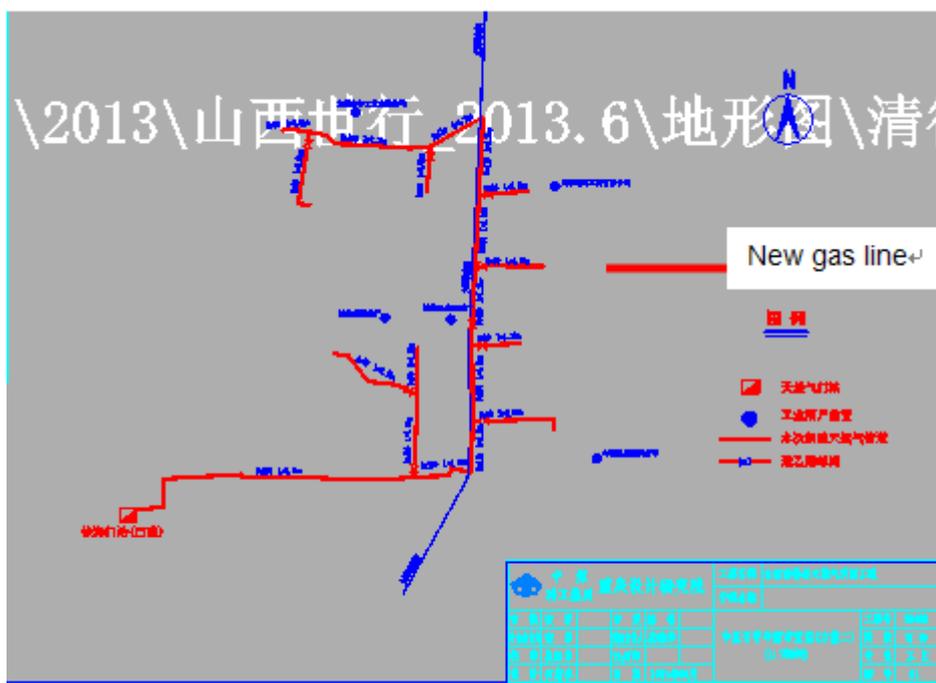


Figure 1.5-14 Distribution of gas line in Qingxu pipeline network

The following table shows the construction items of the 4 pipeline networks, as well as technical and economic indices.

Table 1.5-2 Construction items of the 4 pipeline networks, and technical and economic indices

| SN  | Construction items, technical and economic indices | Unit | Changzhi | Xiangyu an | Tunliu | Qingxu | Remarks                       |
|-----|--|------|----------|------------|--------|--------|-------------------------------|
| 1   | Total land acquisition                             | Mu   | 579.12   | 1019.69    | 993.18 | 370.5  | temporary and long term lease |
| 1.1 | Land acquisition of pipelines                      | Mu   | 578.4    | 1019.09    | 992.70 | 370.5  | Temporary                     |
| 1.2 | Land acquisition of regulators                     | Mu   | 0.72     | 0.6        | 0.48   |        | Permanent                     |
| 2   | Pipelines  | Km   | 68       | 83.2       | 86.4   | 31.7   |                               |

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|   |                             |                      |        |         |         |        |  |
|---|-----------------------------|----------------------|--------|---------|---------|--------|--|
| 3 | Number of regulators        |                      | 12     | 10      | 8       | 0      |  |
| 4 | Potential users in long run | 10000                | 3.08   | 8.81    | 1.221   | 0.65   |  |
| 5 | Annual gas supply           | 10000 m <sup>3</sup> | 8972.7 | 6295.02 | 8483.62 | 662.47 |  |
| 6 | Average daily supply        | 10000 m <sup>3</sup> | 25.31  | 17.51   | 24.11   | 1.85   |  |
| 7 | Total investment            | million Yuan         | 59.9   | 63.2    | 58.8    | 14.8   |  |

## 1.6 Linked Projects

The six components are all linked to other projects. For details, refer to the following table.

**Table 1.6-1 Projects correlated to the 6 components**

| Component                          | Correlated projects  |                                   |                    |
|------------------------------------|--|-----------------------------------|--------------------|
|                                    | Name   | Project owner                     | Complete time      |
| Xiyang heat and power cogeneration | Pingding – Xiyang pipeline network   | Shanxi Compressed Natural Gas     | 2011               |
| Baode heat and power cogeneration  | Baode station  | Shanxi Natural Gas                | 2013               |
| Changzhi gas pipeline network      | Changzhi portal station  | Shanxi CBM (Natural Gas) Pipeline | 2012               |
| Xiangyuan gas pipeline network     | Xiangyuan portal station   | Shanxi CBM (Natural Gas) Pipeline | Under construction |
| Tunliu gas pipeline network        | Tunliu portal station  | Shanxi CBM (Natural Gas) Pipeline | 2012               |
| Qingxu gas pipeline network        | Xugou and Kongcun portal stations<br>Xugou portal station – Kongcunportal station pipeline | Qingxu Kaitong Natural Gas        | 2011               |

Among linked elements for 6 components, those linked with Xiyang CHP, Changzhi, Tunliu and Qingxu Gas Network Components had already completed process of land acquisition with compensation fully delivered to affected people. According to due diligence review, all affected villages and people were satisfied with land compensation and process. No one had made any complaint to the process. For linked elements for Baode CHP Component and Xiangyuan Gas Network Component, the land acquisition implementation is still being carried out. During RAP implementation of the Project, the selected external monitoring team will include these two subprojects into the scope of external monitoring and ensure full completion of land acquisition in accordance with relevant laws and restoration of livelihood of affected people. For the resettlement actions of the linked projects see Appendix 1: *Resettlement Due Diligence Report of Linked Projects*.

## 1.7 Project Progress

### 1.7.1 Power and Heat Cogeneration Components

According to the feasibility report, the two components' schedules are almost the same.

The Xiyang component plans to start up in March 2014, and the plant commissions in May 2015. The Baode component plans to start up in April, 2014, and the plant commissions in October 2015.

Table 1.7-1 shows the construction schedules of the two components.

**Table 1.7-1 Schedule of Xiyang and Baode CHP plants**

| SN         | Item  | Xiyang     |               | Baode      |               |
|------------|---|------------|---------------|------------|---------------|
|            |   | Start time | Complete time | Start time | Complete time |
| <b>I</b>   | <b>Feasibility research and Work Bank review</b>                |            |               |            |               |
| 1          | Survey TOR  |            | 2013.2.6      |            | 2013.2.6      |
| 2          | Commissioned Special Subject TOR                                | 2013.1     | 2013.2.28     | 2013.1     | 2013.2.28     |
| 3          | Feasibility Research Report (Draft)                             | 2013.1     | 2013.3.15     | 2013.1     | 2013.3.15     |
| 4          | Final Commissioned Special Subject Report and Support Documents |            | 2013.5.15.    |            | 2013.5.15.    |
| 5          | Feasibility Research Report (Final)                             | 2013.5.16  | 2013.5.30.    | 2013.5.16  | 2013.5.30.    |
| 6          | Review of Feasibility Research Report                           |            | 2013.7        |            | 2013.7        |
| 7          | Project review  |            | 2013.8        |            | 2013.8        |
| 8          | Review and evaluation of project by the World Bank              |            | 2013.9        |            | 2013.9        |
| <b>II</b>  | <b>Preliminary design</b>                                       |            |               |            |               |
| 1          | Start of design   | 2013.8.1   | 2013.9.30     | 2013.8.1   | 2013.9.30     |
| 2          | Review of design  |            | 2013.10.30    |            | 2013.10.30    |
| <b>III</b> | <b>Design of construction drawings</b>                          |            |               |            |               |
| 1          | plant layout  |            | 2013.10.10    |            | 2013.10.10    |
| 2          | Main workshop leveling drawings                                 |            | 2013.10.25    |            | 2013.10.25    |
| 3          | Drawings of host machine base                                   |            | 2013.11.15    |            | 2013.11.15    |
| 4          | Complete the civil work drawings                                |            | 2014.3.30     |            | 2014.3.30     |
| 5          | Complete the process drawings                                   |            | 2014.6.30     |            | 2014.6.30     |
| 6          | Complete the electrical & thermal control drawings              |            | 2014.7.30     |            | 2014.7.30     |
| <b>IV</b>  | <b>Construction progress</b>                                    |            |               |            |               |
| 1          | Plant area leveling and   | 2014.3     |               | 2014.4     |               |

| SN | Item   | Xiyang     |               | Baode      |               |
|----|--|------------|---------------|------------|---------------|
|    |  | Start time | Complete time | Start time | Complete time |
|    | foundation processing  |            |               |            |               |
| 2  | Onsite water and power supply                                  |            | 2014.6        |            | 2014.6        |
| 3  | Leveling of main workshop                                      | 2014.5     | 2014.7        | 2014.5     | 2014.7        |
| 4  | First-time foundation concreting for main workshop             | 2014.8     |               | 2014.8     |               |
| 5  | Building wall for main workshop                                | 2014.8     | 2014.12.30    | 2014.8     | 2014.12.30    |
| 6  | Installation of gas turbine, steam turbine and power generator | 2015.3     | 2015.7        | 2015.3     | 2015.7        |
| 7  | First time startup of turbine unit                             | 2015.8     |               | 2015.8     |               |
| 8  | Commissioning of whole system                                  |            | 2015.5        |            | 2015.10       |

## 1.7.2 Gas Pipeline Network Components

Based on the Feasibility Research Report, the schedules of the 4 networks are close to each other. The one in Qingxu is earlier in progress.

### 1) Pipeline networks in Changzhi, Xiangyuan, and Tunliu

By the end of 2030, the 3 networks will reach the design period. Since 2031, they will reach their design capacity respectively.

Based on the schedule, by 2020 the main framework of the network will have been completed. Users will be rapidly developed to initially form a gas supply network and management system covering the whole region. By 2031, the number of users will comply with the design target, and the pipeline network will have become a safe and reliable system with rational structure and complete functions through year-by-year improvement. The networks will be built in the following sequences:

- Regulators and measuring systems are installed to meet supply requirements;
- Lay hypo-pressure gas pipelines by section;
- Set up branch pipelines, and courtyard and indoor pipelines by community according to development of users;
- When residents and industry users reach to certain number, an automatic monitoring and management system for transmission control will be installed by step, and by 2030 the overall debugging and tuning shall have been finished;

### 2) Qingxu gas pipeline network

By the end of 2020, the network will reach the design period. Since 2021, it will reach its design capacity.

Based on the schedule, by 2015 the main framework of the network will have been completed. Users will be rapidly developed to initially form a gas supply network and a management system covering the whole region. By the end of 2020, it will reach the supply capacity designed for. The networks will be built in the following sequences:

- Lay mid-pressure pipeline by section;
- Set up branch pipelines, and courtyard and indoor pipelines by community according to development of users;
- When residents and industry users reach to certain number, automatic monitoring and management systems for transmission control will be installed by step, and by 2030 the overall debugging and tuning shall have been finished;

For construction schedules of the 4 component, refer to the following table:

**Table 1.7-2 Construction schedule of 4 gas pipeline networks**

| SN  | Task  | Changzhi   | Xiangyuan  | Tunliu   | Qingxu   |
|-----|---|--|--|--|--|
| I   | <b>Preliminary work</b>   |  |  |  |  |
| 1   | Project approval, feasibility research, preliminary design, and construction drawing design | 2013.3-2014.3  | 2013.3-2014.3  | 2013.3-2014.3  | 2013.3-2014.3  |
| 2   | Land acquisition and lease, and other preliminary work                                      | 2014.1-3   | 2014.1-3   | 2014.1-3   | 2014.1-3   |
| II  | Design of construction drawings   | 2014.1-3   | 2014.1-3   | 2014.1-3   | 2014.1-3   |
| III | <b>Main hypo-pressure pipeline</b>  | <b>Total: 52.7 km</b><br>10 km every year in 2014.10-2018.12;<br>12.7km in 2019; | <b>Total: 83.2km</b><br>60km from Oct. 2014.10 to 2017,<br>20km/year;<br>23.2km in 2018; | <b>Total: 86.4km</b><br>60km from Oct. 2014.10 to 2017,<br>20km/year;<br>26.4km in 2018; |  |
| IV  | Main mid-pressure pipeline  |  |  |  | <b>Total: 31.7km</b><br>10km from Oct. 2014 to Dec. 2015;<br>11.7km in 2017; |
| V   | Regulator   | Total: 12<br>3/year from 2015 to 2018;   | Total: 10<br>2/year from 2015 to 2016;<br>3/year since 2017 to 2018;                     | Total: 8<br>2/year from Sept. 2014 to 2018;  |  |
| VI  | Automatic network monitor and management system   |  |  |  |  |
| 1   | Design of construction drawings   | Jan.-Jun. 2019   | Jan.-Jun. 2019   | Jan.-Jun. 2019   | Jan.-Jun. 2019   |

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|     |  |   |   |   |  |
|-----|--|---|---|---|--|
| 2   | Installation of control center and remote terminal           | Jun. – Dec. 2019  | Jun. – Dec. 2019  | Jun. – Dec. 2019  | Jun. – Dec. 2019   |
| 3   | Software debugging   | Jan.-Jun. 2020  | Jan.-Jun. 2020  | Jan.-Jun. 2020  | Jan.-Jun. 2020   |
| 4   | Operation, evaluation and acceptance of the automatic system | Jul. – Dec. 2020  | Jul. – Dec. 2020  | Jul. – Dec. 2020  | Apr. – Sept. 2020  |
| 5   | Electronic payment system, inquiring and customer service    | Jan. – Mar. 2021  | Jan. – Mar. 2021  | Jan. – Mar. 2021  | Sept. – Dec. 2020  |
| 6   | Networking and debugging                                     | Apr. – Jun. 2021  | Apr. – Jun. 2021  | Apr. – Jun. 2021  |  |
| VII | User development   | <b>Total: 30800 users</b><br>8000 in 4 years (2015-2018), 2000/year;<br>4800 in next 3 years (2019-2021), 1600/year;<br>18000 in 2022-2030, 2000/year | <b>Total: 88000 users</b><br>10000 in 2015-2018, 2500/year;<br>10000/year in 2019-2021;<br>45000 in 2020-2030, 5000/year; | <b>Total: 12210 users</b><br>4000 users in 2015-2018, 1000/year;<br>2000 in 2019-2020, 1000/year;<br>1710 users in 2021;<br>4500 users in 2022-2030, 500/year | <b>Total: 6500 users</b><br>5000 in 2015-2018, 1250/year;<br>1000 in 2019;<br>500 in 2020; |

## 1.8 Measures to Mitigate Reverse Impact

The mitigation measures mainly manifest in the following aspects:

- Reducing permanent land acquisition;
- Reducing using amount of water;
- Minimizing land occupation of higher profit, such as vegetable land or gardening land;
- Avoiding or minimizing occupation of forestland;
- Shortening land using time;
- Arranging the construction period wisely;

### 1) Reducing permanent land acquisition

Reducing permanent land acquisition is mainly shown in the two plants. Under the premise of safe and economic operation, reasonable and smooth process, advanced process and scientific process procedure are preferred to enable the selection of smaller structure and construction components, in order to use smaller land. For this purpose, the following measures are taken:

- a. Modular design is used, and the processing system is optimized to reduce the footprint of each workshop. The plant involves composite construction, and workshops and modules are basis to construct a plant. Therefore, optimizing main processing systems, reducing the footprint of workshops and modules are addressing the source of space use.
- b. Arrange construction components in a systematic way. Try to reduce the number of construction components or buildings, and combine construction components or buildings of same or similar functions together, to reduce land use. Lay the buildings of similar functions into a group to extend the combination.
- c. Plan the plant area in a rational way, and strictly control the size of road, square and pipeline network. Partition the area based on site conditions and process procedures for a reasonable layout. Under the premise of meeting the prevention and protection requirements, corners and borders should be fully used. The length and width of pipelines, roads, and corridor should be shortened as much as possible. Strictly control the area of road and square. Try to use comprehensive pipe support and utility tunnel, and arrange pipelines or utility tunnels of same or similar functions close to each other for space saving.

With the above measures, the 2 components use 60 mu less space.

### 2) Water conservation

Water conservation is mainly shown in the 2 plants. Fresh water is a limited resource in Shanxi. Pursuant to industry policies of the state, air cooling steam turbine is used, and water is distributed in a rational way. The following water conservation measures are taken:

- a. All working water uses reclaimed water from water treatment plant. The two plants both use the reclaimed water respectively from two local plants.

- b. Waste steam cooling of steam turbine uses air cooling system, instead of the usual humid cooling system, saving 400m<sup>3</sup>/h water, as the humid cooling system incurs wind blowing, evaporation, and waste water discharge.
- c. The open cycling cooling water of auxiliary unit uses a cycling water system of main pipe structure on the mechanical draft cooling tower, so that the cycling water can be reused.
- d. The concentration ratio of auxiliary unit's cycling water is improved to reduce water discharge, and the 5m<sup>3</sup>/h discharge is reclaimed to the water system of the steam turbine, thus saving amount of 5m<sup>3</sup>/h fresh water.
- e. The water discharged from the cooling unit and the boiler is cycled for reuse.
- f. Treated as resource, waste water is reclaimed for reuse, which reduces the use of fresh water, as well as discharge of waste water.
- g. The mechanical draft cooling tower is equipped with water remover. It makes wind blowing loss reduce to 0.1% from 0.4%, saving 6m<sup>3</sup> water per hour in summer.
- h. The used living water is used for gardening and road spray after treatment, saving 4m<sup>3</sup> water per hour.

Water is repeatedly used through reasonable water using sequence and water treat process, so that the same amount of water is used more than one time for more than one purpose. In this way, less amount is used and less waste water is discharged.

### **3) Avoiding farmland and farming season, using less irrigated land and gardening land, and causing no disturbance**

To avoid farmland and farming season, to take less irrigated land and gardening land of higher profit, and to cause no disturbance, the project company takes the following measures:

- a. During pipeline route design and actual construction, the project company will try not to take farmland or try to take less farmland, and waste land is used with priorities. If it is inevitable to take the farmland, dry land is preferred over vegetable land, gardening land and forestland. As the pipeline is long, it is inevitable to take much land. The length of pipeline is an important element to consider when the design department compares the design schemes. For example, the Qingxu network select scheme 1 over scheme 2, because the former uses 40 mu less land, thus, saving construction time and eliminating adverse impact. In addition, the selected schemes of all components do not involve house relocation, and only a small amount of vegetable land and gardening land is taken. Statistics show, within temporary land acquisition, vegetable land accounts for 11.2%, gardening land 3.4%, forestland 3%.
- b. The width of required land is reduced to the minimum according to the category of the land. If the pipeline is to be buried in unused land, the width is generally 12m. In the vegetable land or gardening land, the width is reduced to 6m to 8m. In this way, less land is occupied and less households are affected.

- c. The construction time generally is before the early spring and after the harvest time. Even if some farmland is taken, in this way, planting and harvesting will not be affected.
- d. The land restoration will be ensured. Before construction, earth on ground surface of the farmland, forestland or grassland will be reserved for future restoration.
- e. When the network is laid in urban area, and the pipeline route is far away from the residential communities, there is generally no big construction machine to do the digging, and digging width is usually 1m wide. The operation time is short, and will not affect residents' work and life.

## 2. Natural, Economical and Social Development in Project Region

The sites where the 6 components are located belong to 4 cities, 6 counties, with 25 towns and 163 villages involved. The affected range of 2 CHP plants is concentrated, with only 2 counties and 7-8 villages affected. The 4 networks affect more regions, with the whole county, most towns and many villages involved.

For details, refer to Table 2-1.

**Table 2-1 Administrative divisions of counties, towns and villages involved**

| Component                                | City     | County    | Towns involved |   | Affected villages                                       | Remarks   |
|--|----------|-----------|----------------|---|---|---|
|  |          |           | Quantity       | Name  |   |   |
| Xiyang heat and power cogeneration plant | Jinzhong | Xiyang    | 2              | Dazhai, Zhaobi  | 9 villages, as Houzhuang                                | Defines where the project site is and what are affected |
| Baode heat and power cogeneration plant  | Xinzhou  | Baode     | 2              | Yangjiawan, Dongguan  | 7 villages, as Gucheng                                  |   |
| Changzhi gas pipeline network            | Changzhi | Changzhi  | 10             | Handian, Beicheng, Donghe, Bayi, Nansong, Yincheng, Xichi, Jiazhang, Sudian, Xihuo          | About 37 villages. For details, refer to Section 2.4.2. | Villages affected by the network                        |
| Xiangyuan gas pipeline network           |          | Xiangyuan | 11             | Guhan, Wangqiao, Houbao, Xiadian, Titing, Xiyang, Wangcun, Xialiang, Shanfu, Beidi, Shangma | About 41 villages. For details, refer to Section 2.4.2. | Villages affected by the network                        |
| Tunliu gas pipeline network              |          | Tunliu    | 8              | Xijiao, Linjiang, Shangcun, Heshenmiao, Zhangdian, Fengyi, Wuyuan, yuwu                     | About 47 villages. For details, refer to Section 2.4.2. | Villages affected by the network                        |
| Qingxu gas pipeline network              | Taiyuan  | Qingxu    | 2              | Xugou, Jixiangyi  | About 22 villages. For details, refer to Section 2.4.2. | Villages affected by the network                        |
| <b>Total</b>                             | <b>4</b> | <b>6</b>  | <b>35</b>      |   | <b>163</b>  |   |

## 2.1 Socioeconomic Development in Related Cities

Xiyang County, where the Xiyang CHP plant is located, belongs to Jinzhong city. Baode County, where the other plant is located, belongs to Xinzhou. Changzhi, Xiangyuan and Tunliu respectively where three networks are located are all subject to the governing of Changzhi city. Qingxu where the Qingxu network locates belongs to Taiyuan. Figure 2.1-1 shows the locations of the project sites, as well as cities.

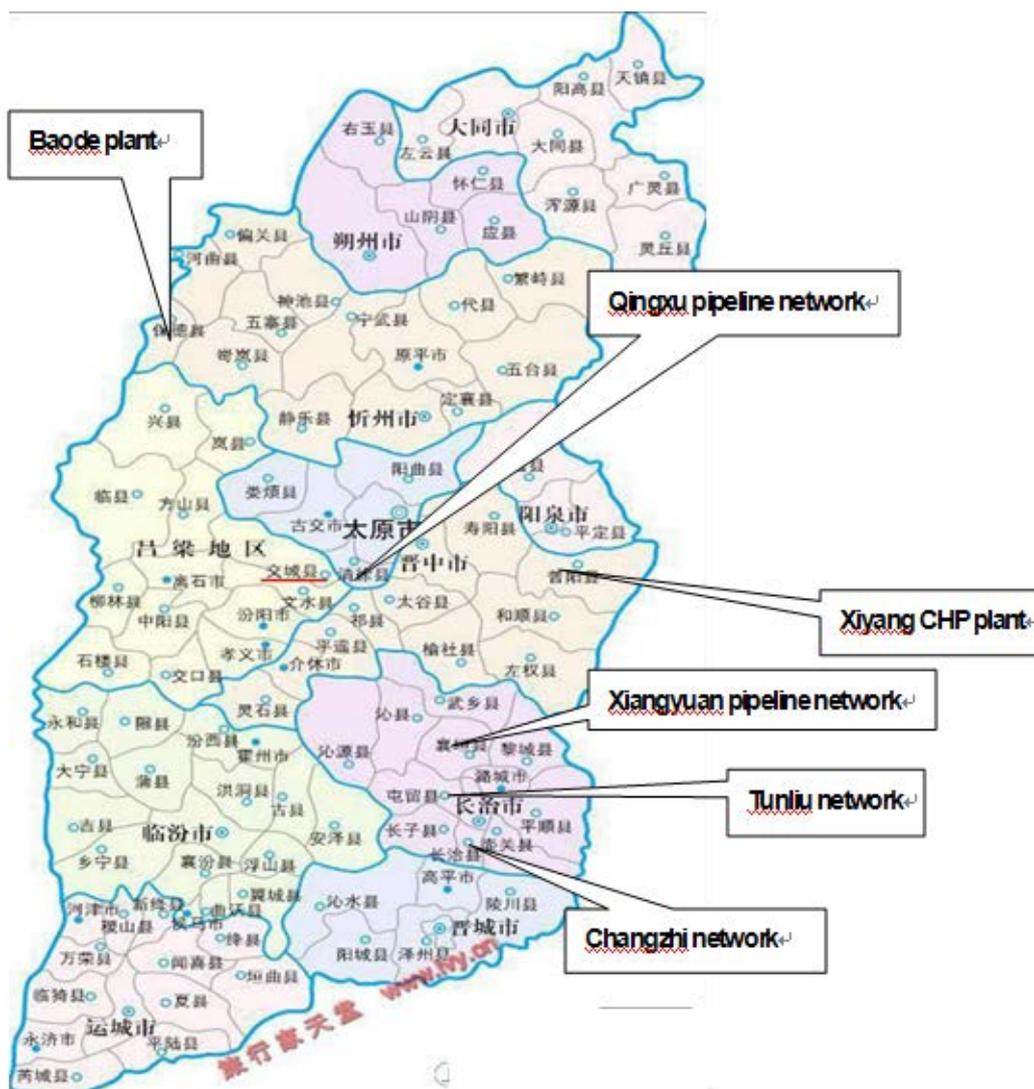


Figure 2.1-1 Sites of 6 components in Shanxi

### 2.1.1 Taiyuan

As the capital of Shanxi province, Taiyuan lies in the central of the province. On the north border of Taiyuan basin, it is at the intersection of the Tongpu railway and Shitai railway. Being the political, economic, science, culture, education, transportation, and information center, Taiyuan is one of mega-city

in China. It is divided into 6 districts, Yingze, Wanboli, Xinghualing, Jiancaoping, Jinyuan, and Xiaodian. It governs 3 counties (Qingxu, Yangqu, and Loufan), and one city (Gujiao). There are 51 sub-district offices, 493 community resident committees, 54 counties/towns, 1258 village committees, and 1805 natural villages. For natural, population, economical, and social development of Taiyuan in 2012, refer to Table 2.2-1.

### **2.1.2 Changzhi**

Changzhi city lies in the southeast of Shanxi, at the border between Shanxi, Hebei and Henan. On its east, lies the Taihang Mountain. On its west, is the Taiyue Mountain. It is next to the Linfen City on the west, and to the Jincheng City to the south. On the north, it is adjacent to the Jinzhong City. Changzhi City has 10 counties (Changzhi, Zhangzi, Tunliu, Huguan, Licheng, Pingshun, Xiangyuan, Wuxiang, Qinxian, and Qinyuan), 2 districts (urban area and suburb areas) and 1 county-level city (Lucheng). It holds 146 towns and 3507 villages. For natural, population, economical, and social development of Changzhi in 2012, refer to Table 2.2-1.

### **2.1.3 Jinzhong**

Jinzhong City lies in the middle of Shanxi. Taihang Mountain is on its east, and Fen River is on its west. It is adjacent to Taiyuan in the north. It governs one City (Jiexiu), one region (Yuci), 9 counties (Taigu, Qixian, Pingyao, Lingshi, Shouyang, Xiyang, Heshun, Zuoquan, and Yushe), Jinzhong development zone, and 118 towns.

For natural, population, economical, and social development of Jinzhong in 2012, refer to Table 2.2-1.

### **2.1.4 Xinzhou**

Xinzhou City locates in the middle of the north part of Shanxi. On its north, lies the Great Wall. It is adjacent to Datong and Suozhou Cities. On its west it faces Shaanxi Province and Inner Mongolia Region across the Yellow River. On its east, it neighbors with Hebei Province across the Taihang Mountain. In the south, it is adjacent with Taiyuan, Yangquan, and Lvliang Cities across Shilingguan. It governs 1 district, 1 city, 12 counties, 190 towns, 4893 villages. For natural, population, economical, and social development of Xinzhou in 2012, refer to Table 2.2-1.

Table 2.1-1 Natural, population, economic, and social development of Shanxi and its four cities in 2012

| Item   | Unit                        | Shanxi province | Taiyuan        | Jinzhong      | Changzhi       | Xinzhou        |
|--|-----------------------------|-----------------|----------------|---------------|----------------|----------------|
| <b>I Population</b>                            | <b>10,000</b>               | <b>3610.83</b>  | <b>425.63</b>  | <b>328.68</b> | <b>336.97</b>  | <b>309.9</b>   |
| Where: Male                                    | 10,000                      | 1850.96         | 215.18         | 169.23        | 172.88         | 160.6          |
| Female   | 10000                       | 1759.87         | 210.45         | 159.45        | 164.08         | 149.3          |
| Rate of two genders                            | %                           | 105.18          | 102.25         | 106.14        | 105.36         | 107.57         |
| Urban residents                                | 10,000                      | 1851.08         | 356.51         | 155.81        | 152.69         | 128.4          |
| Rural residents                                | 10,000                      | 1759.75         | 69.12          | 172.87        | 184.28         | 181.5          |
| Urbanization rate                              | %                           | 51.26           | 83.76          | 47.41         | 45.31          | 41.43          |
| <b>II Land area</b>                            | <b>10,000km<sup>2</sup></b> | <b>15.6</b>     | <b>0.6988</b>  | <b>1.64</b>   | <b>1.3896</b>  | <b>2.5</b>     |
| <b>III GDP</b>                                 | <b>CNY100,000,000</b>       | <b>12112.8</b>  | <b>2311.43</b> | <b>985.9</b>  | <b>1328.6</b>  | <b>620.9</b>   |
| 1. Added value of primary industry             | CNY100,000,000              | 697.9           | 36.02          | 83.2          | 53.5           | 58.7           |
| Ratio of primary industry                      | %                           | 5.8             | 1.56           | 8.4           | 4.0            | 9.4            |
| 2. Added value of secondary industry           | CNY 100,000,000             | 7009.1          | 1035.57        | 538.7         | 894.9          | 319.0          |
| Ratio of secondary industry                    | %                           | 57.8            | 44.80          | 54.7          | 67.4           | 51.4           |
| 3. Added value of tertiary-industry            | CNY 100,000,000             | 4405.9          | 1239.84        | 364.0         | 380.2          | 243.2          |
| Ratio of tertiary-industry                     | %                           | 36.4            | 53.64          | 36.9          | 28.6           | 39.2           |
| <b>IV Per Capita GDP</b>                       | <b>CNY</b>                  | <b>33628</b>    | <b>54440</b>   | <b>30073</b>  | <b>39523</b>   | <b>20081</b>   |
| <b>V Financial revenue</b>                     | <b>CNY100,000,000</b>       | <b>2650.4</b>   | <b>454.49</b>  | <b>210.4</b>  | <b>302.1</b>   | <b>144.2</b>   |
| <b>VI Cultivating area</b>                     | <b>10,000 hectares</b>      | <b>379.6</b>    | <b>8.18</b>    | <b>27.78</b>  | <b>25.39</b>   | <b>42.64</b>   |
| <b>VII Grain yield</b>                         | <b>10,000 tons</b>          | <b>1274.1</b>   | <b>31.95</b>   | <b>169.5</b>  | <b>159</b>     | <b>163.42</b>  |
| <b>VIII Urban per capita disposable income</b> | <b>CNY</b>                  | <b>20411.7</b>  | <b>22587</b>   | <b>21409</b>  | <b>22548.9</b> | <b>18317.9</b> |
| <b>IX Rural per capita net income</b>          | <b>CNY</b>                  | <b>6356.6</b>   | <b>10079</b>   | <b>7936</b>   | <b>8120</b>    | <b>4776</b>    |

## **2.2 Socioeconomic Development in Related Counties**

The two plants locate at Xiyang and Baode Counties. The 4 networks locate respectively at Changzhi, Xiangyuan, Tunliu and Qingxu Counties.

### **2.2.1 Xiyang**

Xiyang County locates in the east of Jinzhong City, to the west of Taihang Mountain. It is 1954km<sup>2</sup> in area, with hills accounting for more than 94% of the area. On the east, it is adjacent with Jingxing, Zhanhuang, Neiqiu of Hebei province. On the west, it neighbors with Shouyang County. On the south, it is close to Heshun. On the north, it neighbors with Pingding. Xiyang lies 149km away from Taiyuan, and 130km away from Jinzhong. It governs 5 towns, 7 townships, and 335 villages. At the end of 2012, it had 229,100 permanent residents.

Xiyang is a grain production base, ecological agriculture demonstration base, important coal producing base, and culturally advanced county. It ranks in the top within the whole province in new socialist new-village building. It is at the convergence of “Great Taiyuan Economic Zone” and the “Economic Zone around Bohai”. Its location is superior, with convenient traffic. The Shitai railway and the Taijiu highway run close to it. The Yangshe railway, 207 national highway, and 317 provincial highway run across it.

For natural, population, economical, and social development of Xiyang in 2012, refer to Table 2.2-1.

### **2.2.2 Baode**

Baode County locates in the northwest of Shanxi, on the west slope of north range of Lvliang Mountain, and on the eastern edge of Loess Plateau. It neighbors with Kelan County on the east, and faces Fugu county of Shaanxi province across the Yellow River. It adjoins Hequ County in the north, and Xing County in the south. The Shenshuo railway, Wubao highway, Shenbao level II highway, and main highway along Yellow River River run through the county. It acts as a vital link between the northwest of Shanxi and Shaanxi and Inner Mongolia. The county totals 997.5km<sup>2</sup>. It governs 4 towns, 9 townships, and 343 villages. At the end of 2012, permanent residents reached 162,037.

Baode boasts rich mineral resources, among which coal, iron, bauxite, sulfur, limestone, and Kaolin reserves have been verified. Its coal resource is richly endowed, with the advantage of good quality, shallow bury, less impurities, and easy mining. Baode grows grain, millet, potatoes, soybean, sorghum, and corn as food grains. It also grows yellow mustard, flax, herbaceous plant and various other vegetables. For natural, population, economical, and social development of Baode in 2012, refer to Table 2.2-1.

### 2.2.3 Changzhi

Changzhi County locates in the southeast of Shanxi Province, at the foot of west range of Taihang Mountain, and in the south of Shangdang basin. It totals 483km<sup>2</sup>, governing 6 towns, 5 townships, 2 districts and 254 villages. At the end of 2012, it had 343,500 permanent residents.

With its favorable location, Changzhi County provides convenient transportation. It borders with Changzhi City in the north, with Jincheng City in the south. The 207 national highway, Changjin highway, Changlin road, and Taijiao railway runs across the county from the south to the north, and the Chang'an highway and the Zhongnan railway traverse the county in the east and west direction.

Changzhi boasts rich coal resource, providing a sound base for industries. It is endowed with 395km<sup>2</sup> coal, with 4.85 billion tons verified and 4 billion tons recoverable deposits. It is among Top 100 Coal Producing Counties. It holds 6 coal backbone enterprises (Jingfang, Sanyuan, Yangtouling, Xiongshan, Liansheng, and Jinmei), 30 reserved coal mines, 4 10-billion RMB enterprises (Zhendong Group, Chenggong Automobile, Yitong Neodymium magnet, Rishengda Solar Glass), Sino-Germany Pipeline, Huapeng Aluminum Plastic, Sente Heavy Machine, and Huatai Concrete. In those enterprises, Zhendong Group has been listed in Shenzhen Stock Exchange's Growth Enterprise Board (GEB).

Changzhi is a county of long history with profound and deep-root culture. It is titled with Yandi Hometown, Coal and Iron's Land, and Capital of Town God. In recent years, Changzhi has made rapid progress in economic construction, urban construction, socialist new-village building, and social undertakings. It is granted with many honors – national model for population and family planning work, cultural model, science model, ecological culture model, and national-level clean city. For natural, population, and socioeconomic development of Changzhi in 2012, refer to Table 2.2-1.

### 2.2.4 Xiangyuan

Xiangyuan lies in the southeast of Shanxi, at the foot of Taihang Mountain, and in the north of Shangdang basin. It adjoins with Licheng in the east, Qinxian in the west, Lucheng, Changzhi suburb and Tunliu in the south, and Wuxiang in the north. It totals 1160km<sup>2</sup>, governing 8 towns, 3 townships, 323 villages. At the end of 2012, its population reached 273,400.

Xiangyuan provides convenient transportation, with Taijiao railway, 208 national highway, provincial Yuchang highway, and Taichang highway traveling through it from south to north.

Being one of national grain bases, Xiangyuan is abundant in output. It is endowed with rich natural resources, with coal, earth and water being its 3 cutting edges. It boasts 7.58 billion tons of coal, with 2.2 billion tons recoverable. It has 590,000 mu farmland, and 800,000 mu barren hills. Three mainstreams, Xizhang - Nanzhang and Beizhang, and more than 10 branch rivers (such as Shishui, Guoshui and Haoshui) travel through the county, with

the total length reaching 90.5km. There are 14 water reservoirs, and rich underground water. It is rich in water among the counties in North China Region. Xiangyuan chooses coke, chemical industry, and building materials as its main industries, with coke being the leading role, about 80% of the economic size. For natural, population, and socioeconomic development of Xiangyuan in 2012, refer to Table 2.2-1.

### **2.2.5 Tunliu**

Tunliu County locates in the southeast of Shanxi, west side of Shangdang basin. It totals 1,142km<sup>2</sup>, governing 4 countries, 7 towns, 2 development zones, 1 industry zone, and 295 villages. At the end of 2012, its population reached 266,900.

Its location is favorable, with 208 and 209 national highways, Changtai and Changhan highways travelling through the entire county. The terrain is higher in the west, and lower in the east, with plains, hills and mountain area dividing equally in area. It has 554,000 mu farmland (including 120,000 mu irrigated land), 400,000 mu hillsides that are fitful for forest growing, and 370,000 mu sloping pasture. It is richly endowed with agriculture, forestry and pasture conditions.

Tunliu is rich in coal resource, with 938km<sup>2</sup> coal mine, 14.6 billion tons of it verified. It is one of fine coal producing bases in Shanxi. It also has 484,000 tons of verified mangiferous iron ore and 0.18 billion m<sup>3</sup> violet sand earthenware clay.

Besides its rich resources, Tunliu is a former revolutionary area with history relics. Since 2007, it has been evaluated as “Science Model County” by the National Science Department 5 times. It is awarded by the National Agriculture Department as “Advanced in Grain Production”. It is listed among Top 100 Counties of Farm Machinery. It is honored with the title of “Provincial-Level Garden City”, and “Provincial Forestation Model”.

For natural, population, and socioeconomic development of Tunliu in 2012, refer to Table 2.2-1.

### **2.2.6 Qingxu**

Qingxu County locates in the middle of the Shanxi, on the south of Taiyuan city. It adjoins with Taiyuan in the north, with Yuci and Taigu in the east, with Qixian and Wenshui in the south, with Gujiao and Jiaocheng in the west. It is situated at the foot of the hill, and faces the river. It provides convenient transportation. It totals 609km<sup>2</sup>, governing 4 towns, 5 countries and 1 sub-district office. By the end of 2012, it had population of 346,900.

Qingxu is endowed with rich resources and local specialties. The Fen River stretches through the county where rivers and streams are densely distributed. It enjoys good reputation of “Land of grapes and vinegar and land of fish and rice”, as well as “land of springs and lakes”, and “city of ancient culture”. Guided by the idea of “quality grain, fine vegetable, starting grape gardening,

strengthening husbandry, and paying attention to processing”, Qingxu has developed 4 main industries – grain, vegetables, husbandry, and fruits. According to the strategies of marketing the vegetables within Shanxi, and grapes to Pingchuan, Qingxu concentrates its efforts for deployment of high-quality agriculture demonstration projects and accelerates the pace of agricultural industrialization. For the industry, a framework with multiple elements, such as food processing, building materials, casting, char, chemical engineering, machinery, and metallurgy has come into being. Now it is the biggest producing base in China for heating radiators, magnesium smelting, and vinegar. It has also become one of producing bases for metallurgical coke. Of recent years, its tertiary industry featured by tourism, transportation and trade has flourished. It ranks No. 1 among the whole province in the field of transportation. Its tourism programs of Chinese culture, grape culture, vinegar culture, festival entertainment activities have made it a hot spot. Its overall economic strength enables it to be listed among Top Ten Counties in China. For natural, population, and socioeconomic development of Qingxu in 2012, refer to Table 2.2-1.

**Table 2.2-1 Economic and Social Development of Involved Counties**

| Item                                 | Unit                  | Xiyang          | Baode           | Changzhi       | Xiangyuan      | Tunliu       | Qingxu        |
|--------------------------------------|-----------------------|-----------------|-----------------|----------------|----------------|--------------|---------------|
| <b>I Population</b>                  | <b>10,000</b>         | <b>22.9</b>     | <b>16.20</b>    | <b>34.35</b>   | <b>27.34</b>   | <b>26.69</b> | <b>34.69</b>  |
| Male                                 | 10,000                |                 | 8.67            | 17.07          | 14.34          | 13.53        | 17.54         |
| Female                               | 10,000                |                 | 7.54            | 17.28          | 13.0           | 13.16        | 17.15         |
| Rate of two genders                  | Female=100            |                 | 115             | 98.78          | 110.31         | 102.78       | 102.3         |
| Urban residents                      | 10,000                | 6.87            | 5.70            | 10.6           | 11.28          | 8.78         | 10.2          |
| Rural residents                      | 10,000                | 16.02           | 10.51           | 23.8           | 16.06          | 17.91        | 24.49         |
| Urbanization rate                    | %                     | 30.02           | 35.16           | 30.85          | 41.25          | 32.9         | 29.41         |
| <b>II Land area</b>                  | <b>km<sup>2</sup></b> | <b>1954</b>     | <b>997.5</b>    | <b>483</b>     | <b>1160</b>    | <b>1142</b>  | <b>609</b>    |
| <b>III GDP</b>                       | <b>CNY100,000,000</b> | <b>51.1</b>     | <b>72</b>       | <b>185.5</b>   | <b>226.65</b>  | <b>112.4</b> | <b>117.49</b> |
| 1. Added value of primary industry   | CNY 100,000,000       | 3.71            | 3.2             | 5.7            | 5.9            | 6.1          | 13.39         |
| Ratio of primary industry            | %                     | 7.3             | 4.4             | 3.1            | 2.6            | 5.4          | 11.4          |
| 2. Added value of secondary industry | CNY100,000,000        | 30.99           | 56.1            | 134.5          | 183.51         | 90.5         | 73.89         |
| Ratio of secondary industry          | %                     | 60.6            | 78              | 72.5           | 81             | 80.5         | 62.9          |
| 3. Added value of tertiary-industry  | CNY 100,000,000       | 16.4            | 12.7            | 45.3           | 37.24          | 15.8         | 30.21         |
| Ratio of tertiary-industry           | %                     | 32.1            | 17.6            | 24.4           | 12.0           | 14.1         | 25.7          |
| <b>IV Per Capita GDP</b>             | <b>CNY</b>            | <b>22325</b>    | <b>44584</b>    | <b>53933</b>   | <b>83062</b>   | <b>42163</b> | <b>33915</b>  |
| <b>V Financial revenue</b>           | CNY 100,000,000       | <b>12.72</b>    | <b>19.2</b>     | <b>57.3</b>    | <b>40.2</b>    | <b>16.05</b> | <b>14.39</b>  |
| <b>VI Cultivating area</b>           | <b>10,000 mu</b>      | <b>44.1</b>     |                 |                | <b>64.1</b>    |              | <b>43.38</b>  |
| <b>VII Grain Planted Areas</b>       | <b>Hectare</b>        | <b>23689.53</b> | <b>22151.34</b> | <b>19623.3</b> | <b>31133.8</b> | <b>34785</b> | <b>20525</b>  |
| <b>VIII Grain Yield</b>              | <b>10,000 tons</b>    | <b>14.98</b>    | <b>3.87</b>     | <b>14.27</b>   | <b>16.62</b>   | <b>24.1</b>  | <b>11.76</b>  |
| <b>IX Urban per capita Income</b>    | <b>CNY</b>            | <b>16924</b>    | <b>19309</b>    | <b>21391</b>   | <b>23250</b>   | <b>18098</b> | <b>21671</b>  |
| <b>X Rural Per Capita Income</b>     | <b>CNY</b>            | <b>5367</b>     | <b>4570</b>     | <b>10557</b>   | <b>9414</b>    | <b>9581</b>  | <b>11633</b>  |

## 2.3 Towns Involved

The two CHP plants only involve 2 towns each. The 4 gas networks involve 31 towns.

### 2.3.1 Towns Involved by the CHP Plants

The Xiyang plant involves only Dazhai and Zhaobixiang Towns. The Baode plant involves only Yangjiawan and Dongguan Towns. As Zhaobixiang and Dongguan are related a little to the project, the impact is slight. Therefore, they are not described in detail in this report.

#### 1) Dazhai Town

Dazhai Town locates on the south end of Xiyang. It totals 183km<sup>2</sup>, governing 61 villages and 13554 households, 35193 people. As the second town of Xiyang, Dazhai has 41,970 mu farmland, 1.2 mu per person.

Since the reform and opening up, complete changes have taken place in Dazhai on ideas, development philosophy, and operation methods. Its agricultural activities have turned to pursuit of quality and profit from pursuit of quantity. The development of rural economy does not rely on crop farming only, but on harmonious development with tertiary industry. By the end of 2012, the total income reached 1.005 billion RMB, in which the primary industry accounts for 8.3%, the secondary industry 39.3%, and the tertiary industry 52.4%. The average income for each farmer was 6287 RMB.

During the process of agriculture and rural economy development, Dazhai has mustered all its efforts to improve the working, ecological and living environment under the strategy of “project construction”. For agriculture development, it has built 5 key water distribution systems to bring water to the dry land. To build high-output and high-efficiency farmland, it have implemented 3 integrated agricultural projects, taking advantage of the Western Development Program and the opportunity that the state encourages conversion of cropland to forest. It devotes all its efforts to grow commercial forest, ecological forest and small trees. It has grown 3,800 mu small trees of hundreds of types. More than 14,000 mu cropland has been converted back to forest, making the forest coverage reaching more than 21%. To improve public facilities in village and to uplifting people’s life, it has built TV, telecommunication and transportation networks. Now phone calls can reach all villages, villagers can watch TV at home, and concrete road can lead to all villages. For socioeconomic development of Dazhai in 2012, refer to Table 2.3-1.

#### 2) Yangjiawan Town

Yangjiawan is one of the 4 towns governed by Baode. It is on the north part of Baode, 10km away from the county. It adjoins Qiaotou town in the east, Hanjiachuan in the south. It faces Qileng town of Fugu county, Shaanxi across the Yellow River. In the north, it neighbors with Dongguan town. It governs 25 villages, 11,820 residents. All of them are of Han people. Within the total

population, 6,207 are male, and 5,613 are female. The gender rate is 110.58. The administrative area totals 66.6km<sup>2</sup>, with 19500 mu farmland, 1.6 mu per person. It has 14,025 dry land and 5,475 irrigated land. It mainly produces maize, grain and potatoes. It also produces apples, pears and peaches.

Yangjiawan is an important CBM development base. Petro China has explored and developed CBM in 21 villages. Now the project has entered pipeline network installing and collection phase. The biggest aluminum industry base in Shanxi, the Tongde aluminum oxide project, is under construction in tight schedule. After the commissioning, it is estimated that the output will reach 8 billion RMB, with 1.2 billion profit and tax.

In 2012, the total income of the town was 92.49 million RMB, in which the primary industry accounts for 47.41%, the secondary industry 1.81%, and the tertiary industry 50.78%. The average income for each farmer is CNY4,850. For socioeconomic development of Yangjiawan in 2012, refer to Table 2.3-1.

**Table 2.3-1 Economical and social development of Dazhai and Yangjiawan in 2012**

| Item  | Unit                  | Overview |            |
|---|-----------------------|----------|------------|
|   |                       | Dazhai   | Yangjiawan |
| <b>I Population and labor force</b>               |                       |          |            |
| 1. Total households                               |                       | 13554    | 3800       |
| 1.1 Five-guarantee household                      |                       | 326      | 62         |
| 1.2 Low income household                          |                       | 977      | 965        |
| 2. Total population                               |                       | 35193    | 11820      |
| 2.1 Agricultural population                       |                       | 32932    | 11700      |
| 2.2 Non-agricultural population                   |                       | 2261     | 100        |
| 2.3 Female  |                       | 17057    | 5613       |
| 2.4 Low income people                             |                       | 1493     | 1176       |
| 2.5 Five-guarantee people                         |                       | 326      | 70         |
| 3. Total labor force in villages                  |                       | 20300    | 7100       |
| 3.1 Total agricultural labor force                |                       | 12000    | 5000       |
| 3.2 Total industrial and construction labor force |                       | 4600     | 600        |
| 3.3 Total commercial and service labor force      |                       | 3700     | 1500       |
| <b>II Land area</b>                               | <b>km<sup>2</sup></b> | 183      | 66.6       |
| <b>III Total rural income</b>                     | <b>CNY10,000</b>      | 100500   | 9249       |
| 1. Agricultural income                            | CNY10,000             | 5891     | 4230       |
| 2. Forest income                                  | CNY10,000             | 328      | 70         |
| 3. Pasture income                                 | CNY10,000             | 2119     | 85         |
| 4. Industrial income                              | CNY10,000             | 38852    | 110        |
| 5. Construction income                            | CNY10,000             | 648      | 57         |
| 6. Transportation income                          | CNY10,000             | 22411    | 4519       |
| 7. Catering industry                              | CNY10,000             | 15003    | 27         |
| 8. Service income                                 | CNY10,000             | 6781     | 151        |

|   |           |            |       |
|---|-----------|------------|-------|
| 9. Others                                     | CNY10,000 | 8467       |       |
| <b>IV Farmland and crop output</b>            |           |            |       |
| 1. Farmland                                   | Hectare   | 2798       | 1300  |
| 2. Crop output                                | Ton       | 13797      | 3400  |
| 3. Crop owned by each person                  | Kg        | 392        | 285.2 |
| 4. Farmland owned by each agricultural person | Mu        | 1.27       | 1.5   |
| <b>VI Average net income of each farmer</b>   |           |            |       |
|   |           | <b>CNY</b> | 6287  |
| <b>VII Cooking and Heating recourse</b>       |           |            |       |
| 1. Households mainly using coal               |           | 11683      | 2620  |
| 2. Households mainly using gas                |           | 245        |       |
| 3. Households mainly using electricity        |           | 1626       | 1230  |

### 2.3.2 Towns Covered by the Pipeline Networks

#### 1) Towns covered by the Changzhi network

Figure 2.3-1 shows the distribution of the Changzhi network. As the figure shows, the network covers 10 towns, 77% of the total 13 town. For basic information of each town, refer to Table 2.3-2.

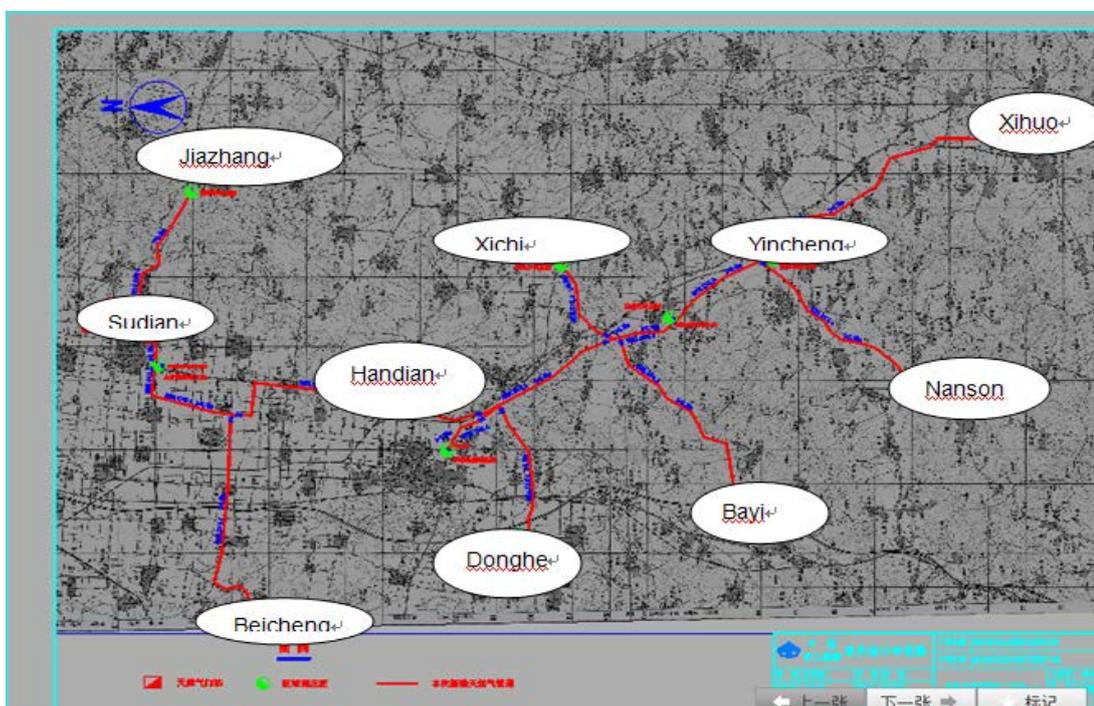


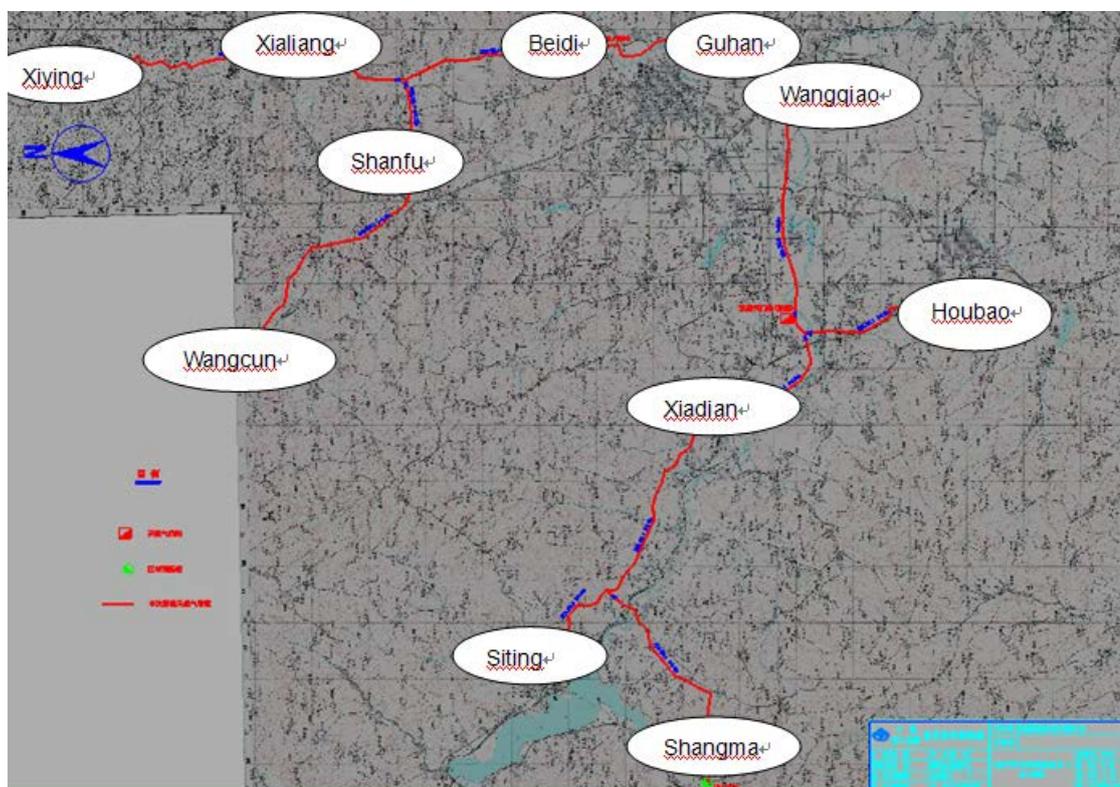
Figure 2.3-1 Towns covered by the Changzhi network

**Table 2.3-2 Basic information of towns covered by the Changzhi network**

| Town     | Land area (km <sup>2</sup> ) | Number of governing villages | Population (10,000) |
|----------|------------------------------|------------------------------|---------------------|
| Handian  | 43.7                         | 19                           | 5                   |
| Dudian   | 37                           | 14                           | 4.2                 |
| Beicheng | 32                           | 16                           | 2.2                 |
| Donghe   | 19                           | 8                            | 2.1                 |
| Bayi     | 33                           | 20                           | 1.9                 |
| Nansong  | 28                           | 9                            | 1.8                 |
| Yincheng | 42                           | 23                           | 4.7                 |
| Xihuo    | 30                           | 33                           | 2.5                 |
| Xichi    | 19                           | 11                           | 2.41                |
| Jiazhang | 29                           | 13                           | 1.63                |

**2) Towns covered by the Xiangyuan network**

Xiangyuan network's users are mainly from the central urban area and peripheral towns. Figure 2.3-2 shows the distribution of the network. As shown in the figure, the network covers all 11 towns of the county. For basic information of each town, refer to Table 2.3-3.



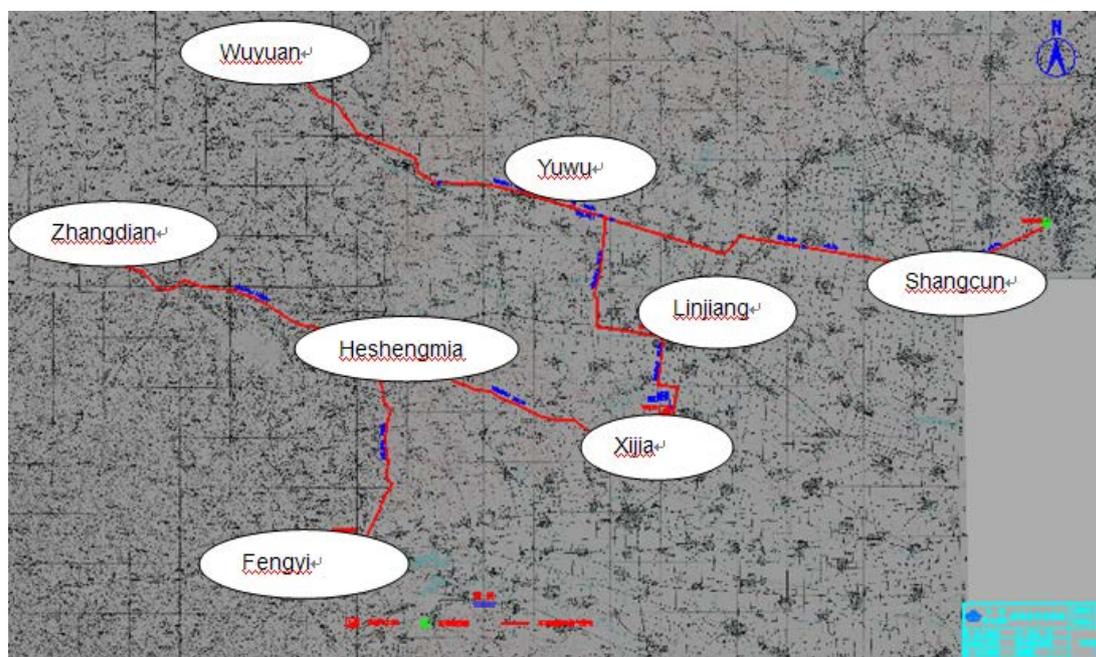
**Figure 2.3-2 Towns covered by the Xiangyuan network**

**Table 2.3-3 Basic information (2011) of towns covered by the Xiangyuan network**

| Town     | Land area (km <sup>2</sup> ) | Number of governing villages | Population (10,000) | Total income of villages (CNY100,000,000) | Average net income per farmer (CNY) |
|----------|------------------------------|------------------------------|---------------------|---|-------------------------------------|
| Wangqiao | 92.64                        | 23                           | 3.46                | 9.89                                      | 8127                                |
| Guhan    | 121.14                       | 44                           | 7.87                | 21.34                                     | 8970                                |
| Houbao   | 80.29                        | 27                           | 3.58                | 3.76                                      | 8080                                |
| Xiandian | 145.8                        | 51                           | 2.04                | 4.52                                      | 7281                                |
| Siting   | 130.56                       | 30                           | 1.58                | 1.42                                      | 6736                                |
| Xiyiing  | 59.84                        | 23                           | 1.07                | 2.16                                      | 6822                                |
| Wangcun  | 141.04                       | 27                           | 1.48                | 1.54                                      | 6221                                |
| Xialiang | 172.05                       | 33                           | 1.63                | 5.18                                      | 8200                                |
| Shanfu   | 38.89                        | 16                           | 0.92                | 3.50                                      | 8574                                |
| Beidi    | 71.32                        | 17                           | 0.79                | 1.55                                      | 7159                                |
| Shangma  | 96.08                        | 22                           | 0.77                | 0.85                                      | 6262                                |

### 3) Towns covered by the Tunliu network

Tunliu network's users come from the peripheral villages. Figure 2.3-3 shows the distribution of the network. As shown in the figure, the network covers 8 towns of the county, 73% of the total 11 towns. For basic information of each town, refer to Table 2.3-4.



**Figure 2.3-3 Towns covered by the Tunliu network**

Table 2.3-4 Basic information (2011) of towns covered by the Tunliu network

| Town       | Land area (km <sup>2</sup> ) | Number of governing villages | Population (10,000) | Total income of villages (CNY100,000,000) | Average net income per farmer (CNY) |
|------------|------------------------------|------------------------------|---------------------|---|-------------------------------------|
| Xijiang    | 59.47                        | 16                           | 1.3974              | 1.067                                     | 7638.5                              |
| Linjiang   | 60.35                        | 28                           | 4.15                |   | 9050                                |
| Heshenmiao | 83.85                        | 31                           | 1.8                 | 1.52                                      | 6811                                |
| Zhangdian  | 294                          | 36                           | 2.1                 | 1.42                                      | 4937                                |
| Fengyi     | 63.26                        | 23                           | 0.95                |   | 6300                                |
| Yuwu       | 66.5                         | 33                           | 1.8                 |   | 9257                                |
| Wuyuan     | 68.5                         | 15                           | 1.64                | 1.43                                      | 7891                                |
| Shangcun   | 59                           | 20                           | 2.1                 | 4.5                                       | 8050                                |

4) Towns covered by the Qingxu network

Qingxu network's users are mainly part of residents in Jiyi Town and some industry users. Figure 2.3-4 shows the distribution of the network. As shown in the figure, the network covers 2 towns of the county, 22% of the total 9 towns. For basic information of each town, refer to Table 2.3-5.

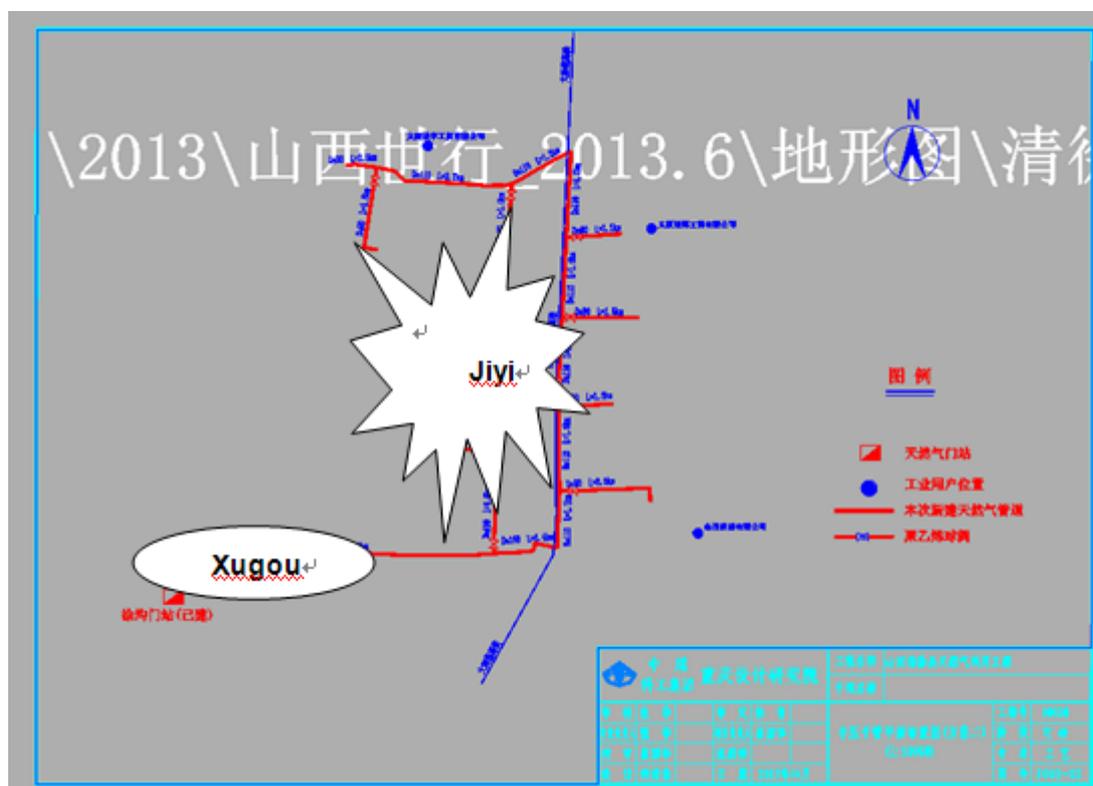


Figure 2.3-4 Towns covered by the Changzhi network

**Table 2.3-5 Basic information of towns covered by the Qingxu network**

| Town  | Land area (km <sup>2</sup> ) | Number of governing villages/community committees | Population (10,000) | Total income of villages (CNY100,000,000) | Average net income per farmer (CNY) |
|-------|------------------------------|---|---------------------|---|-------------------------------------|
| Xugou | 83.85                        | 28/1  | 4.51                | 12.112                                    | 11730                               |
| Jiyi  | 56                           | 20  | 2.7                 | 8.11                                      | 10675                               |

## 2.4 Affected Villages

### 2.4.1 Villages Affected by the 2 Plants

One plant locates at Houzhuang village (and a small part of land acquisition also involves with Houlongfengnao Village) Dazhai town, Xiyang County. The other locates at Gucheng village, Yangjiawan town, Baode County.

#### 1) Houzhuang village

Houzhuang lies 1.5km away from the southeast of the county, with the county road passing through. The village has 249 households, 587 residents. It has 304 labors (including both men and women). 280 people are employed. The village has 950 mu farmland, 1.7 mu for each person. In 2012, the average net income is more than CNY5,000.

The income of the family sources from farming and employment. The village mainly has dry land, generally growing maize. The net income for each mu of farmland is 800 to 1000 yuan. The villagers also grow cash crops, such as small trees and walnut trees. Young man adults mainly work in coal mine nearby for 8-9 months a year, with an annual income of about 20,000 yuan. Some people work in the sector of transportation, construction, and catering service, with an annual income of CNY15,000 to 20,000. 10 people of elder age work in the tree farm, with an annual income of about CNY15,000. We are told 5% of families make higher income, whose annual net income is above CNY50,000. 75% of families have medium net income, about 20,000 yuan a year. 20% of families have lower net income, about CNY10,000 a year. For socioeconomic information of Houzhang in 2012, refer to Table 2.4-1.

#### Houlongfengnao Village

Houlongfengnao lies to the northeast of Houzhuang Village. The village has 273 households, 642 residents. The total land holding is 1230 mu, averaging 1.92 mu per capita. There are 300 labors (including both men and women). 190 of them are engaging in farming, accounting for 63%, 10 on industry or 3.33%, 30 on construction, or 10%, 30 on transportation or 10%, and 40 on catering and service, or 13%. Like the situation in Houzhuang, majority of their income come from farming and migrant works, with 35% from planting and 65% from non-farm activities. In 2012, the average net income is CNY4300. For socioeconomic information of Houlongfengnao in 2012, refer to Table 2.4-1.

### 3) Gucheng village

Gucheng village lies 7km away from the southwest of the county. It has 190 households, 553 people. It has 293 labors (including both men and women). 250 people are employed. The village has 160 mu farmland, in which 700 mu is irrigated land, 900 mu is dry slope land. Averagely each person has 2.89 mu. In 2012, the average net income is more than CNY5,500.

The income of the family sources from farming and employment. Gucheng is beside the Huanghe River. It has 700 mu irrigated land on the beach. If vegetables are growing in the irrigated land, the average net income per mu can reach CNY3,000. Generally millet, grain, and beans are grown in dry flat land and dry slope land. The average net income per mu for dry flat land can reach CNY500 to 600, for dry slope CNY 400 to 500. Gucheng is convenient in transportation. On the west of village, along the Huanghe river is the 249 provincial highway. The Yushang highway lies on the south of village. Most man adults work in the transportation sector, and more than 30 young people work in the county mainly as welders, trade men, waiters/waitresses. Some work in sand digging. Based on our survey, about 10% of families have higher income, with a net income of CNY 50,000 to 100,000. They mainly work in transportation. About 75% families have medium income, averagely 5000 to 6000 for each person. The income mainly comes from vegetable growing and employment. Less than 15% families have lower income, an average net income of 3000 for each person per year. Such families are mainly lack of labor or there is a sick person in the family. For socioeconomic information of Gucheng in 2012, refer to Table 2.4-1.

**Table 2.4-1 Socioeconomic information of Houzhuang and Gucheng in 2012**

|                                | Item   | Unit     | Basic information     |         |                    |
|--------------------------------|--|----------|-----------------------|---------|--------------------|
|                                |  |          | Houzhuang             | Gucheng | Houlongfeng<br>nao |
| Household and number of people | Households                                     |          | 249                   | 190     | 273                |
|                                | Number of people                               |          | 587                   | 553     | 642                |
|                                | Where: Male                                    |          | 304                   | 281     | 330                |
|                                | Female   |          | 283                   | 272     | 312                |
|                                | Where: Ethnic minority families                | Ethnic   | Households/<br>People |         |                    |
|                                | Families with women as housemaster             |          | Households/<br>People | 7/30    |                    |
|                                | Five-Guarantee families                        |          | Households/<br>People | 3/3     | 2/2                |
|                                | Low-income families                            |          | Households/<br>People | 21/28   | 35/57              |
|                                |  |          |                       |         | 5/5                |
|                                |  |          |                       |         | 23/32              |
| Labor and employment           | Total labor                                    |          | 304                   | 293     | 300                |
|                                | Where: Male                                    |          | 161                   | 192     | 165                |
|                                | Female   |          | 143                   | 101     | 135                |
|                                | Employed people                                |          | 280                   | 250     | 300                |
|                                | Where: Farming, forestry, pasture, and fishing | Farming, | Persons               | 112     | 135                |

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|                 |                               |                       |          |   |      |
|-----------------|-------------------------------|-----------------------|----------|---|------|
|                 | Industry                      | Persons               | 96       |   | 10   |
|                 | Construction                  | Persons               | 30       | 10  | 30   |
|                 | Transportation                | Persons               | 22       | 50  | 30   |
|                 | Catering service              | Persons               | 20       | 20  | 40   |
|                 | Others                        | Persons               |          | 35  |      |
| Land and output | Total agricultural land       | Mu                    | 950      | 1657                                      | 1998 |
|                 | Where: Farmland               | Mu                    | 950      | 1600<br>(including 700 mu irrigated land) | 1230 |
|                 | land                          |                       |          |   |      |
|                 | Gardening                     | Mu                    |          |   |      |
|                 | Forest land                   | Mu                    |          | 57  | 768  |
|                 | Grassland                     | Mu                    |          |   |      |
|                 | Other agricultural land       | Mu                    |          |   |      |
|                 | Total crop output             | Ton                   | 250      | 62  | 280  |
|                 | Income per mu of main crop    | CNY                   | 1300     | 1000 - 4000                               | 1300 |
|                 | Net income per mu of farmland | CNY                   | 800-1000 | 400 - 3000                                | 1000 |
| Income          | Total income                  | CNY10,000             | 295      | 312.5                                     | 278  |
|                 | Where: Agriculture:           | CNY10,000             | 50       | 150                                       | 98   |
|                 | Industry                      | CNY10,000             | 170      |   | 20   |
|                 | Construction                  | CNY10,000             | 30       | 30  | 60   |
|                 | Transportation                | CNY10,000             | 35       | 92.5                                      | 60   |
|                 | Catering service              | CNY10,000             | 10       | 40  | 40   |
|                 | Others                        |                       |          | 17.5                                      |      |
|                 | Residents' living             | Net income per person | CNY      | 5000                                      | 5500 |
|                 | Living area per person        | M <sup>2</sup>        | 25       | 21  | 30   |

## 2.4.2 Villages Affected by the Pipeline Networks

Many villages are affected by the 4 pipeline networks. For more information, refer to Table 2.4-2 - 2.4-5.

### 1) Villages affected by the Changzhi network

The Changzhi network affects 37 villages. For more information, refer to Table 2.4-2.

**Table 2.4-2 Villages affected by the Changzhi pipeline network**

| Line   | Length (km) | Towns covered | Villages affected   |
|--|-------------|---------------|---|
| West main line: portal station – regulator at Beicheng | 10.4        | Sudian        | Suandian, Haodian, East Shenjiazhuang, West Shenjiazhuang |
|  |             | Handian       | Linyi, Baocun   |
|  |             | Beicheng      | Qinglonggou, Beicheng                                     |
| East main line: portal station – regulator at          | 3           | Sudian        | Sudian, Nantianhe   |
|  |             | Jiazhang town | Jiazhang village  |

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|   |             |             |   |
|---|-------------|-------------|---|
| Jiazhang  |             |             |   |
| Donghe branch line: East Shenjiazhuang – regulator at Donghe town | 10          | Sudian      | East Shenjiazhuang, Nangzhuang                |
|   |             | Handian     | Ximiao, Jingfang, Nangou, South Wangzhuangcun |
|   |             | Donghe town | Donghe village                                |
| Xichi branch line: Hanchuan – regulator at Xichi town             | 5.5         | Handian     | Hanchuan                                      |
|   |             | Xichi       | Tuqiao, Shayu, Xichi                          |
|   |             | Yincheng    | Lifang  |
| Branch line for Zhendong Group                                    | 1.5         | Handian     | Hanchuan, Donghan                             |
| Bayi branch line: Lifang - Bayi                                   | 6.2         | Yincheng    | Lifang, Nanwangqing                           |
|   |             | Bayi        | Longshan, Bayi                                |
| Yincheng branch line: Lifang - Mengcheng                          | 3.8         | Yincheng    | Lifang, Henan, Cangzi village 1               |
| Nansong branch line: Yincheng – regulator at Nansong              | 5.5         | Yincheng    | Sangzi village 1, Sangzi village 2, Neiwang   |
|   |             | Nansong     | Beisong, Nansong                              |
| Xihuo branch line: regulator at Yincheng - regulator at Xihuo     | 6.8         | Mengcheng   | Sangxin Village 1, Shitanyu, Heixia           |
|   |             | Xihuo       | Fengbei, zhong                                |
| <b>Total</b>  | <b>52.7</b> | <b>10</b>   | <b>37</b>                                     |

**2) Villages affected by the Xiangyuan Network**

The Xiangyuan network affects altogether 41 villages. For more information, refer to Table 2.4-3.

**Table 2.4-3 Villages affected by the Xiangyuan network**

| Line  | Length (km) | Towns covered | Villages affected                               |
|---|-------------|---------------|---|
| Xiangyuan portal station – regulator at Houbao                    | 5.5         | Xiadian       | Qiaotou, Beili                                  |
|   |             | Houbao        | Xiyuannao, Xizhou, Houbao                       |
| Xiangyuan portal station – regulator at Xiadian                   | 4.8         | Xiadian       | Qiaotou, Xiadian                                |
| Regulator at Xiadian - regulator at Xiting - regulator at Shangma | 21.5        | Xiadian       | Xiadian, South Mahancun, Shiquan, Xishi, Daping |
|   |             | Xiting        | Nuanquan, Dongpodi, Xiting, Shijialing          |
|   |             | Shangma       | Sima, Nanwa                                     |

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|   |             |               |   |
|---|-------------|---------------|---|
| Xiangyuan portal station – regulator at Wangqiao                            | 10.5        | Xiadian       | Qiaotou, Fucun                                  |
|   |             | Guhan         | Dahuangzhuang, Shizidao, Xiwangqiao             |
|   |             | Wangqiao      | Tiancang, Wangqiao                              |
| Regulator at Wangqiao - regulator at Beidi                                  | 8.1         | Wangqiao town | Wangqiao village                                |
|   |             | Guhan         | South Lixin, North Lixin, Quli                  |
|   |             | Beidi town    | Beidi village                                   |
| Regulator at Beidi - regulator at Shanfu - regulator at Wangcun             | 20.2        | Beidi         | Beidi, Yangjiagou, Changzhen, Hancun            |
|   |             | Shanfu        | Shanfu, Shilou, Jianao                          |
|   |             | Wangcun       | Beiyao, Liyabian, Dianshang, Wenjianao, Wangcun |
| Haocun village, Xialiang town – regulator at Xialiang – regulator at Xiyang | 12.6        | Xialiang      | Haocun, Haojiazhuang, Zhaigou                   |
|   |             | Xiyang        | Luzhouwa, Xiyang                                |
| <b>Total</b>  | <b>83.2</b> | <b>11</b>     | <b>41</b>                                       |

### 3) Villages affected by Tunliu network

The Tunliu pipeline network will affect 47 villages altogether. For more information, refer to Table 2.4-4.

**Table 2.4-4 Villages affected by the Tunliu pipeline network**

| Line  | Length (km) | Towns covered | Villages affected   |
|---|-------------|---------------|---|
| Portal station – regulator at Xijia                 | 1.9         | Xijia         | Dongjia, Xijia  |
| Regulator at Xijia town – Heshenmiao - Zhangjiadian | 25.8        | Xijia         | Xijia, Niujiachuan, Zhaojiagou, Lijiaogou   |
|   |             | Heshenmiao    | Xigu, Dougou, Heshenmiao, Xiyang, Dongyang  |
|   |             | Zhangjiadian  | Niuwangmiao, Zhangbamiao, Lijiazhuang, Zhangjiacun                                      |
| Heshenmiao - Fengyi                                 | 8.7         | Heshenmiao    | Heshenmiao, Zhuanggou, Wangmuling, Xinzhuang  |
|   |             | Fengyi        | Shiquan, Fengyi   |
| Portal station - Shangcun                           | 26.4        | Xijia         | Dongjia, Luozhuang  |
|   |             | Linjiang      | Xijie, Guocun, Liujiaping, Gaodian, Lihang, Xizhuang, Xinzhuang, Qiansu, Banxiangzhuang |
|   |             | Yuwu          | Dongjiazhuang, Weicun, Changjiawan  |
|   |             | Shangcun      | Guanzhuang, Laojunzhuang, Nanhuzhuang, Xipo, Shangcun                                   |
| Shangcun - Regulator at Changgang                   | 5.3         | Shangcun      | Shangcun  |
| Yuwuzheng branch line                               | 2.9         | Yuwu          | Xizhuang, Nanjie  |
| Wuyuanzhen  | 15.2        | Yuwu          | Yuedi   |

|              |             |          |   |
|--------------|-------------|----------|---|
| branch line  |             | Wuyuan   | Xicun, Huidu, Dongcun, Jiazhuang, Fengxiu, Mapipo, Wuyuan |
| <b>Total</b> | <b>86.4</b> | <b>8</b> | <b>47</b>   |

#### 4) Villages affected by the Qingxu pipeline network

The Qingxu pipeline network will affect 22 villages altogether. For more information, refer to Table 2.4-5.

**Table 2.4-5 Villages affected by the Qingxu pipeline network**

| Line                              | Length (km) | Towns covered | Villages affected                            |
|-----------------------------------|-------------|---------------|--|
| Xugou portal station - Yangliqing | 8.1         | Xugou         | Xichuwang, Zhangchuwang                      |
|                                   |             | Jiyi          | Yangliqing, Wenliqing, Dailiqing             |
| Jiyi – Dailiqing - Shijiashe      | 5           | Jiyi          | Jiyi, Dongchuwang, Dailiqing, Shijiashe      |
| Yanglixing - Dachang              | 2.1         | Jiyi          | Yangliqing, Xijiao, Dongjia, Dachang         |
| Xijia - Jiacunbao                 | 2.9         | Jiyi          | Xijia, Jiacunbao                             |
| Jiacunbao - Xiaowang              | 3.1         | Jiyi          | Jiacunbao, Yaojiabao, Xiaowang               |
| Yaojiabao - Wangfang - Dengqiao   | 3.4         | Jiyi          | Yaojiabao, Wangfang, Dengqiao                |
| Dengqiao - Jincun                 | 2.3         | Jiyi          | Dengqiao, Taoyuambao, Lianglong, Jincun      |
| Lianglong – West Liaoxi           | 2.7         | Jiyi          | Lianglong, Dongliaozi, Zhongliaozi, Xiliaoxi |
| <b>Total</b>                      | <b>31.7</b> | <b>2</b>      | <b>22</b>                                    |

## 2.5 Livelihood of Affected Households

Form early April to the end of May, 2013, 14 members of the RAP team, along with personnel from project management office of each component, went to the 6 project sites – Changzhi, Tunliu, Xiangyuan, Qingxu, Xiyang and Baode, for an socioeconomic survey. During the survey, related documents were looked through, study sessions were hold, related departments were visited, and Questionnaires were handed out. This part is to analyze the Questionnaire result only.

The Questionnaires handed out in the villages affected by the 2 plants are for the families that will be affected by permanent land acquisition. The Questionnaires handed out in the counties affected by the 4 pipeline networks are for ordinary villagers. The two plants require permanent land acquisition, and the impact is small in range, but deep in scale. The 4 pipeline networks require mainly temporary land acquisition, and the range is more extensive, but the scale is light. The 6 components will cause wide and deep impact. This part will analyze the impact by the two kinds of components.

## 2.5.1 Power and Heat Cogeneration Plants

### 1) Sampling selection

To fully understand the effect to families caused by the plant, the RAP team made the research among families affected by permanent land acquisition with the random sampling method. The team questioned 25 families, 41.7% of the actually affected families that can presently verified. In the 25 families, 10 are from Gucheng village, Yangjiawan town, taking 38.5% of the affected in the village. Fifteen are from Houzhuang village and Houlongfengnao village, Dazhai, Xiyang, taking 44.12% of toil affected.

### 2) Analysis of survey result

#### Number of persons and age structure

There are 89 people in the 25 families, averagely 3.6 people per family. There are 39 females, and 50 males. For ages, social status, education, and employment, refer to the statistics in Table 2.5-1.

Within the families researched on, 12 people are above 60, 13.48% of the total; 13 people are between 50 and 59, 14.61% of the total; 17 people are 40 to 49, 19.10% of the total; 13 people are 30 to 39, 14.61% of the total; 14 are 20 to 29, 15.73% of the total; 20 are below 20, 22.47% of the total.

#### Education

Most family members have junior high education, and some have senior high or primary school education. One third of the researched peopled have completed or are having senior high education, or higher education. No one has bachelor degree or any other degree above. Three are illiterate, and they are all above 80 years old.

#### Employment

Within the 89 people, 62 are labors above 16 years old, and 60 of them are employed, taking 67.42% of the total. 29 of them are not employed, taking 32.58% of the total.

Within the employed people, 2 are from the government institution and enterprise, accounting for 3.33% of the total; 22 are working in the farming, forestry, husbandry and fishing sector, accounting for 36.67% of the total; 6 are within village leadership, accounting for 10% of the total; 8 are doing odd jobs, accounting for 13.33%; 22 perform farming during the farming seasons and odd jobs during non-farming seasons, accounting for 36.67%.

Within the unemployed people, 1 is retired, accounting for 3.45% of the total; 4 are doing housework, accounting for 13.79%; 2 are disabled from work, accounting for 6.89%; 8 are waiting for school admission, 27.59% of the total; 14 are still students, accounting for 48.28%.

**Table 2.5-1 Statistics of research families**

| Item                         | Gucheng |        | Houzhuang |        | Total |        |      |   |
|------------------------------|---------|--------|-----------|--------|-------|--------|------|---|
|                              | Male    | Female | Male      | Female | Male  | Female | Sum  | % |
| Households                   | 10      |        | 15        |        |       |        | 25   |   |
| Average people per household | 3.70    |        | 3.47      |        |       |        | 3.56 |   |

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|                            |           |           |           |           |           |           |           |             |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|
| <b>Age</b>                 |           |           |           |           |           |           |           |             |
| ≤6                         | 5         | 1         | 1         | 2         | 6         | 3         | 9         | 10.1%       |
| 7-19                       | 2         | 1         | 6         | 2         | 8         | 3         | 11        | 12.4%       |
| 20-35                      | 6         | 5         | 7         | 4         | 13        | 9         | 22        | 24.7%       |
| 36-50                      | 4         | 5         | 8         | 9         | 12        | 14        | 26        | 29.3%       |
| 51-60                      | 1         | 0         | 4         | 4         | 5         | 4         | 9         | 10.1%       |
| 61-70                      | 4         | 3         | 1         | 2         | 5         | 5         | 10        | 11.2%       |
| ≥71                        | 0         | 0         | 1         | 1         | 1         | 1         | 2         | 2.2%        |
| <b>Total</b>               | <b>22</b> | <b>15</b> | <b>28</b> | <b>24</b> | <b>50</b> | <b>39</b> | <b>89</b> | <b>100%</b> |
| <b>Composition</b>         |           |           |           |           |           |           |           |             |
| Child                      | 5         | 1         | 1         | 2         | 6         | 3         | 9         | 10.1%       |
| Student                    | 2         | 1         | 7         | 3         | 9         | 4         | 13        | 14.6%       |
| Labor                      | 13        | 10        | 19        | 16        | 32        | 26        | 58        | 65.2%       |
| Retired                    | 2         | 3         | 1         | 3         | 3         | 6         | 9         | 10.1%       |
| <b>Sum</b>                 | <b>22</b> | <b>15</b> | <b>28</b> | <b>24</b> | <b>50</b> | <b>39</b> | <b>89</b> | <b>100%</b> |
| <b>Education</b>           |           |           |           |           |           |           |           |             |
| Illiterate                 | 0         | 1         | 1         | 1         | 1         | 2         | 3         | 3.7%        |
| Primary school             | 4         | 4         | 5         | 4         | 9         | 8         | 17        | 21.3%       |
| Junior high                | 5         | 7         | 12        | 12        | 17        | 19        | 36        | 45%         |
| Senior high                | 5         | 1         | 8         | 5         | 13        | 6         | 19        | 23.7%       |
| College                    | 3         | 1         | 1         | 0         | 4         | 4         | 5         | 6.3%        |
| Undergraduate              | 0         | 0         | 0         | 0         | 0         | 0         | 0         | 0.0%        |
| <b>Sum</b>                 | <b>17</b> | <b>14</b> | <b>27</b> | <b>22</b> | <b>44</b> | <b>36</b> | <b>80</b> | <b>100%</b> |
| <b>Employment</b>          |           |           |           |           |           |           |           |             |
| Jobless                    | 0         | 0         | 0         | 3         | 0         | 0         | 3         | 4.8%        |
| Farming and husbandry      | 6         | 8         | 8         | 9         | 14        | 17        | 31        | 50%         |
| Odd jobs                   | 3         | 2         | 3         | 0         | 6         | 2         | 8         | 12.9%       |
| Village leadership         | 2         | 1         | 3         | 0         | 5         | 1         | 6         | 9.7%        |
| Institution and enterprise | 0         | 0         | 2         | 0         | 2         | 0         | 2         | 3.2%        |
| Farming + odd jobs         | 2         | 2         | 4         | 4         | 6         | 6         | 12        | 19.4%       |
| <b>Sum</b>                 | <b>13</b> | <b>13</b> | <b>20</b> | <b>16</b> | <b>33</b> | <b>29</b> | <b>62</b> | <b>100%</b> |

Note: 1). Retired age means above 66 for males, and above 61 for females. Therefore, labor means people who are not in school, and who are under the retired age and above 16. 2). In the table, there is 1 person disabled for work.

#### 4) Income and Expenditures

Within the 25 families, their average net income is CNY42,582.4 per year. Due to non-farming operation income, 2 families respectively have CNY200,000 and CNY260,000 net income per year, much higher than local

ordinary families. If these two families are not counted, then the average net income per household is CNY26,285.22, and the average net income per person is CNY7,463.70. Viewed from the income structure, generally agricultural income accounts for 1/4 of the total, non-agricultural income, including salary, labor remuneration, and operation income account for 3/4.

Not taking the 2 high-income families into account, averagely each family of the 23 families spends 22,397.06 yuan each year, 85.21% of their total income. Viewed from the expenditure structure, food costs the most in each rural household, about 35.55% of the total annually; while 4 other items, that is, clothing, health care, transportation and telecommunication, and transfer expenditure constitute the other shares, respectively 10.20%, 11.74%, 14.78% and 9.83% of the total annually.

Averagely, the annual income and outcome of households in Gucheng village are higher than those in Houzhang village.

**Table 2.5-2 Economic statistics of researched villagers in 2012**

| Affected village | index       | Households | Income      | Average (CNY/person) |
|------------------|-------------|------------|-------------|----------------------|
| Gucheng          | Net income  | 10         | 960-100000  | 34495                |
|                  | Expenditure | 10         | 7460-166600 | 33260                |
| Houzhuang        | Net income  | 15         | 1000-50000  | 21906                |
|                  | Expenditure | 15         | 9000-36800  | 21143                |

### 5) Housing, farmland and household property

The average construction area of each household is 95.56m<sup>2</sup>, 26.54m<sup>2</sup> per person.

The average farmland area per household is 10.64 mu, 1.89 mu per person.

Averagely, each household has 1.08 TV sets, 0.48 stereo/VCD/DVDs, 0.6 electric fans, 0.92 washing machines, 0.2 kitchen ventilators, 0.28 water heaters, 0.28 micro-wave ovens, 0.84 electromagnetic stoves, 0.68 refrigerators, 0.84 telephone sets, 1.88 mobile phones, 0.08 air conditioners, 0.2 cameras, 0.88 computers, 0.76 motorcycles, 0.24 farm vehicles, and 0.44 cars.

## 2.5.2 Gas Pipeline Networks

### 1) Sampling selection

The RAP team took a sample of 84 households and 331 persons in random in the villages affected by the pipeline network in the 4 counties – Changzhi, Xiangyuan, Tunliu and Qingxu. A questionnaire was conducted. For sample information, refer to Table 2.5-3.

**Table 2.5-3 Sampling information**

| County    | Number of households | Number of persons |
|-----------|----------------------|-------------------|
| Changzhi  | 29                   | 112               |
| Tunliu    | 19                   | 78                |
| Xiangyuan | 15                   | 57                |

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|              |           |            |
|--------------|-----------|------------|
| Qingxu       | 21        | 84         |
| <b>Total</b> | <b>84</b> | <b>331</b> |

**2) Sampling result and information analysis**

**a. Household information**

In the 84 household and 331 persons surveyed, male totals 170, accounting for 51.4%; female totals 161, accounting for 48.6%. For affected people's age, social status, education and employment, refer to Table 2.5-4 below.

As the figure shows, people's age presents normal distribution, and most people are between 20-35, 36-50 and 51-60, respectively accounting for 23.6%, 30.8% and 16.9% of the total. Students account for 15.7% of the surveyed number of people.

About 1/2 of household members have accepted junior high education, and next is primary school and senior high. The three account for 87% of total samples. Fewer people have college or above education.

Among the people surveyed, 58.5% work in the farming, forestry, pasture, and fishing sector. However, we found during the survey, many people of the village households do not purely perform farming, transportation or other business activities have become their steady secondary employment.

**Table 2.5-4 Statistics of surveyed households**

| Item                                   | Changzhi   | Tunliu    | Xiangyu<br>an | Qingxu    | Total      |             |
|--|------------|-----------|---------------|-----------|------------|-------------|
|  |            |           |               |           | Sum        | %           |
| Number of households                   | <b>29</b>  | <b>19</b> | <b>15</b>     | <b>21</b> | <b>84</b>  |             |
| Number of people                       | 112        | 78        | 57            | 84        | 331        |             |
| <b>Age</b>                             |            |           |               |           |            |             |
| ≤6                                     | 7          | 1         | 2             | 2         | 12         | 3.6%        |
| 7-19                                   | 10         | 19        | 9             | 14        | 52         | 15.7%       |
| 20-35                                  | 32         | 17        | 9             | 20        | 78         | 23.6%       |
| 36-50                                  | 32         | 33        | 12            | 25        | 102        | 30.8%       |
| 51-60                                  | 24         | 2         | 16            | 14        | 56         | 16.9%       |
| 61-70                                  | 6          | 5         | 7             | 6         | 24         | 7.3%        |
| ≥71                                    | 1          | 1         | 2             | 3         | 7          | 2.1%        |
| <b>Total</b>                           | <b>112</b> | <b>78</b> | <b>57</b>     | <b>84</b> | <b>331</b> | <b>100%</b> |
| <b>Education</b>                       |            |           |               |           |            |             |
| illiterate                             | 8          | 2         | 2             | 7         | 19         | 5.7%        |
| Primary school                         | 22         | 16        | 14            | 19        | 71         | 21.5%       |
| Junior high                            | 45         | 37        | 30            | 36        | 148        | 44.7%       |
| Senior high/Technical secondary school | 29         | 17        | 8             | 15        | 69         | 20.8%       |
| Junior college                         | 7          | 3         | 1             | 4         | 15         | 4.5%        |
| College and above                      | 1          | 3         | 2             | 3         | 9          | 2.7%        |
| <b>Total</b>                           | <b>112</b> | <b>78</b> | <b>57</b>     | <b>84</b> | <b>331</b> | <b>100%</b> |
| <b>Employment</b>                      |            |           |               |           |            |             |
| Heads in institutions                  | 0          | 1         | 0             | 1         | 2          | 1.0%        |

|  |           |           |           |           |            |             |
|--|-----------|-----------|-----------|-----------|------------|-------------|
| and enterprises                                |           |           |           |           |            |             |
| Ordinary staff in institutions and enterprises | 1         | 6         | 2         | 3         | 12         | 5.8%        |
| Professional                                   | 1         | 0         | 0         | 0         | 1          | 0.5%        |
| Farming, forestry, pasture and fishing sector  | 52        | 22        | 25        | 22        | 121        | 58.5%       |
| Transportation and equipment operation         | 7         | 0         | 0         | 5         | 12         | 5.8%        |
| Tertiary service                               | 4         | 3         | 1         | 7         | 15         | 7.2%        |
| Others   | 11        | 8         | 7         | 18        | 44         | 21.3%       |
| <b>Total</b>                                   | <b>76</b> | <b>40</b> | <b>35</b> | <b>56</b> | <b>207</b> | <b>100%</b> |
| Unemployed                                     | 36        | 38        | 22        | 28        | 124        |             |

### b. Farmland of sampled families

According to our survey, each family averagely has 5.5 mu farmland. The family in Xiangyuan has 12.1 mu by average. The family in Changzhi has the least farmland, 2 mu only. The statistics show 2-3 families among the sampled families have forest land, and the others are all farmland. Some families have rented out their land. Some families rent other family's land for scale management, so their land approximates 40 mu. The main crop of 4 counties is maize.

**Table 2.5-5 Land information of sampled families**

| County       | Survey families | Least area of land (mu/family) | Most area of land (mu/family) | Average    |
|--------------|-----------------|--------------------------------|-------------------------------|------------|
| Changzhi     | 29              | 0                              | 4                             | 2.0        |
| Tunliu       | 19              | 0                              | 15                            | 6.1        |
| Xiangyuan    | 15              | 1                              | 39                            | 12.1       |
| Qingxu       | 21              | 0                              | 12                            | 5.0        |
| <b>Total</b> | <b>84</b>       | <b>0</b>                       | <b>39</b>                     | <b>5.5</b> |

### c. Financial information of sampled families

Among the 84 families, each family averagely has an annual net income of 52,596 yuan, annual expenditure 32,952 yuan. The families in Qingxu have the highest income and expenditure, 77,390 yuan and 48,156 yuan. The families in Xiangyuan have the lowest, 34,707 and 21,377. Viewed from income structure, agricultural income accounts for about 20%. Non-agricultural income, including salary, transportation, service business, is the main income of local families. Families working in transportation business have higher income. We found many men in Xiangyuan work in local coal mines, and their income is steady. For details, refer to the following table.

**Table 2.5-6 Economic information of sampled families in 2012**

| County   | Index       | Families surveyed | Income (CNY/family) | Average |
|----------|-------------|-------------------|---------------------|---------|
| Changzhi | Net income  | 29                | 7000-203000         | 46899   |
|          | Expenditure | 29                | 6220-71920          | 30755   |

|              |             |           |                    |              |
|--------------|-------------|-----------|--------------------|--------------|
| Tunliu       | Net income  | 19        | 2400-384000        | 65695        |
|              | Expenditure | 19        | 2000-115000        | 28638        |
| Xiangyuan    | Net income  | 15        | 10000-77000        | 34707        |
|              | Expenditure | 15        | 5400-43800         | 21377        |
| Qingxu       | Net income  | 21        | 5000-300000        | 77390        |
|              | Expenditure | 21        | 5000-158000        | 48156        |
| <b>Total</b> | Net income  | <b>84</b> | <b>2400-384000</b> | <b>56596</b> |
|              | Expenditure | <b>84</b> | <b>2000-158000</b> | <b>32952</b> |

#### d. Vulnerable group within samples

There are 4 disadvantaged families within the samples, accounting for 4.8% of the total. Among the 4 families, 3 are of Low-Income Family, with their annual average income below CNY2100. The lowest annual income is CNY 1200, and the highest, CNY 2000. Three are 3 families with senior people, and 1 family with disabled member.

### 2.5.3 Social Status of Women in the Affected Area

During the social and economic information survey, the RAP team specially paid their attention to women's status in the affected areas, including the basic information, position in the household, social position, participation in public affairs, in the form of questionnaire and conversation session.

From the perspective of education, there is no obvious difference between women and men. Most people have junior high and senior high education, and few people are illiterate or have primary school education.

Generally, women above 60 years old and physically weak women do not work any longer. They mainly do housework at home. More and more middle-aged and young women go elsewhere to work, especially young women, about 90%. Most middle-aged and old women perform agricultural jobs. By average, women's income accounts for 30.89% of the total income of household.

Women have begun to play important roles in social affairs. The survey shows all women understand their villages will be affected by the project, and they do not object to the construction of it. 60% of women put forward their views and comments to the land compensation methods. They hope the schedule of construction can be reasonably arranged, avoiding the harvest time of crops or vegetables. If construction schedule is determined, they need to be informed of it as soon as possible for convenience. Land compensation standards and ground attachment compensation standards should be negotiated with affected families, and compensation for permanent land acquisition and temporary acquisition should be handed out timely to the affected people. The project will create some jobs for women.

## **3. Project Impact**

### **3.1 Affected Regions and Categories**

The project involves 6 counties, 35 towns and 163 villages. The project causes impact because of its permanent land acquisition, temporary land acquisition, ground attachment, and households affected by land acquisition.

For the two plants, the main affected contents consist of permanent land acquisition, ground attachment, and households affected by permanent land acquisition, and the secondary affected contents consist of temporary land acquisition for pipeline installation, temporary land acquisition for construction site, and households affected by temporary land acquisition.

For the 4 pipeline networks, the affected contents mainly consist of temporary land acquisition for pipeline burying, families affected by temporary land acquisition, and a little amount of long-term land lease. The 6 components' land acquisition involves mainly dry land, gardening land, forest land, unused land, and country road. Ground attachments mainly are forest and tombs.

Based on survey, the 6 components do not account for natural protection zone, and forest parks. No house will be resettled. Therefore, no families will be affected in this way. No enterprises or institutions will be affected, as well as bridges, irrigation facilities, power and communication facilities, and cultural heritages.

This project is still in the feasibility research phase, and the construction contents are basically defined. But detailed designs are not done. The final and accurate affected range and contents will be determined when the drawings of detailed design are finished, and the land and resources bureau, forest bureau and other departments perform the demarcation survey.

### **3.2 Definition of Land Acquisition Range**

The construction contents of 2 plants consist of 10 items: plant area, construction site, entrance road, water supply pipeline, gas supply pipeline, heating pipeline, heat exchange station, power supply line, pump house and inspection well.

The 4 pipeline networks consist of mainly pipeline networks and regulators. Table 3.1-1 shows the construction items and land acquisition of 6 components.

**Table 3.1-1 Permanent land acquisition, long-term land lease, and temporary land acquisition of 6 components**

| Component                   | Items required for permanent acquisition   | Items required for temporary land acquisition | Items required for long term land lease |
|-----------------------------|--|---|---|
| Xiyang power and heat plant | Plant area, entrance road, pump house, inspection well, tower base for power supply line | Pipelines and construction site               |   |
| Baode power and heat plant  | Plant area, entrance road, inspection well, tower base for power supply line             | Pipelines and construction site               |   |
| Changzhi pipeline network   |  | Pipeline network                              | Regulator                               |
| Xiangyuan pipeline network  |  | Pipeline network                              | Regulator                               |
| Tunliu pipeline network     |  | Pipeline network                              | Regulator                               |
| Qingxu pipeline network     |  | Pipeline network                              |   |

### 3.3 Research Methods for Permanent and Temporary Land Acquisition Impact

The indices for researching permanent and temporary land acquisition impact are determined with the following methods:

1. Talk with parties who formulates the feasibility research report for all components to understand project construction contents, administrative region of project sites, and planned land areas of all components;
2. Talk with project owner to understand the actual land area to be used by each component;
3. Survey in the villages of the two plants, talk with the village committee to understand the area of land planned to use, land categories, and information of the families to be affected by land acquisition;
4. Go to the counties involved by the 4 pipeline networks, and talk with personnel from branch offices of Shanxi CBM (Natural Gas) Pipeline and Qingxu Kaitong Natural Gas, to understand the length of pipeline, distribution, information of towns and villages covered and affected;
5. Consult with 3 professional construction companies, such as Shengli Petrochemical Construction Cooperation of Shengli Oil Field, to understand information of land use during pipeline installation.

### 3.4 cut-off date

On cut-of-date, for Xiyang CHP Component, it was set in August 2013, and for Baode CHP Component, it was set in April 2013. These cut-of dates are

consistent with the dates that both Xiyang and Baode County Land Resources Bureaus carried out detailed land acquisition survey.

### 3.5 Indices of Project Impact

The main indices are described as follows from 4 perspectives.

#### 3.5.1 Permanent Land Acquisition

The two plants requires permanently 220.21 mu land, among which 140.92 mu is dry land, accounting for 64% of the total; 1.21 mu is gardening land, accounting for 0.5% of the total; 2.27 mu is irrigated land, accounting for 1.0% of the total; 28.15 mu is unused land, accounting for 12.8% of the total; 44.33 mu is forest land, accounting for 20.1% of the total; 3.34 mu is country road, accounting for 1.5% of the total. For details, refer to Table 3.5-1.

**Table 3.5-1 Permanent land acquisition of 2 heat and power plants**

| Component    | Items                    | Permanent land acquisition (mu) |               |             |             |              |              |              |
|--------------|--------------------------|---------------------------------|---------------|-------------|-------------|--------------|--------------|--------------|
|              |                          | Total                           | Dry           | Gardening   | Irrigated   | Unused       | forest       | Country road |
| Xiyang plant | Plant area               | 79.23                           | 46.19         |             |             |              | 33.04        |              |
|              | Access road              | 14.63                           |               |             |             |              | 11.29        | 3.34         |
|              | Inspection well          | 0.006                           |               |             |             | 0.006        |              |              |
|              | Tower base of power line | 7.2                             |               |             |             | 7.2          |              |              |
|              | <b>Sum</b>               | <b>101.07</b>                   | <b>46.19</b>  |             |             | <b>7.21</b>  | <b>44.33</b> | <b>3.34</b>  |
| Baode plant  | Plant area               | 70.7                            | 69.5          | 1.21        |             |              |              |              |
|              | Entrance road            | 42.17                           | 22.73         |             | 2.27        | 17.17        |              |              |
|              | Pump house               | 3.75                            |               |             |             | 3.75         |              |              |
|              | Inspection well          | 0.018                           |               |             |             | 0.018        |              |              |
|              | Tower base of power line | 2.5                             | 2.5           |             |             |              |              |              |
|              | <b>Sum</b>               | <b>119.14</b>                   | <b>94.73</b>  | <b>1.21</b> | <b>2.27</b> | <b>20.94</b> |              |              |
| <b>Total</b> |                          | <b>220.21</b>                   | <b>140.92</b> | <b>1.21</b> | <b>2.27</b> | <b>28.15</b> | <b>44.33</b> | <b>3.34</b>  |



Figure 3.5-1 Location of plant site of Xiyang CHP plant



Figure 3.5-2 Location of plant site of Baode CHP plant

### 3.5.2 Temporary Land Acquisition

The 6 components requires temporarily 3501.06 mu land, among which 2228.5 mu is dry land, accounting for 63.65% of the total; 336 mu is vegetable land, accounting for 9.6% of the total; 103.5 mu is gardening land, accounting for 2.96% of the total; 568.86 mu is unused land, accounting for 16.25%; 90 mu is forest land, accounting for 2.57% of the total; 136.71 mu is county road, accounting for 3.9% of the total; 37.5 mu is country road, accounting for 1.07% of the total. For details, refer to Table 3.5-2.

**Table 3.5-2 Information of temporary land use of 6 components**

| Component                   | Items                | Temporary land acquisition (mu) |               |            |              |               |           |               |              |
|-----------------------------|----------------------|---------------------------------|---------------|------------|--------------|---------------|-----------|---------------|--------------|
|                             |                      | Total                           | Dry           | Vegetable  | Gardening    | Unused        | Forest    | County road   | Country road |
| Xiyang plant                | Water pipeline       | 64                              | 44.8          |            |              | 19.2          |           |               |              |
|                             | Heating pipeline     | <b>38.16</b>                    | <b>10.5</b>   |            |              | <b>4.5</b>    |           | 23.16         |              |
|                             | Gas pipeline         | 10.5                            | 7.35          |            |              | 3.15          |           |               |              |
|                             | Temporary power line | 0.45                            | 0.45          |            |              |               |           |               |              |
|                             | Construction site    | 45                              | 45            |            |              |               |           |               |              |
|                             | <b>Sum</b>           | <b>158.11</b>                   | <b>108.1</b>  |            |              | <b>26.85</b>  |           | <b>23.16</b>  |              |
| Baode plant                 | Water pipeline       | 63.1                            | 18.93         |            |              | <b>44.17</b>  |           |               |              |
|                             | Heating pipeline     | <b>188.55</b>                   | <b>30</b>     |            |              | <b>45</b>     |           | 113.55        |              |
|                             | Gas pipeline         | <b>85.05</b>                    | <b>25.52</b>  |            |              | <b>59.54</b>  |           |               |              |
|                             | Temporary power line | 0.55                            | 0.55          |            |              |               |           |               |              |
|                             | Construction site    | 45                              | 45            |            |              |               |           |               |              |
|                             | <b>Sum</b>           | <b>382.25</b>                   | <b>120</b>    |            |              | <b>148.71</b> |           | <b>113.55</b> |              |
| Changzhi pipeline network   | Pipeline network     | 578.4                           | 308.4         | 120        | 45           | 91.5          |           |               | 13.5         |
| Xiangyu an pipeline network | Pipeline network     | 1019.1                          | 816           | 36         |              | 77.1          | 90        |               |              |
| Tunliu pipeline network     | Pipeline network     | 992.7                           | 660           | 120        | 45           | 152.7         |           |               | 15           |
| Qingxu pipeline network     | Pipeline network     | 370.5                           | 216           | 60         | 13.5         | 72            |           |               | 9            |
| <b>Total</b>                |                      | <b>3501.1</b>                   | <b>2228.5</b> | <b>336</b> | <b>103.5</b> | <b>568.86</b> | <b>90</b> | <b>136.71</b> | <b>37.5</b>  |

### 3.5.3 Ground Attachments

In the 6 components, ground attachments that presently can be identified refer to mainly walnut trees, date trees, apple trees, land poplar trees. The quantity of ground attachments are the number reported to the RAP team during their survey. The accurate number needs to be verified when three parties (the County Land Resource Bureau, the village committee and the property owner) perform the survey and define the range. For more information, refer to Table 3.5-3.

**Table 3.5-3 Information of ground attachments**

| component                  | Ground attachment  | Unit | Quantity | Remarks  |
|----------------------------|--------------------|------|----------|--|
| Xiyang plant               | Young walnut trees |      | 2000     | Young walnut trees are planted in more than 60 mu land.  |
|                            | Tombs              |      | 10       |  |
| Baode plant                | Date trees         |      | 100      | Mainly big trees with diameter bigger than 30cm  |
|                            | Tombs              |      | 4        |  |
| Changzhi pipeline network  | Fruit trees        |      | 5000     | About 45mu, the compensation cost degrades by level of primary fruiting trees, trees and seedlings.    |
| Xiangyuan pipeline network | Poplar trees       |      | 1800     | About 90 mu, with diameter around 10cm   |
| Tunliu pipeline network    | Fruit trees        |      | 5000     | About 45 mu, the compensation cost degrades by level of primary fruiting trees, trees and seedlings.   |
| Qingxu pipeline network    | Fruit trees        |      | 1500     | About 13.5 mu, the compensation cost degrades by level of primary fruiting trees, trees and seedlings. |

### 3.5.4 Affected Families and Persons

The affected families fall into families affected by permanent land acquisition and families affected by temporary land acquisition. The number of families affected by permanent land use is identified, 80 households and 256 people. After initial estimation, the number of families affected by temporary land use is 1185 households and 4352 persons. For more information, refer to Table 3.5-4.

**Table 3.5-4 Information of affected families**

| Component                  | Families affected by permanent land use |         | Families affected by temporary land use |             |
|----------------------------|---|---------|---|-------------|
|                            | Households                              | Persons | Households                              | Persons     |
| Xiyang plant               | 34                                      | 110     | <b>46</b>                               | <b>126</b>  |
| Baode plant                | 26                                      | 87      | <b>45</b>                               | <b>167</b>  |
| Changzhi pipeline network  |   |         | 245                                     | 858         |
| Xiangyuan pipeline network |   |         | 359                                     | 1265        |
| Tunliu pipeline network    |   |         | 285                                     | 1140        |
| Qingxu pipeline network    |   |         | 205                                     | 796         |
| <b>Total</b>               | 60                                      | 197     | <b>1185</b>                             | <b>4352</b> |

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**Table 3.5-5 Information summary of affected families**

| Component    | Items                    | Permanent land acquisition (mu) |              |           |             |              |              |               | Temporary land acquisition (mu) |     |           |              |        |              |              | Families affected by permanent land use |            | Families affected by temporary land use |            |         |
|--------------|--------------------------|---------------------------------|--------------|-----------|-------------|--------------|--------------|---------------|---------------------------------|-----|-----------|--------------|--------|--------------|--------------|---|------------|---|------------|---------|
|              |                          | Sum                             | Dry          | Gardening | Irrigated   | Unused       | forest       | Country road  | Sum                             | Dry | Vegetable | Gardening    | Unused | Forest       | Country road | Country road                            | Households | Persons                                 | Households | Persons |
|              |                          |                                 |              |           |             |              |              |               |                                 |     |           |              |        |              |              |   |            |   |            |         |
| Xiyang Plant | Plant area               | 79.23                           | 46.19        |           |             |              | 33.04        |               |                                 |     |           |              |        |              |              |   | 34         | 110                                     | 46         | 126     |
|              | Entrance road            | 14.63                           |              |           |             |              | 11.29        | 3.34          |                                 |     |           |              |        |              |              |   |            |   |            |         |
|              | Inspection well          | 0.006                           |              |           |             | 0.006        |              |               |                                 |     |           |              |        |              |              |   |            |   |            |         |
|              | Tower base of power line | 7.2                             |              |           |             | 7.2          |              |               |                                 |     |           |              |        |              |              |   |            |   |            |         |
|              | <b>Sum</b>               | <b>101.07</b>                   | <b>46.19</b> |           |             | <b>7.21</b>  | <b>44.33</b> | <b>3.34</b>   |                                 |     |           |              |        |              |              |   |            |   |            |         |
|              | Water pipeline           |                                 |              |           |             |              |              | 64            | 44.8                            |     |           | 19.2         |        |              |              |   |            |   |            |         |
|              | Heating pipeline         |                                 |              |           |             |              |              | 38.16         | 10.5                            |     |           | 4.5          |        | 23.16        |              |   |            |   |            |         |
|              | Gas pipeline             |                                 |              |           |             |              |              | 10.5          | 7.35                            |     |           | 3.15         |        |              |              |   |            |   |            |         |
|              | Temporary power line     |                                 |              |           |             |              |              | 0.45          | 0.45                            |     |           |              |        |              |              |   |            |   |            |         |
|              | Construction site        |                                 |              |           |             |              |              | 45            | 45                              |     |           |              |        |              |              |   |            |   |            |         |
| <b>Sum</b>   |                          |                                 |              |           |             |              |              | <b>158.11</b> | <b>108.1</b>                    |     |           | <b>26.85</b> |        | <b>23.16</b> |              |   |            |   |            |         |
| <b>Total</b> | <b>101.07</b>            | <b>46.19</b>                    |              |           | <b>7.21</b> | <b>44.33</b> | <b>3.34</b>  | <b>158.11</b> | <b>108.1</b>                    |     |           | <b>26.85</b> |        | <b>23.16</b> |              |   |            |   |            |         |
| e Plant      | Plant area               | 70.7                            | 69.5         | 1.21      |             |              |              |               |                                 |     |           |              |        |              |              | 26                                      | 87         | 45                                      | 167        |         |
|              | Entrance                 | 42.17                           | 22.73        |           | 2.27        | 17.17        |              |               |                                 |     |           |              |        |              |              |   |            |   |            |         |

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|           |                           |               |              |             |             |              |  |               |            |     |    |      |               |  |               |  |  |     |      |
|-----------|---------------------------|---------------|--------------|-------------|-------------|--------------|--|---------------|------------|-----|----|------|---------------|--|---------------|--|--|-----|------|
|           | road                      |               |              |             |             |              |  |               |            |     |    |      |               |  |               |  |  |     |      |
|           | Pump house                | 3.75          |              |             |             | 3.75         |  |               |            |     |    |      |               |  |               |  |  |     |      |
|           | Inspection well           | 0.018         |              |             |             | 0.018        |  |               |            |     |    |      |               |  |               |  |  |     |      |
|           | Tower base for power line | 2.5           | 2.5          |             |             |              |  |               |            |     |    |      |               |  |               |  |  |     |      |
|           | <b>Sum</b>                | <b>119.14</b> | <b>94.73</b> | <b>1.21</b> | <b>2.27</b> | <b>20.94</b> |  |               |            |     |    |      |               |  |               |  |  |     |      |
|           | Water pipeline            |               |              |             |             |              |  | 63.1          | 18.93      |     |    |      | 44.17         |  |               |  |  |     |      |
|           | Heating pipeline          |               |              |             |             |              |  | 188.55        | 30         |     |    |      | 45            |  | 113.55        |  |  |     |      |
|           | Gas pipeline              |               |              |             |             |              |  | 85.05         | 25.52      |     |    |      | 59.54         |  |               |  |  |     |      |
|           | Temporary power line      |               |              |             |             |              |  | 0.55          | 0.55       |     |    |      |               |  |               |  |  |     |      |
|           | Construction site         |               |              |             |             |              |  | 45            | 45         |     |    |      |               |  |               |  |  |     |      |
|           | <b>Sum</b>                |               |              |             |             |              |  | <b>382.25</b> | <b>120</b> |     |    |      | <b>148.71</b> |  | <b>113.55</b> |  |  |     |      |
|           | <b>Total</b>              | <b>119.14</b> | <b>94.73</b> | <b>1.21</b> | <b>2.27</b> | <b>20.94</b> |  | <b>382.25</b> | <b>120</b> |     |    |      | <b>148.71</b> |  | <b>113.55</b> |  |  |     |      |
| Changzhi  | Pipeline network          |               |              |             |             |              |  | 578.4         | 308.4      | 120 | 45 | 91.5 |               |  | 13.5          |  |  | 245 | 858  |
| Xiangyuan | Pipeline network          |               |              |             |             |              |  | 1019.1        | 816        | 36  |    | 77.1 | 90            |  |               |  |  | 359 | 1265 |

Shanxi Gas Utilization Project

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|              |                  |               |              |             |             |              |              |             |               |               |            |              |               |           |               |             |           |            |             |             |
|--------------|------------------|---------------|--------------|-------------|-------------|--------------|--------------|-------------|---------------|---------------|------------|--------------|---------------|-----------|---------------|-------------|-----------|------------|-------------|-------------|
| Tunliu       | Pipeline network |               |              |             |             |              |              |             | 992.7         | 660           | 120        | 45           | 152.7         |           |               | 15          |           |            | 285         | 1140        |
| Qingxu       | Pipeline network |               |              |             |             |              |              |             | 370.5         | 216           | 60         | 13.5         | 72            |           |               | 9           |           |            | 205         | 796         |
| <b>Total</b> |                  | <b>220.21</b> | <b>140.9</b> | <b>1.21</b> | <b>2.27</b> | <b>28.15</b> | <b>44.33</b> | <b>3.34</b> | <b>3501.1</b> | <b>2228.5</b> | <b>336</b> | <b>103.5</b> | <b>568.86</b> | <b>90</b> | <b>136.71</b> | <b>37.5</b> | <b>60</b> | <b>197</b> | <b>1185</b> | <b>4352</b> |

### 3.6 Vulnerable Groups

Vulnerable groups consist of poor families with annual income per person lower than CNY2300, families with disabled person, families with lonely senior person, families of ethnic group, and families with woman as household head.

The survey shows, within the families affected by the 2 plants, there is no household of ethnic group. Within the surveyed households in Gucheng, there is a family with a woman as household head; there are 3 poor families whose annual net income per person is lower than 2300 yuan. There is only 1 person, aged 67, in the family with woman as household head, and she can only do a little farming job, which gives her only 1000 yuan. Among the other 3 poor families, there are only two old people, aged 64, in one family. Without any young labor, they rely on low-income subsidy for living. In one family, the male head is disabled, and is living with married children. There are 5 people in the family, with farming income only. Another poor family have 2 children in school; one is in senior high, and the other in junior high. The family is heavily burdened, and their livelihood comes from farming only. The RAP team initially determines that these 4 families are within the vulnerable group, and they account for 4.6% of the affected total.

Within the affected families in Houzhuang, there are 3 low-income families. There is only an old woman, aged 67, in one of them. She makes 1000 yuan through farming, and lives on her daughter's help. One household have a disabled woman, aged 27, level I visually handicapped. The whole family live on her husband's farming income solely. In one family, both the husband and wife are 40 years old. There is a 71-year-old sick man, and two children, one in junior high and one in primary school. The husband do farming and odd jobs, and the wife do farming and takes care of old and young. The team initially decide these 3 families are within vulnerable group, and they account for 8.8% of total.

For the 4 gas pipeline networks, as the accurate number of affected households cannot be identified now, the RAP team conducted questionnaire in villages along the pipeline. In the 84 surveyed households, there are 5 families belonging to vulnerable group, accounting for 4.8% of the total surveyed.

During RAP implementation, actual number of vulnerable groups will be determined based on detailed survey and census. The project owners promised to provide additional financial support (CNY2000 per household) for affected vulnerable groups and give priority to them for temporary and permanent employment opportunities during project implementation.

### 3.7 Impact Analysis

As project construction requires land acquisition, the quantity of farmland in the affected village will be reduced to certain degree, which will bring some impact upon local villagers' life and farming. However, as the construction contents among the 6 components vary greatly, the affected range and contents will be also different. The 2 plants require mainly permanent land

acquisition, and the range of impact is limited to 2-3 villages. The 4 networks require mainly temporary land acquisition, and they will cause wide range of impact. Therefore, the two categories of components will cause different impact to local regions, and need to be analyzed by category.

### 3.7.1 CHP Plants

Though the two plants both require permanent land acquisition, and the quantity of land and affected households is close, the impact of the two plants to local regions varies with natural conditions and socioeconomic development.

#### 1) Xiyang plant

The plant affects 2 towns and 8 villages, among which Gouzhuang village of Dazhai town is where the plant locates. Most construction of the plant occurs in this village, with a large amount of permanent and temporary land acquisition, and a large number of affected households. Therefore, the impact is great. In addition, the plant site will also involve small amount of permanent land acquisition from Houlongfengnao Village. For transmission line connection, only 1.8 mu land for tower bases of power line is respectively required in Yanguo village of Dazhai Town, and Huangyandi village and Huangyan village of Zhaobi Township. The land is unused, and no household is affected. Shutiaoyu, Huwo and Liuzhuang of Dazhai is affected by temporary land use of water supply pipelines, only 10 mu of each village is affected, 7-8 households are affected, and the affected time lasts only 4 months. The compensation for temporary land use can fully make up the short-term land loss. Therefore, the construction of the project only causes limited impact on all villages, except Houzhuang and Houlongfengnao.

The plant in Houzhang and Houlongfengnao requires 101.07 mu land permanently, among which 46.19 mu is dry land. It also requires 90.2 mu land temporarily, among which 76.8 mu is dry land. There are 34 households and 110 people affected by permanent land acquisition and 26 households and 64 people affected by temporary land acquisition. According to the survey, the 34 affected households by permanent land acquisition have 200.5 mu of land holding, averaging 1.8 mu per capita. The acquisition of 46.19 mu farmland will account for 23.1% of land loss for these 34 households. Based on survey, the land to be used by the project is mainly dry land, with output value of 800-1000 yuan per mu. Based on CNY1000 per mu of annual output value, per capita income loss each year will be CNY420 per year. The Questionnaires show the net annual income per person is 7,463.7 yuan, and land acquisition will make them lose 5.6% of their annual income. In general, the impact upon affected household is limited, which varies among households with different proportion of land losses. .

There are 6 households or 17.6% will lose less than 10% of their land holding, their average loss will be 8.5%, and their per capita annual income loss will be CNY148 or 2% of their annual income. There are 18 households or 53% will

lose 10% to 30% of their land holding, their average loss will be 21.3%, and their per capita annual income loss will be CNY397 or 4.6% of their annual income. There are 10 households or 29.4% will lose 30% to 50% of their land holding, their average loss will be 37.2%, and their per capita annual income loss will be CNY666 or 8.9% of their annual income. For detail please refer Table 3.7-1.

**Table 3.7-1: Land Loss Impacts for Houzhuang and Houfengnao Village**

| Degree of Losses | No. of Household | Persons | Total Farmland Before Land Acquisition (mu) | Acquired Farmland (mu) | Percent of Land losses (%) | Annual Income Loss CNY | Per Capita Income Loss CNY |
|------------------|------------------|---------|---|------------------------|----------------------------|------------------------|----------------------------|
| <10%             | 6                | 21      | 36.68                                       | 3.1                    | 8.5                        | 3100                   | 148                        |
| 10%-30%          | 18               | 60      | 111.47                                      | 23.79                  | 21.3                       | 23790                  | 397                        |
| 30%-50%          | 10               | 29      | 51.9  | 19.3                   | 37.2                       | 19300                  | 666                        |
| 合计               | 34               | 110     | 200.05                                      | 49.01                  | 23.1                       | 46190                  | 420                        |

## 2) Baode plant

The Baode plant will affect 2 towns and 8 villages, 71 households and 254 people. 26 households, 87 people will be affected by permanent land use, and 45 households and 167 people by temporary land use.

For the 8 affected villages, only Gucheng suffers double impact from both permanent and temporary land use, and 7 other villages - Shantou, Cuijiachang, Qianhe, Jiaonigeda, Lixianling, Zhanjiageda, and Wangjiatan – will be affected by temporary land use only. The compensation for each affected household is enough to make up the short-term land loss. Therefore, the impact upon all villages is small, and villagers' income will be restored and even improved soon.

The plant requires 119.14 mu land in Gucheng permanently, among which 98.21 mu is farmland, affecting 26 households and 87 people. According to the survey, the 21 affected households by permanent land acquisition have 170.1 mu of land holding, averaging 2.4 mu per capita. Among them, 68.1 mu is irrigated land. The acquisition of 49.04 mu farmland will account for 28.83% of land loss for these 21 households. And most acquired land are dryland.

Based on the survey, the land to be used by the plant is mainly dry leveled land and slope land, with annual output of 500-600 yuan.. Questionnaires show the net annual income per person is more than 7,000 yuan, and land acquisition will make them lose 5.92% of their annual income. In general, the impact upon affected household is slight, which varies among households with different proportion of land losses. .

There are 2 households or 9.52% will lose less than 10% of their land holding, their average loss will be 7.23%, and their per capita annual income loss will be CNY108 or 1.5% of their annual income. There are 7 households or 33.3% will lose 10% to 30% of their land holding, their average loss will be 19.9%, and

their per capita annual income loss will be CNY307 or 4.4% of their annual income. There are 8 households or 38.1% will lose 30% to 50% of their land holding, their average loss will be 37.6%, and their per capita annual income loss will be CNY479 or 6.8% of their annual income. There are 4 households or 19.05% will lose 50% to 70% of their land holding, their average loss will be 56.9%, and their per capita annual income loss will be CNY905 or 12.9% of their annual income. For detail please refer Table 3.7-2.

**Table 3.7-2: Land Loss Impacts for Gucheng Village in Baode County**

| Degree of Losses | No. of Household | Persons   | Total Farmland Before Land Acquisition (mu) | Acquired Farmland (mu) | Percent of Land losses (%) | Annual Income Loss CNY | Per Capita Income Loss CNY |
|------------------|------------------|-----------|---|------------------------|----------------------------|------------------------|----------------------------|
| <10%             | 2                | 10        | 24.9  | 1.8                    | 7.23                       | 1080                   | 108                        |
| 10%-30%          | 7                | 25        | 64.5  | 12.81                  | 19.86                      | 7686                   | 307                        |
| 30%-50%          | 8                | 28        | 59.5  | 22.36                  | 37.58                      | 13416                  | 479                        |
| 50%-70%          | 4                | 8         | 21.2  | 12.07                  | 56.93                      | 7242                   | 905                        |
| <b>total</b>     | <b>21</b>        | <b>71</b> | <b>170.1</b>                                | <b>49.04</b>           | <b>28.83</b>               | <b>29424</b>           | <b>414</b>                 |

According to the survey, the affected households have an average of 1.43 mu dry land and slope land per person, as well as an average of 1 mu irrigated land. The irrigated land can grow vegetables, with annual average income of 5000-8000 yuan. The farming income of villagers mainly comes from irrigated land. Therefore, acquisition of dry land cause little impact upon villagers.

In general, the village owns a large amount of farmland, and the land to be used is mainly slope land. The average yield of such land depends largely on weather, and villagers farm extensively but harvest little, or give up such land completely. Therefore, land acquisition will have limited impact upon these households.

### 3.7.2 Gas Pipeline Networks

In general, the 4 pipeline networks' impact is extensive. Some networks covers all towns of county, a large quantity of farmland is affected, as well as a large number of households. However, each network requires only temporary land use, and the time is short, generally 3-4 months. In addition, the construction team will avoid the spring and autumn when installing the pipelines, and restore the used land strictly to the original conditions in accordance with the restoration scheme approved by the Land and Resources Bureau after the construction completes, to ensure next year's farming is not be affected. Restoration of affected land areas will be carried out one to two months after construction. There are no any restrictions for people to farm on the restored land areas. Therefore, the impact of pipeline network is restricted to a very limited degree.

#### 1) Changzhi pipeline network

The network will affect 10 towns and 37 villages. When pipelines are buried, 578.4 mu land is required temporarily, among which 308.4 mu is dry land, accounting for 53.2% of the total; 120 mu is vegetable land, accounting for 20.75% of the total; 45 mu is gardening land, accounting for 7.78% of the total; 91.5 mu is unused land, accounting for 15.82% of the total; 10.5 mu country road, accounting for 2.33% of the total. Altogether 245 household and 858 persons will be affected.

In general, the network requires relatively a large amount of farmland temporarily, including 120 mu vegetable land and 45 mu gardening land. Many households will be affected. Therefore, though the land acquisition is temporary, and the time is short, it still will cause some adverse impact upon households. The loss on the dry land and vegetable land for one season amounts to about CNY668,400. In addition, more than 5,000 fruit trees, CNY400,000 in value, need to be transplanted.

### **2) Xiangyuan pipeline network**

The network will affect 11 towns and 41 villages. To bury the pipeline, 1019.1 mu land is required temporarily, among which 816 mu is dry land, accounting for 80% of the total; 36 mu is vegetable land, accounting for 4% of the total; 77.1 mu is unused land, accounting for 8% of the total; 90 mu is forest land, accounting for 9% of the total. Altogether, 359 households and 1265 persons will be affected.

In general, the network uses dry land mostly, as well as some vegetable land and forest land. A big number of households will be affected. Therefore, though the land acquisition is temporary, and the time is short, it still will cause some adverse impact upon households. The loss on the dry land and vegetable land for one season amounts to about CNY924,000. In addition, more than 1,800 fruit trees, CNY144,000 in value, need to be transplanted.

### **3) Tunliu Pipeline Network**

The network will affect 8 towns and 47 villages. To bury the pipeline, 992.7 mu land is required temporarily, among which 660 mu is dry land, accounting for 66.5% of the total; 120 mu is vegetable land, accounting for 12.09% of the total; 45 mu is gardening land, accounting for 4.53% of the total; 152.7 mu is unused land, accounting for 15.38% of the total; 15 mu is country road, accounting for 1.51% of the total. Altogether, 285 households and 1140 persons will be affected.

In general, the network uses dry land mostly, as well as some vegetable land and gardening land. A big number of households will be affected. Therefore, though the land acquisition is temporary, and the time is short, it still will cause some negative impact upon households. The loss on the dry land and vegetable land for one season amounts to about CNY1.02 million. In addition, more than 5,000 fruit trees, CNY400,000 in value, need to be transplanted.

### **4) Qingxu pipeline network**

The network will affect 2 towns and 22 villages. To bury the pipeline, 370.5 mu land is required temporarily, among which 216 mu is dry land, accounting for 58% of the total; 60 mu is vegetable land, accounting for 16% of the total; 13.5

mu is gardening land, accounting for 4% of the total; 9 mu is country road, accounting for 2% of the total. Altogether, 205 households and 796 people will be affected.

In general, the network uses dry land mostly, as well as some vegetable land and gardening land. A big number of households will be affected. Therefore, though land acquisition is temporary, and the time is short, it still will cause some adverse impact upon households. The loss on the dry land and vegetable land for one season amounts to about CNY324,000. In addition, more than 1,500 fruit trees, CNY120,000 in value, need to be transplanted.

## 4. Resettlement Policy Framework

The RAP under the project is compiled in accordance with the World Bank policy of OP/BP 4.12 and the laws, regulations and local rules of the People's Republic of China. Resettlement implementation will be made by strictly abiding to the policies and criteria made in this resettlement plan. In case of any changes during the implementation, the World Bank will be kept informed in time.

### 4.1 Fundamental Policies

The legal and policy frameworks of the resettlement action plan are as follows.

- Operational Policy on Involuntary Resettlement (OP/BP 4.12)
- The Law of Land Administration of the People's Republic of China (Adopted in June 1986, revised in 1988, 1998, 2004).
- Forest Law of The People's Republic of China (Adopted in September 1984, revised in April 1998)
- Implementation of Forestry Law of the Peoples Republic of China (Promulgated in June 17, 2005)
- Rules on the Assignment of the State-owned Land Use Right by Means of Bid Tendering, Auction and Quotation (Promulgated by the Decree No.11 by the Ministry of Land and Resources of the People's Republic of China and come into force on July 1, 2002)
- State Council's Decision of Deepening Reform and Strengthening the Management of Land (State issue [2004] No.28, issued on Oct. 21, 2004)
- Regulations of Shanxi Province on Implementing the "Land Administration Law of the People's Republic of China" (Adopted On September 26, 1999, revised on May 16, 2008)
- Measures of Shanxi Province on Distributing the Compensations for the Acquisition and Occupation of Land Collectively Owned by Rural Farmers (Circular No. 182 by Shanxi Province People's Government, issued on Oct. 18, 2005, and effective on Dec. 1, 2005)
- Circular of Shanxi Government Concerning Unified Standard of Annual Land Output Values in Land Acquisition (Jinzhengfa [2009] No. 38, issued and effective on Dec. 10, 2009)
- Regulations on Land Reclamation (Adopted on Feb. 22, 2011, issued and effective on Mar. 5, 2011)
- Interim Regulations of Shanxi Province on Charging Compensations for Forest Land Acquiring and Occupying and for Vegetation Restoration (Effective as of January 1, 2009)
- Implementation Measures of Shanxi Province on Administrating the Levy and the Use of Fee for Forest Vegetation Restoration (Jincaizong [2002]No.155, issued and effective on Dec. 27, 2002)
- Regulations of Shanxi Province on Review and Approval of Forest Land Acquisition and Occupation (Including Temporary Occupation)

## 4.2 Related Laws and Regulations

### 4.2.1 Key Provisions from the *World Bank Operational Policy on Involuntary Resettlement (OP 4.12)*

The goal of resettlement plan by World Bank is to ensure that the resettled persons will be benefited from the project. As involuntary resettlement is an integral part of the project, the following activities should be performed at the initial and preparatory phase of the project.

(1) Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs.

(2) Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons resettled by the project to share in project benefits. Resettled persons<sup>3</sup> should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs.

(3) Resettled persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

(4) All the persons impacted by the project are provided prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project to improve or at least restore their living standard.

"Replacement cost" is the method of valuation of assets that helps determine the amount sufficient to replace lost assets and cover transaction costs. In applying this method of valuation, depreciation of structures and assets should not be taken into account.

(5) All persons impacted by the project are to be benefited from the project. Subsidies should be provided in addition to the compensation for the losses of their property for restoration. The persons losing the property, equity, legal domicile permit, business, land exploitation, or building attributed directly to the project, should be treated the same as those with legitimate assets, equity or franchise, in life restoration and asset compensation.

### 4.2.2 Key Provisions from the *Land Administration Law of the People's Republic of China*

**Article 42** The land use institution or individual shall be responsible for restoration if damages are made to the land due to diggings, collapse, or seizure. If the institution or individual is not qualified to perform the restoration or the restoration does not comply with requirements, restoration cost shall be paid, and the paid amount shall be used for the restoration only. The restored land shall be used for agricultural purpose in priorities.

**Article 47** Land requisitioned shall be compensated for on the basis of its

original purpose of use.

Compensation for requisitioned cultivated land shall include compensation for land, resettlement subsidies and attachments and young crops on the requisitioned land. Compensation for requisition of cultivated land shall be six to ten times the average annual output value of the requisitioned land for three years preceding such requisition.

Resettlement subsidies for requisition of cultivated land shall be calculated according to the agricultural population needing to be resettled. The agricultural population needing to be resettled shall be calculated by dividing the amount of requisitioned cultivated land by the average amount of the original cultivated land per person of the unit the land of which is requisitioned.

The highest resettlement subsidies to be divided among members of the agricultural population needing resettlement shall not exceed fifteen times its average annual output value for the three years preceding such requisition.

Standards of land compensation and resettlement subsidies for requisition of other types of land shall be prescribed by provinces, autonomous regions and municipalities directly under the Central Government with reference to the standards of compensation and resettlement subsidies for requisition of cultivated land.

Standards for compensation for attachments and young crops on the requisitioned land shall be prescribed by provinces, autonomous regions and municipalities directly under the Central Government.

For requisition of vegetable plots in city suburbs, the land users shall pay towards a development and construction fund for new vegetable plots in accordance with the relevant regulations of the State.

If land compensation and resettlement subsidies paid in accordance with the provisions of the second paragraph of this Article are still insufficient to help the peasants needing resettlement to maintain their original living standards, the resettlement subsidies may be increased upon approval by people's governments of provinces, autonomous regions and municipalities directly under the Central Government. However, the total land compensation and resettlement subsidies shall not exceed 30 times the average annual output value of the requisitioned land for the three years preceding such requisition.

**Article 48** After the plan for land compensation and resettlement fees is finalized, related local people's governments shall make an announcement and hear the opinions of the rural collective economic organizations and peasants whose land has been requisitioned.

**Article 49** The rural collective economic organization, the land of which is requisitioned, shall accept supervision by making known to its members the income and expenses of the compensation received for land requisition.

The compensation and other charges paid to the unit for its land

requisitioned is forbidden to be embezzled or misappropriated.

**Article 57** Where land owned by the State or by peasant collectives needs to be used temporarily for construction of projects or for geologic prospecting, the matter shall be subject to approval by the land administration departments of people's governments at or above the county level. However, if the land to be temporarily used is located in the area covered by urban planning, the matter shall be subject to agreement by the urban planning administration department concerned before it is submitted for approval. The land user shall, depending on who owns the land and who has the land-use right, enter into a contract for the temporary use of the land with the land administration department concerned, or the rural collective economic organization, or the villagers committee and pay compensation for it in accordance with the provisions of the contract.

The temporary land user shall use the land for purposes stipulated in the contract for temporary use of the land and may not build permanent structures on it.

Generally, the period for temporary use of land shall not exceed two years.

#### **4.2.3 Key Provisions in the *Rules for Transferring Use Right of State-Owned Land through Tendering, Auction or Opening Bidding***

**Article 4** The land for business operations such as commerce, tourism, entertainment and commercial residence buildings shall be transferred through tendering, auction or opening bidding. For a piece of land not in the category as defined above but with two or more intended buyers, the land shall also be transferred through tendering, auction or opening bidding

#### **4.2.4 Key Provisions in the *State Council's Decision of Deepening Reform and Strengthening Land Management***

(12) Improving compensation the measures for land expropriation: The local people's government at or above county level will take effective measures to ensure the living standard of the farmers not to be lowered due to land expropriation, to ensure the full and timely payment of the compensations for the expropriated land, the resettlement subsidy and the ground attachment and/or crops. In case the amount of the compensation for land requisition and resettlement in accordance with the prevailing laws and regulations is not sufficient for maintaining the original living standard of farmers due to land expropriation and the social security of the farmers of land requisition, the government at province, autonomous region or direct municipality will approve the increase in resettlement subsidy. In case the total sum of land compensation and resettlement subsidy has reached to the upper limit but still not sufficient for the farmers to maintain the original living standard, the local government will provide the further subsidy using the revenue from the transfer of state-owned land. The government at province, autonomous region or direct

municipality will make and promulgate unified standard for the annual land output values or the comprehensive land price in predefined area to ensure the same price for equivalent land. For national key projects, the compensation for land requisition shall be fully included into the project budget.

(13) Properly arranging farmers' resettlement: The local government at or above county level will make specific measures to ensure the long-term means of economic resources for the farmers of land requisition. For the project, with stable revenue the farmers may obtain the equity with the land with legitimate approval for such construction. In case the land is for urban expansion according to city planning, the farmers of land expropriation shall be included into the urban/town employment system by local government. In places beyond urban area, the local people government shall reserve the necessary farmland or job positions for the farmers whose collectively-owned land is expropriated. Relocation settlement will be arranged for farmers without basic production and living conditions. The department of labor and social security along with the relevant administrative departments will provide directives on employment training and social security system for the farmers of land requisition.

(14) Improving the land requisition process: In the process of land requisition, rights of farmers will be maintained in terms of collective ownership of the land and the associated rights contract and business operation. Prior to legitimate application for administrative approval of land requisition, the farmers will be kept informed about land to be expropriated including the use, location, standard for compensation and resettlement plan. The survey results on the land to be expropriated must be verified by the collective economic organization of the village and the farmers. If necessary, the administrative department of land resources will organize the public hearing. The verified documents showing the farmers have had the full knowledge about land requisition must be provided in application for administrative approval to land requisition. It is necessary to accelerate and complete the establishment of the system for coordinating and arbitrating the disputes in compensation and resettlement attributed to land requisition to maintain the legal rights of the farmers in the process. The official approval to land requisition will be publicized expect for special cases.

(15) Strengthening monitoring and supervision over land requisition process: No land will be forcefully expropriated without the actual implantation of compensation and resettlement. The government at province, autonomous region or direct municipality will formulate the measures for allocating the revenue from the compensation for land requisition within/among the collectively-owned economic organization(s) in accordance to the principle that the compensation will be mainly used for the farmer households of land expropriation. The collective economic organization of land expropriation should promulgate the payments and distribution of the compensation fees of land expropriation, and be supervised as well. Agricultural and civil affairs departments should strengthen the supervision of distribution and usage of the compensation fees of the internal collectively-owned economic organization(s).

#### **4.2.5 Key Provisions in the *Regulations of Shanxi Province on Implementing the Land Administration Law***

**Article 27** For land acquisition, land users should pay the compensation fees according to the following standards:

(1) For basic farmland (orchard, fishing pool and lotus pond are all considered as basic farmland), the compensation fees should be eight to ten times of the average annual output value of three years prior to acquisition;

(2) For farmland other than basic farmland, the compensation fees should be six to nine times of the average annual output value of three years prior to acquisition;

(3) For pasture and grassland, the compensation fees should be seven times of the average annual output value of three years prior to acquisition;

(4) Forestland acquisition should be compensated according to the relevant rules and regulations;

(5) Housing land expropriation should be compensated according to the compensation standards of the neighboring farmland;

(6) Compensation standards for vacant land, desolated hills, desolated land and desolated sands should be three to six times of the average annual output value of the farmland of the village of three years prior to acquisition;

(7) Threshing floor, drying area and other types of land for collective use should be compensated according to the compensation standards of the original type of the land.

**Article 28** For land acquisition, land users should pay resettlement subsidy according to the following standards:

(1) For basic farmland (orchard, fishing pool and lotus pond are all considered as basic farmland), the resettlement subsidy should be five to six times of the average annual output value of three years prior to acquisition;

(2) For farmland other than basic farmland, the resettlement subsidy should be four to five times of the average annual output value of three years prior to acquisition;

(3) For pasture and grassland, the resettlement subsidy should be five times of the average annual output value of three years prior to acquisition;

(4) Forestland acquisition should be subsidized according to relevant rules and regulations;

The resettlement subsidy of acquired land in the provisions mentioned above should be no more than 15 times of the average annual output value of three years prior to acquisition per hectare.

Acquiring house premises, vacant land, desolate land, hills and sands and drying fields will not be subsidized with resettlement subsidy.

**Article 30** According to Article 27 and 28, if the resettled people cannot maintain their living standard with the paid compensation and resettlement subsidy, they can get additional subsidy with approval of the provincial government. However, the total sum of compensation and resettlement subsidy cannot exceed thirty times of the average annual output value of three years prior to acquisition.

**Article 31** For land acquisition, land users should pay compensation fees for land attachment and standing crops according to the following standards:

(1) Land attachment like buildings and structures can be compensated based on the evaluated price according to relevant regulations or the same quantity and quality;

(2) The value of standing crop should be calculated by the value of crop less than one season;

(3) For the trees that can be bedded out, the labor cost and cost for trees lost during bedding out should be paid. If the trees cannot be bedded out, the trees will be compensated based on evaluated price according to relevant regulations;

(4) Fish, lotus root, grass and other products should be compensated based on the evaluated price according to relevant regulations;

Trees and other surface attachment planted or built after the land acquisition plan is publicized won't be compensated.

Illegal buildings and other facilities on the land that will be acquired won't be compensated.

#### **4.2.6 Key Provisions in the *Measures of Shanxi Province on Distributing the Compensations for the Acquisition and Occupation of Land Collectively Owned by Rural Farmers***

**Article 5** The administrative department of agriculture and agricultural economy will strengthen the allocation and use of the revenue from land compensation within the collective economic organization in village.

**Article 6** Prior to legitimate application for administrative approval of land requisition, the administrative department of Land and Resources at county level or higher will keep the farmers, the collective economic organization and the owner of land attachment informed in written about land to be expropriated including the use, location, area, standard for compensation and resettlement plan.

The administrative department of Land and Resources at county level or higher will make the surveys on the land to be expropriated in terms of ownership, category, and area, and of the ground attachment in terms of kinds and quantity. The survey results must be verified by the individual or collective owner(s) of the land and land attachment in the village. The verified documents must be provided in application for administrative approval to land requisition. The official approval to land requisition will be publicized expect for special cases.

**Article 10** The entity of land acquisition will make the full payment for land compensation within 3 months upon the approval of the land requisition and resettlement plan. Upon the agreement of the farmers the payment for land compensation may be made in installment.

Prior to the actual payment for land compensation, the administrative department of land and resources shall neither issue the approval letter for the land to construction project, nor process the land supply procedure; the entity of land acquisition is forbidden to use the land by means of force; the construction is not allowed to start; and the land owner(s) of farmer(s) and/or

rural collective economic organization(s) reserve(s) the right of land use.

**Article 13** For land which has clear ownership, when being partly or fully acquired, the compensation fee should be paid to the farmers at the proportion of no less than 80% and the remaining 20% will be left as collectively owned.

For land without clearly defined ownership, when being partly or fully acquired, no less than 80% of the compensation and resettlement subsidy will be divided equally among all members of the ownership. The rest part will remain collectively owned.

**Article 14** Compensation fee for land attachment and standing crops will be fully paid to the owners of the land attachment and standing crops.

**Article 15** The subsidy of resettlement will be paid according to the nature of resettlement. In case the resettlement will be uniformly arranged by the entity of land acquisition or other institution, the payment will be made to the entity implementing the resettlement. In case no uniform resettlement is necessary, the full payment will be made to the farmers of land expropriation.

**Article 17** Compensation fee left to rural collective economic organization is collective asset which should be incorporated in the management of public accumulative fund and public beneficiary fund for production, increasing accumulation, collective welfare, social welfare and so on. The fund will not be used to pay non-production expenses such as remuneration to officials, reception costs or debt payment.

The plan for the use of land compensation allocated to the collectively-owned rural economic organization will be come into effect only after being agreed by at least two-thirds of the organization's assembly or the representatives of the organization. The account will be publicized timely for public supervision.

**Article 18** The collectively-owned rural economic organization will timely publicize the availability of the fund from compensation for land expropriation, allocation and expenditure.

The administrative departments of agriculture and agricultural economy will audit and supervise the allocation and expenditure of the fund from compensation for land expropriation.

#### **4.2.7 Key Provisions in the *Circular of Shanxi People's Government on Promulgating Unified Standard of Annual Land Output Values in Land Acquisition***

II. The application of and the explanation for the uniform standard for land annual output values

The uniform standard of land annual output value for land requisition contains the uniform land annual output value and the coefficients, which is used as the basis for calculating the amount of land compensation.

(1) The standard is applicable to all the collectively owned land for agricultural within the jurisdiction of Shanxi Province expect for the basic farmland.

For the state key construction projects in energy, transportation, water resource work, mining sites and military facilities that are consistent with the “Law of PRC on Land Administration” and the “Regulations on Conserving Basic Farmland”, in case that the occupation of basic farmland is inevitable, the compensation for land expropriation shall be made according to maximal limit and the land supply is subject to the approval by the State Council.

(2) The standards for the annual output value made in this document refers to the comprehensive and abstract annual output value of agricultural land instead of the standard of annual land output value for any specific piece of land.

In land acquisition for non-agricultural purpose, the uniform annual output value and the coefficient depends on the geographical location of the land (county, city, or district), from which the amount of land compensation and resettlement will be calculated. In order to ensure the reasonable compensation for the agricultural lands of different quality within the same region, the uniform adjustment are made across the province, i.e. the coefficient doubled for irrigated land or vegetable land will be doubled based on the baseline value; the coefficient for irrigated or park land will be based on published value, the coefficient for forest land will be half of the published value, and the coefficient for grassland and other agricultural land will be one-fourth of the published value.

(3) The standards made in this document cover the compensation for land and subsidy for resettlement only, without including other compensations such as these for standing crops and land attachment. The amount of compensation for standing crops will be calculated according to the value no more than the output in one harvest season; and that for land attachment be calculated according to the actual situation and the relevant state and provincial regulations. In case of forest land the entity of land acquisition will make payments for land compensation and resettlement subsidy in accordance with this document, which will be calculated according to the state regulations on the standard for compensation for trees and for forest restoration.

(4) The compensation for the state-owned agricultural land will be made in reference to the standard as defined above.

(5) The compensations for the land other than agricultural land shall be made in accordance with the locally promulgated standard for the land’s annual output value in reference to the upper limit as defined in the “Regulations of Shanxi Province on Implementing the ‘The Law of Land Administration of the People's Republic of China’”.

**Appendix 1: Summary of Unified Annual Land Output Values and Land Acquisition Compensation Standards in Related Counties**

**Table 4.2-1 Summary of annual land output values and land acquisition compensation standards in related counties in Shanxi Province**

| County | Area No. | Area name | Uniform annual land output value | Compensation coefficient (multiplication) |      |          | Compensation cost (yuan/mu) |
|--------|----------|-----------|----------------------------------|---|------|----------|-----------------------------|
|        |          |           |                                  | Sum                                       | Land | Displace |                             |

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|           |                             |  | (yuan/mu)   |             | compensation multiple | ment multiple |              |
|-----------|-----------------------------|--|-------------|-------------|-----------------------|---------------|--------------|
| Xiyang    | I                           | Mountain area of earth and stones in northwest | 716         | 23          | 9                     | 14            | 16468        |
|           | II                          | Hilly area in the middle                       | 979         | 22          | 8                     | 14            | 21538        |
|           | III                         | Planning area in the county                    | 1438        | 28          | 9                     | 19            | 40264        |
|           | IV                          | Hilly area in the east                         | 831         | 23          | 9                     | 14            | 19113        |
|           | Unified annual output value |  | 856         | 22.8        | /                     | /             | 19305        |
| Changzhi  | I                           | Hilly area in northwest                        | 1104        | 21          | 9                     | 12            | 23184        |
|           | II                          | Plain area in mid-north                        | 1426        | 21          | 9                     | 12            | 29946        |
|           | III                         | Hilly area in the east                         | 759         | 26          | 9                     | 17            | 19734        |
|           | IV                          | Urban planned area                             | 1265        | 28          | 9                     | 19            | 35420        |
|           | V                           | Mountain area in the south                     | 736         | 26          | 9                     | 17            | 19136        |
|           | VI                          | Hilly area in southeast                        | 736         | 26          | 9                     | 17            | 19136        |
|           | Unified annual output value |  | 943         | 24          | /                     | /             | 22653        |
| Xiangyuan | I                           | Hilly area in mid-north                        | 1063        | 23          | 7                     | 16            | 24449        |
|           | II                          | Mining area along the road                     | 1193        | 25          | 8                     | 17            | 29825        |
|           | III                         | Hilly area in southwest                        | 1090        | 23          | 7                     | 16            | 25070        |
|           | IV                          | Urban mining development area                  | 1518        | 26          | 8                     | 18            | 39468        |
|           | Unified annual output value |  | 1110        | 23.5        | /                     | /             | 26126        |
| Tunliu    | I                           | Mountain area in west                          | 1127        | 22          | 8                     | 14            | 24794        |
|           | II                          | Hilly area in center                           | 1142        | 23          | 8                     | 15            | 26266        |
|           | III                         | Urban planned area                             | 1318        | 28          | 8                     | 20            | 36904        |
|           | IV                          | Plain area in east                             | 1323        | 27          | 8                     | 19            | 35721        |
|           | Unified annual output value |  | <b>1179</b> | <b>23.7</b> | <b>/</b>              | <b>/</b>      | <b>27898</b> |
| Qingxu    | I                           | Urban planned area                             | 4100        | 25          | 8                     | 17            | 102500       |
|           | II                          | Mining and industry development area           | 1200        | 25          | 8                     | 17            | 30000        |
|           | III                         | Construction area in small town                | 810         | 25          | 8                     | 17            | 20250        |
|           | IV                          | Plain area in mid-south                        | 1000        | 25          | 8                     | 17            | 25000        |

|                             |                        |      |    |   |    |       |
|-----------------------------|------------------------|------|----|---|----|-------|
| V                           | Mountain area in north | 850  | 25 | 8 | 17 | 21250 |
| Unified annual output value |                        | 1078 | 25 | 8 | 17 | 26945 |

## **Appendix 2: Compensation Standard for Land Acquisition in Baode**

On March 13, 2013, Baode government office (BGO) issued the *Circular on Adjusting Compensation Standard for Land Acquisition* (BGO[2013] No. 25), adjusting the compensation standard for acquired land in the whole county.

The adjusted standard is as follows:

Irrigated land: 65,000 yuan/mu

Dry leveled land, dike field, and house site: 32,000 yuan/mu

Unused land: 5,000 yuan/mu

### **4.2.8 Key Provisions in the Land Restoration Regulations**

**Article 3** The land destroyed through construction activities shall be restored to the original status by the construction institution or individual (hereinafter called “the liable party”), following the principle: The one who has made the destruction shall be the one who makes the restoration.

**Article 4** Land should be used in thrift and intensive ways during construction activities, and farmland acquisition should be tried to eliminated or reduced to the minimum. Effective measures should be taken for legally acquired land to reduce damage area and degree.

**Article 5** The Ministry of Land and Resources of State Council is responsible for supervision and management over land restoration in whole country. The Land and Resources Bureau of county level or above is responsible for supervision and management over land restoration in its administrative region.

**Article 10** The liable party shall be responsible for restoration of the following destroyed land:

- 1) Ground surface destructed through such activities as open mining, brick and tile burning, sand dredging, and soil borrowing;
- 2) Land collapse due to underground mining or other activities;
- 3) Land seized for piling of solid waste, such as mining overburden, waste stones, waste residue, and coal powder;
- 4) Land destruction caused by temporary acquisition for construction activities, including construction of public energy, transportation and irrigation facilities;

**Article 11** The restoration scheme should be formulated in accordance with restoration standards and regulations by the Ministry of Land and Resources.

**Article 13** The land restoration scheme should be submitted along with the application for land acquisition or the application for mining rights.

**Article 15** The land restoration cost should be listed among the construction cost or the total budget of construction.

**Article 16** The liable party should establish a restoration quality control system, abide by restoration standards and environment protection standards, protect soil quality and ecological environment, and avoid pollution of soil and underground water.

The liable party shall first strip the surface soil from the farmland, forest land or grassland to be destructed. The stripped soil will be used for land restoration.

It is prohibited to back fill heavy metal pollutant or any other poisonous or harmful substance among the backfilling materials. If the land is contaminated by heavy metal pollutant or any other poisonous or harmful substance, and the restored land does not comply with national standards, edible crops are not allowed to plant on the land.

**Article 17** The liable party shall report land destruction information, restoration cost use, and execution information of the year to the Land and Resources Bureau above the county level before December 31 every year.

The Land and Resources Bureau above the county level shall strengthen its supervision over the use of restoration cost and execution of restoration by the liable party.

**Article 18** If the liable party will not restore the land, or the restoration remains unqualified though rectified after restoration acceptance inspection, the liable party shall pay restoration cost with which the Land and Resources Bureau find other institution to do the job.

**Article 19** Besides the restoration cost, the liable party shall also compensate the loss to the institute or individuals whose land in use or land collectively owned by village is destructed by the liable party during construction activities. The loss compensation shall be agreed upon by the two parties through negotiations. If not, the damaged party can appeal to the Land and Resources Bureau for arbitration or to the civil court for lawsuit.

**Article 28** When the liable party have fulfilled the restoration task as required, it shall apply to the Land and Resources Bureau above county level for acceptance in accordance with the regulations of the Land and Resources Bureau. The Land and Resources Bureau accepting the application shall perform inspection for acceptance along with the same-level agricultural, forestry and environment protection bureaus.

To perform the acceptance, related experts should be invited for onsite survey, to examine whether the restored land complies with restoration standards and the restoration scheme. Information including category, area, and quality of restored land is to be verified, and the initial inspection result is to be publicized to seek comments of right holders. If any right holder raises objection to the restoration, the Land and Resources Bureau shall make further check along with related government bureaus, and feed back the check result to the right holder. If the right holder's opinion is true, rectification

suggestions shall be made to the liable party.

**Article 32** If the liable party restores the farmland, forest land or grassland destructed through construction activities to the original status in the defined period, the land occupancy tax that have been paid by the liable party can be returned in accordance with related tax collection laws and regulations of the state.

#### **4.2.9 Key Provisions in the *Implementation of Forestry Law***

**Article 16** In the event of surveying or exploiting mineral resources, or constructing road, water conservancy, power, communication and etc. projects needing to occupy or confiscate forest land, the following provisions must be adhered to:

(1) The unit using the land shall submit land use application to the competent forestry authority of the people's government at or above county level, and, after examination and approval, prepay forest cover restoration fees according to the standard stipulated by the state and collect approval document on forest land usage. The unit using the land shall conduct examination and approval procedures for use of land in construction with the approval document according to law. Without examination and approval by the competent forestry authority for the occupancy or confiscation of forest land, the competent land administration authority shall not process application for use of land in construction.

(2) For occupation or confiscation of forest land of shelter forest land or special-use forest land with an area over 10 hectares, or timber forest, economic forest or fuel forest as well as cutting blank over 35 hectares, or other forest land over 70 hectares, it shall be examined by the competent forestry authority of the State Council; for occupation or confiscation of forest land with an area below the above regulated amount, it shall be examined by the competent forestry authority of the people's government of province, autonomous region or municipality directly under the central authority. Occupation or confiscation of forest land of key forest zone shall be examined by the competent forestry authority of the State Council.

(3) When the unit using land needs to cut the forest wood on the forest land occupied or confiscated with approval, it shall apply for forest wood felling permit from the competent forestry authority of the people's government at or above county level where the forest land is located or from the competent forestry authority of State Council.

(4) The relevant competent forestry authority shall refund the forest cover restoration fees charged within 7 days as from the date of receipt of notice of non-approval.

**Article 17** Where ones need to occupy and use forest land temporarily, they shall obtain the approval of the competent authorities of the people's governments at or above county level. The period of temporary usage of forest land shall not exceed 2 years, and it's prohibited to construct permanent

structures on the temporarily used forest land; after such period expires, unit using land must restore forestry production conditions.

#### **4.2.10 Key Provisions in the *Interim Regulations of Shanxi Province on Compensations for Acquiring and Occupying Forest Land and Forest Vegetation Restoration***

**Article 2** Any entity and/or individuals with approval of forest land acquisition or occupation will pay the compensations for the land, trees, forest restorations, and resettlement subsidy.

**Article 8** The local administrative department of forestry will collect the compensations for the forest land, trees, and resettlement subsidy. In case the forest land rights were originally owned by individual(s), the compensations for the forest land, trees and resettlement will be returned to the previous owner(s). In case the trees were originally owned by individual, the compensation for these trees will be returned to the previous owner. The residual amount from the compensation for forest land and from other fees will be temporarily deposited in the local administrative department of forestry, and returned to the previous owner of the forest land if and only if the cost for forestation paid by such owner has reached total compensation amount with official verification and acceptance.

#### **4.2.11 Key Provisions in the *Implementation Measures of Shanxi Province on Adminstrating the Levy and the Use of Fees for Forest Vegetation Restoration***

**Article 6** The amount of fee for forest restoration will be determined according to the cost for forestation and the associated planning, design and seedling incubation among others for the area no smaller than the land to be expropriated. The specific unit amount is as follows.

- (1) 6 yuan per m<sup>2</sup> for the land of lumber forest, economic forest, charcoal forest, and tree seedling nursery;
- (2) 4 yuan per m<sup>2</sup> for land without established forest;
- (3) 8 yuan per m<sup>2</sup> for the land of shelter forest or forest of special purpose, and 10 yuan per m<sup>2</sup> for the land of national key shelter forest or forest of special purpose;
- (4) 3 yuan per m<sup>2</sup> for land of open forest or shrubs;
- (5) 2 yuan per m<sup>2</sup> for land suitable for forestation, land of deforestation or land after burning.

#### **4.2.12 Key Provisions in the *Regulations of Shanxi Province on Review and Approval of Forest Land Acquisition and Occupation (Including Temporary Occupation)***

I. Item for administrative examination: the administrative examination of forest land acquisition and occupation.

II. Targeted Entities and Events

1. The administrative examination on forest land acquisition and

occupation for prospecting, mineral extraction, or construction projects (hereafter as construction projects);

2. The administrative examination on the temporary occupation of forest land;

3. The administrative examination on forest land occupation for constructing the facilities directly for forest production and services within the forest area owned by the forest business entity.

IV. Procedure for administrative examination and approval: the application will be submitted to the department of forestry at county level, then to municipal level, and then to provincial level.

1. The applicant submits the application along with the relevant documents to the administrative department of forestry at county level;

2. The administrative department of forestry at county level examines the application documents and proposes the comments and measures for forest restoration;

3. The prospecting institution with proper certification will provide the *in situ* prospecting report, feasibility study, and assessment report;

4. The municipal administrative department of forestry examines the application documents and proposes the comments;

5. The provincial department of forestry examines and approves the application, and issues the "Approval to Forest Land Examination";

6. In case the application is subject to the examination by the State Administration of Forestry, the verified application will be submitted to the State Administration.

## **4.3 Compensation Standards under the Project**

The compensation standards under the project refer the compensation rate paid for permanent land acquisition, temporary land acquisition and ground attachments.

### **4.3.1 Compensation for Permanent Land Acquisition**

In this project, the two plants involve permanent land acquisition.

The land involved consists of dry land, irrigated land, gardening land, unused land and country road.

The compensation standard for permanent land acquisition is identified according to the *Summary of Annual Land Output Values for Land Acquisition* by the Shanxi Provincial Government, division of areas in the affected village by the county government, and the actual local compensation policies.

#### **1) Xiyang CHP plant**

Houzhuang and Yanwo of Dazhai town are of urban planned area. Based on the *Summary of Annual Land Output Values for Land Acquisition*, the compensation for this area is 40,264 yuan/mu. However, after consulting with the County Land Resource Bureau, the RAP team found the actual compensation for this area can reach CNY70,000 per mu. Compensations for country road, forest land, unused land and dry land are all the same. Huangyan and Huangyandi of Zhaobixiang are of central hilly areas. The compensation for such areas is CNY21538 per mu. According to information

from the County Land Resource Bureau, the actual compensation can reach CNY50,000 per mu.

## 2) Baode CHP plant

In Gucheng of Yangjiawan town, Baode County, 4 categories of land –dry land, irrigated land, gardening land, and unused land - are acquired for project construction.

**Table 4.3-1 Compensation standard for permanent land acquisition of Baode plant**

| Dry land (yuan/mu) | Irrigated land (yuan/mu) | Gardening land (yuan/mu) | Unused land (yuan/mu) |
|--------------------|--------------------------|--------------------------|-----------------------|
| 32000              | 65000                    | 32000                    | 5000                  |

### 4.3.2 Compensation for Long-Term Lease

Among the 4 pipeline networks, 3 of them need to set up a certain number of regulators. A regulator generally needs a space of 40m<sup>2</sup>. As routine the space for each regulator is rented at CNY10,000 usually. It is estimated by CNY10,000 each in this project.

### 4.3.3 Compensation for Temporary Land Acquisition

In this project, temporary land acquisition mainly involves dry land, vegetable land, gardening land, unused land, forest land, country road, and county road. County road consists of dirt road and concrete road.

There are not unified policies regarding compensation for temporary land acquisition. Some county government offices have issued unified standard, such as Baode. Some have the compensation standard regulated, such as Qingxu. Generally, compensation standards for all land, except the forest land, are established according to local government office's policies or according to unified output values issued by the provincial government. In the latter case, the standards are identified through negotiations among the construction team, county/town government and the affected village committee.

Based on the survey, compensations for all categories of land, except the forest land, are listed in Table 4.3-3.

**Table 4.3-3 Compensation standard for temporary land acquisition unit : yuan/mu**

| Component                 | Dry land | Vegetable land | Gardening land | Unused land | Country road | Country concrete road | County road |
|---------------------------|----------|----------------|----------------|-------------|--------------|-----------------------|-------------|
| Xiyang plant              | 1000     | 3000           | 1000           | 1000        | 1000         | 53333.6               | 10000       |
| Baode plant               | 1200     | 2000           | 1000           | 200         | 1000         | 53333.6               | 10000       |
| Changzhi pipeline network | 1500     | 3000           | 1500           | 1000        | 1500         | 53333.6               |             |

|                            |      |      |      |      |      |         |  |
|----------------------------|------|------|------|------|------|---------|--|
| Xiangyuan pipeline network | 1500 | 3000 | 1500 | 1000 | 1500 | 53333.6 |  |
| Tunliu pipeline network    | 1500 | 3000 | 1500 | 1000 | 1500 | 53333.6 |  |
| Qingxu pipeline network    | 1000 | 3000 | 1000 | 500  | 1000 | 53333.6 |  |

To identify the compensation for forest land, a professional forest survey team is needed, combining the survey result with laws and regulations of the state and Shanxi province.

The compensation fee for temporary forest land acquisition falls into 3 parts: vegetation restoration cost, compensation for forest land, and compensation for trees. When the Xiangyuan pipeline network is distributed, it needs to go through a forest in the mid-north. Based on information of local forest department, the forest land belongs to the hilly area in the mid-north, and the unified annual output value is CNY1,063. The forest land is for timber trees, where poplar trees with diameter of the trunk around 10cm are grown. The compensation standard is listed below:

- 1) Vegetation restoration cost: timber forest, 6 yuan/m<sup>2</sup>, 4000 yuan/mu;
- 2) Compensation for forest land: 6793.96 yuan/mu {21×(7÷23)×1063=6793.96};
- 3) Compensation for trees: 80 yuan/tree (including the transplanting cost)

Before the land acquisition permission is granted, the compensation standard needs to be re-verified by the professional forest survey department.

#### 4.3.4 Security for Land Restoration

After the County Land and Resource Bureau approves the temporary land use, the project owner needs to pay the land restoration security, 18 yuan/ m<sup>2</sup> for farmland, that is, 12000 yuan/mu; 7.5 yuan/m<sup>2</sup> for unused land, that is, 5000 yuan/mu.

#### 4.3.5 Compensation for Ground Attachments

The ground attachments affected by the project mainly consist of walnut trees, date trees, poplar trees, and tombs. Based on survey information, the compensation standard for these is listed in Table 4.3-4.

**Table 4.3-4 Compensation standard for ground attachments**

| Item               | Compensation standard | Remarks   |
|--------------------|-----------------------|---|
| Walnut trees       | 50 yuan/tree          | Small trees   |
| Fruit trees        | 80 yuan/tree          | The compensation cost degrades by level of primary fruiting trees, trees and seedlings. |
| Date grow-up trees | 2750 yuan/tree        | With the diameter of trunk above 30cm   |

|              |  |  |
|--------------|--|--|
| Poplar trees | 80 yuan/tree   | With the diameter of trunk about 10cm    |
| Tombs        | 10000 yuan/tomb  | Local practice in Houzhuang, Dazhai      |
|              | 2000 yuan for each tomb;<br>36000 more if resettlement is needed | Standard made by Baode county government |

#### **4.4 Entitlement of Displaced Persons**

Any person affected by the project is entitled to the rights as shown in Table 4.4-1.

**Table 4.4-1 Entitlement Matrix**

| Impact category  | Affected persons  | Compensation and resettlement policies   | Compensation standard   |
|--|---|--|---|
| <p>Permanent land acquisition and ground attachments</p> | <p>Property Rights Owners;<br/>Property Contractors;<br/>Property Lessees</p> | <p>1. According to the <i>Circular on Implementing Unified Annual Output Value for Land Acquisition in the Whole Province by the Shanxi People's Government</i>, the compensation standard is 40,264 yuan/mu. However, the actual compensation standard is higher. For the actual figure, refer to the right column of this table.</p> <p>2. On March 13, 2013, Baode government office (BGO) issued the <i>Notice on Adjusting Compensation Standard for Land Acquisition</i> (BGO[2013] No. 25), adjusting the compensation standard for acquired land in the whole county. For the adjustment, refer to the right column of this table.</p> <p>3. The project owner pays the land transferring fee to the Land and Resources Bureau. The latter allocates and distributes the compensations for land requisition and for standing crops, as well as the resettlement subsidy to the village committee according to identified standard. All fees are paid to the special account of the town financial bureau.</p> <p>4. The compensation for Houzhuang and Houlongfengnao is paid as follows: Compensation is paid to families who lose their land by CNY15000/mu (1000 yuan/mu ×15 years (the years until the second round of land contract ends). 80% of the remaining compensation fee is distributed among all villagers. The affected villagers also share the second round of distribution, and 20% of the compensation remains in the village committee as public fund. Until the end of second round of land contracting period is over, the household who lose their land is entitled to the third round of land contract.</p> <p>5. Compensation is paid in Gucheng as follows: All land compensation will be paid to affected individuals for land areas under lease to individuals. For collectively owned farmland or other lands, all compensation will be kept in the village, to be used as collective fund for village welfare and development.</p> <p>6. Compensation for the affected villager is paid by the county/town financial bureau directly to the individual's account according to a list provided by the village committee.</p> <p>7. The distribution and use of land compensation are subject to auditing, review and supervision of county government, and the agriculture department.</p> <p>8. The compensation for ground attachments is fully paid to the property owner.</p> <p>9. Compensation for collectively-owned land is also collectively owned. As a part of public fund, it is used for village development, fund accrual, and public welfare.</p> <p>10. The project owner should pay the compensation in full to the affected households within</p> | <p><b>I Compensation for permanent acquisition</b></p> <p>1. Houzhuang: CNY70,000/mu<br/>2. Huangyan and Huangyandi: CNY50,000/mu<br/>4. Gucheng:<br/>Irrigated land: CNY 65,000/mu;<br/>Dry leveled land: CNY32,000/mu;<br/>Unused land: CNY 5,000/mu;</p> <p><b>II Compensation for ground attachments</b></p> <p>1. Yong walnut tree: CNY50/tree;<br/>2. Date tree: VNY2,750 /tree (trunk diameter≥30cm)<br/>3. Tomb:<br/>Houzhuang: CNY10,000/tomb<br/>Gucheng: CNY38,000/tomb</p> <p><b>III Long-term lease</b><br/>Regulator: CNY10,000/regulator</p> |

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|   |  |   |   |
|---|--|---|---|
|   |  | <p>3 months since the date on which the resettlement plan is approved. The compensation can also be paid by installment as agreed by the affected villagers.</p> <p>11. Regulators are required in the pipeline network. As they do not take much space, generally long-term rent is paid. For the amount of rent, refer to the right column of this table.</p>   |   |
|   | Vulnerable Groups                              | <p>For those affected vulnerable groups by permanent land acquisition, the project owner promise to provide additional financial support to facilitate the process of livelihood restoration and rehabilitation.</p>  | <p><b>The standard of assistance for vulnerable Groups</b><br/>CNY2000 per family</p>   |
| Temporary land acquisition and ground attachments | Land contractor, Village as a collective group | <p>1. The compensation standard for temporarily acquired farmland and unused land are agreed upon among the construction company, county/town government, and the affected village. For the compensation standard regulated by the government in the writing from and the compensation standard in practice, refer to the right column. The construction period for pipeline laying is short, generally 3-4 months. The compensation period is 1 year. The construction period of the plants is 2 years, and the compensation period for the construction site is 3 years.</p> <p>2. Within the compensation for temporary land acquisition, 80% is paid to affected households, and 20% is managed by the village committee. The compensation for ground attachments is paid to the owners.</p> <p>3. For the compensation for forest land, the category of the affected land needs to be identified by a professional forest survey team, and then the compensation standard can be determined according to laws and regulations of the state and provincial government. The compensation consists of compensation for forest land, compensation for trees, and vegetation restoration cost.</p> <p>4. The construction team is responsible for restoring the affected land to its original status after construction completes.</p> <p>5. After approved by the county land and resources bureau, the project owner needs to pay the restoration security for temporary land acquisition. For the standard, refer to the right column.</p> | <p><b>IV Compensation standard for temporary land acquisition</b></p> <p>1. Dry land: CNY1000-1500/mu<br/>                 2. Vegetable land: CNY 3000/mu<br/>                 3. Gardening land: CNY 000/mu<br/>                 4. Unused land: CNY 200-1000/mu<br/>                 5. Country road: CNY1000-1500/mu<br/>                 6. Country concrete road: CNY53333.6/mu<br/>                 9. Forest land: CNY 6793.96/mu<br/>                 10. County street: CNY10,000/mu</p> <p><b>VI Compensation for ground attachments</b></p> <p>7. Fruit trees: CNY80/tree<br/>                 8. Poplar trees: CNY80/tree</p> <p><b>VII Vegetation restoration cost</b><br/>6 yuan/m<sup>2</sup></p> <p><b>VIII Restoration security</b><br/>                 Farmland: CNY18/m<sup>2</sup>, CNY 12000/mu;<br/>                 Unused land: CNY 7.5/m<sup>2</sup>, CNY 5000/mu</p> |

## **5. Livelihood Restoration and Resettlement Planning**

This Resettlement Action Plan has been formulated based on the characteristics of economic development in each village, the status quo of resource utilization, in accordance with the prevailing policies, regulations, laws, and the stipulations on resettlement by the World Bank, and according to the consultations with the comments from the authorities at county, township and villages, and the farmers who are impacted by the project.

### **5.1 Goals and Principles for Resettlement Planning**

#### **5.1.1 Goals for Resettlement Planning**

It is to make proper compensation for all kinds of property and the placement for the persons impacted by the project, to ensure the production, income and living standard to be restored or be higher than before.

#### **5.1.2 Guiding Principles for Resettlement Planning**

(1) The resettlement plan is prepared based on the results of socioeconomic survey and the statistics of physical property to be impacted by the project, and in accordance with the state laws and local regulations/policies on compensation for land requisition, and the World Bank Guideline OP/BP4.12 of "Involuntary Resettlement".

(2) Attentions should be paid to optimizing the design for construction in terms of protecting the arable and forest land, and minimizing the permanent land acquisition and temporary land occupation, and thus the involuntary resettlement. Various measures should be taken to make less inconvenience and fewer troubles to the people during the construction.

(3) The expropriated land and the associated losses are subject to reasonable compensation. The full payment for land compensation will be made within 3 months upon the approval of the plans for land requisition and resettlement, or at least no later than the starting date when the piece of land is used for the construction work.

(4) It is to ensure that land rights owners will get the full amount of compensation for land requisition prior to land transfer, and to ensure that their living standard, production capacity and income will be resumed or better than that prior to the resettlement.

(5) No compensation will be made to those who occupied the land and/or constructed building on the land without approval after the predefined date.

(6) The public participation is encouraged in both the preparation and the implementation phases of the resettlement plan. The policies on the standards for compensation and resettlement will be publicized in timely manner. The persons to be impacted by the project will be broadly consulted and their comments will be integrated into the plan.

(7) Great importance will be attached to the complaints and grievance by the persons impacted by the project, to provide reasonable and timely assistance to those with difficulties and inconvenience encountered in the process of compensation for land requisition.

(8) The coordination and cooperation will be strengthened among the administrative departments and institutions responsible for the resettlement. The institutional capacity will be enhanced and all the staff will be trained prior to working on the post.

(9) The project implement entity will perform internal monitoring on the project process. The independent institution will also be entrusted for external monitoring, for submitting reports to the World Bank periodically. After all the activities are completed, the final assessment on resettlement will be made.

(10) The World Bank will be kept informed about any significant alterations in the implementation of this resettlement plan (including lowering the compensation amount, changing location and scope of land requisition, adding new subcomponent(s), and/or state investment on a subcomponent). If necessary the resettlement plan will be revised or a new plan will be prepared.

## 5.2 Resettlement

Resettlement in this project is to make compensations to the residents affected by permanent and temporary land acquisition, to restore their working conditions and income and to ensure their sustainable livelihood.

### 5.2.1 Compensations to Residents Affected by Permanent Land Acquisition and Resettlement

Compensations to residents affected by permanent land acquisition and resettlement involve the villages where the two plants locate. The two plants lie at different administrative regions. The compensation standards vary with regions, as well as the payoff methods and resettlement actions.

#### 1 Houzhuang village of Dazhai, Xiyang

The plant's permanent land acquisition affects 27 households, 99 people. All of them are villagers of Houzhuang. The resettlement actions are as follows:

- 1) Handing out compensation fee:** The plant requires 93.15 mu land permanently. By compensation standard of CNY70,000/mu, Houzhuang can get CNY6.52 million.

In Houzhuang village, the compensation fee is paid as follows: First, families who lose their land are paid 15,000 yuan/mu (1000 yuan/mu × 15 years (the years until the second round of land contract ends)). Within the remaining compensation fee, 80% is paid evenly among all residents of the village, including the families who lose their land. 20% remains as public fund of the village.

The affected families can take part in land contracting in 2028, when the

second round of land contract period ends.

The compensation for the affected families is estimated according to the payoff method. There are 27 households, 99 people affected, and 38.27 mu dry land acquired. Averagely, each person can get 13900 yuan compensation, 36 times of land output value, higher than the income of 15 years available on the land. They ranges from CNY9407 per capita for those losing less than 10% to CNY17,462 per capita for those losing 30 to 50% of their current land holding.

In addition, the villagers whose land is untouched can also get 8100 yuan per person. There are also 1.19 million yuan left as public fund.

**Table 5.2-1 Compensation allocation in Houzhuang**

| Item  | Quantity |          | Standard (yuan/mu) | Compensation (CNY10,000) | Remarks  |
|---|----------|----------|--------------------|--------------------------|--|
|   | Unit     | Quantity |                    |                          |  |
| Total of land compensation  | Mu       | 93.15    | 70000              | 652.05                   | The total land acquired is 93.15 mu.                       |
| Compensation available for affected households                                  | Mu       | 38.27    | 15000              | 57.41                    | In the 93.15 mu land, 38.27mu is contracted by households. |
| Compensation available for affected households at the first time                | Mu       | 0.39     | 15000              | 0.58                     | 0.39mu is the average area among 99 people.                |
| Remaining fee after allocating the total compensation among affected households | Mu       | 93.15    |                    | 594.65                   | $652.05 - 57.41 = 594.65$                                  |
| Allocating the remaining fee evenly among all people in the village             | Person   | 587      |                    | 0.81                     | $594.65 \times 80\% \div 587 = 0.81$                       |
| Sum of compensation fee available for each affected person                      | Person   | 99       |                    | 1.39                     | $0.58 + 0.81 = 1.39$                                       |
| Sum of compensation fee available for all affected people                       | Person   | 99       |                    | 137.61                   | $1.39 \times 99 = 137.61$                                  |

|  |        |     |  |        |                                     |
|--|--------|-----|--|--------|-------------------------------------|
| Compensation available for unaffected people | Person | 488 |  | 395.28 | $0.81 \times 488 = 395.28$          |
| Remaining compensation as public fund        |        |     |  | 119.16 | $652.05 - 137.61 - 395.28 = 119.16$ |

The survey shows all villagers are satisfied with the payoff method, and they would like to get the compensation in cash. They think the compensation standard is high enough for them to cover their land loss or higher.

**2) Employment rehabilitation:** Through talking and discussion with affected families and village committee, the RAP team was informed that affected families would use the compensation for investment to get higher income, improve their living standard, and ensure sustainable livelihood.

More than 7-8 families plan to buy transportation vehicles to provide transportation service. Houzhuang is not far away from the county town, and it is advantageous to develop transportation. In recent years, Xiyang enjoys fast economic growth, especially coal mining and tourism. The goods transportation market is developed. In average, each affected household could receive CNY30,000 of land acquisition. To buy a middle-range transportation vehicle, 20,000-30,000 yuan is needed, and the annual net profit can reach 10,000-20,000 yuan. Some families think a farm vehicle provides means to increase family income, and also provides employment for children. It is to gain two advantages by a single move.

Another 5 families would like to do tertiary service with the compensation. Presently they are in trade business or open a small restaurant in the county town. It is hard for them to get a commercial loan. Therefore, they all have financial strains. They will get about 10000-20,000 yuan for land acquisition, which can be used to pay for the rent or work as flowing fund. This enables them to get more income.

A dozens of families plan to develop small-scale special husbandry. With fast urban development of Xiyang, the urban area is expanding and more and more people gather in the city. The catering service is growing fast. Some families are going to plant special vegetables like mushrooms. Some are going to raise chickens and pigs. It is estimated special husbandry needs about 10,000 yuan investment, and the annual net profit can reach more than CNY5000-10,000. The affected families think husbandry can exert specialty of middle-aged and old women, and men.

**3) Developing new land with remaining fund:** The village committee said they will use the remaining compensation to open up new land. To ensure that there is enough land for the third round of land contracting, Houzhuang Village is planning to use CNY500,000 to CNY800,000 from land compensation fund to develop about 100 mu of new farmland, which could be leased to affected households for farming.

With the above measures, the affected families not only restore and improve their income, but also sustain their livelihood.

## **2 Houlongfengnao village of Dazhai, Xiyang**

The project will affect 7 households and 11 persons in Houlongfengnao Village. There are following economic rehabilitation measures for the affected people.:

**1) Distribution of Land Compensation.** The land acquisition for Xiyang CHP will acquire 7.92 mu of land area from Houlongfengnao Village. Based on CNY70,000 per mu, a total of CNY554,400 of land compensation could be received by the village.

The distribution method in Houlongfengnao village will be the same as Houzhuang Village. First, each affected household will be provided with CNY15,000 per mu of compensation based on amount of land acquired, covering the remaining lease (CNY1000 per mu for 15 years (there are 15 years remaining by the end of second lease period). For the remaining land compensation, 80% of them will be evenly distributed among all members in the village including affected people and 20% of compensation will be kept in the village as development fund. By 2028, all village members including all affected people will participate in next round of land leasing.

Based on such distribution process, among 7 affected households and 11 persons, each affected people could receive CNY11,300 of land compensation, which is equal to 15.8 times of annual output value of acquired land area, higher than the gross output of acquired land. They range from CNY5418 per capita to CNY22,893 per capita depending on different degree of land losses.

For those who are not affected by land acquisition, each person will receive CNY543 of land compensation, and village collective will receive CNY87,000 as village development fund.

**2) Development of New Business Opportunities.** In average, each affected household could receive CNY10,000 to CNY20,000 of land compensation, which could be used for development of small planting and animal husbandry activities. According to the estimate, small animal husbandry activity will require investment of CNY10,000 and annual profit could be around CNY5,000. The development of small planting and animal husbandry activities require less new technique and could employ many middle aged men and women and restore their income and livelihood.

**3) Allocating Village Reserved Land to Affected People:** At present, there are over 50 mu village reserved farmlands. At least three affected households are planning to lease some farmland from the village so that their income and livelihood could be restored or improved.

## **3 Gucheng village of Yangjiawan town, Baode**

The project will acquire 119.14 mu land for permanent use, among which 91.92 mu is dry land, 2.81mu is slope land, 2.27 mu is irrigated land, 1.21 mu is gardening land, and 20.94 mu is unused land. 3.28 million yuan is compensated for the land.

**Table 5.2-4 Compensation standard for permanent land acquisition**

| Category of land | Quantity (mu) | Compensation standard (CNY10,000/mu) | Compensation (CNY10,000/mu) |
|------------------|---------------|--------------------------------------|-----------------------------|
| Dry              | 91.92         | 3.2                                  | 294.14                      |
| Irrigated        | 2.81          | 2                                    | 5.62                        |
| Slope            | 2.27          | 6.5                                  | 14.76                       |
| Gardening        | 1.21          | 3.2                                  | 3.87                        |
| Unused           | 20.94         | 0.5                                  | 10.47                       |
| Total            | 119.14        |                                      | 328.86                      |

The survey shows the new compensation standard of Baode was issued and effective as of March 13, 2013. Before that, the compensation standard for dry land had been 24,000 yuan/mu, for slope farmland 16,000 yuan/mu, for irrigated land 55,000 yuan/mu. The new standard is 4,000-CNY10,000/mu higher than the original standard.

Through talking with the village committee and affected families, the RAP team was informed that the village plans to perform resettlement, and restore and improve their income in the following ways:

### **1) Handing out the compensation fee:**

Based on consultations with village officials, the land compensation distribution in Gucheng Village will be: distribute all land compensation for the acquired land leased to individuals, and keep all compensation for acquired village reserved farmland and other land areas as collective development fund. The compensation for unused land is collectively owned by the whole village. The project uses 49.04 mu family contracted farmland (including dry land, irrigated land, and slope land). Altogether 21 families, 71 people are affected. The taking of dry land and slope land affects 20 families, 68 people. The taking of irrigated land affects 1 families, 3 people.

After estimation, for the 20 families, 68 people, each person averagely loses 0.69 mu dry land and gets 22000 yuan compensation, and each family can get 74800 yuan compensation. It ranges from CNY5760 per capita for those losing less than 10% of their land holding, CNY16,397 for those who losing 10 to 30% of their land holding, CNY27 000 for those who losing 30 to 50% of land holding, and CNY48,280 per capita for those losing over 50% of their land holding. For the 1 family and 3 people, loses 2.27 irrigated land and gets 147600 yuan compensation. Based on the survey, the families also have more than 1 mu additional vegetable land near the river.

### **2) Investing the land compensation fee into existing vegetable land**

**to improve income:**

The affected villagers indicated, the compensation for each family was a big sum of money, and they would put the money into work to get higher profit, restore the land loss and sustain the livelihood. The survey shows, all villagers in Gucheng, including the affected families, have 3.7 mu irrigated land. They grow vegetables, but the profit is just average, with an annual profit of 2000-3000 per mu. To build a greenhouse, 20,000-30,000 yuan is needed, and the income can reach about CNY10,000. Due to lack of fund and technology, most families grow vegetable in the traditional way, which does not profit much. A dozens of families expressed their idea that they would use the compensation fee to build 1 greenhouse where new vegetables can grow. In this way, the annual profit will be 2-3 times higher than the original gain, which is far enough to compensate the land loss.

**3) Purchasing farm vehicles for transportation service:**

8 families indicated they would purchase farm vehicle with the compensation fee. The vehicle can be used for their own family, also providing transportation services for enterprises nearby.

Industries have been growing fast in Baode. There are some large scale enterprises near Gucheng, like Petro China and Tongli Aluminum. The stationing of these enterprises fuels the growing of transportation and services. Rapid development in Fugu of Shaanxi, a county separated only by a river, drives the flourishing of catering service in Baode. Therefore, goods transportation is greatly in need.

According to estimation, a big farm vehicle needs 30,000-40,000 yuan, with the annual net profit reaching 20,000-30,000 yuan. The gain is much higher than the land loss. Some families indicated a farm vehicle provides means to increase family income, and also provides employment for children. It is to gain two advantages by a single move.

**4) Participate in skill training for farmers organized by county employment center:**

A dozens of families indicated children's employment was the greatest concern. Their next generation basically cannot and are not willing to do farming. They can only do odd jobs in cities. Though there are always jobs to do, the income is low and the job is not steady as the job does not require any skills. For example, a skilled worker in Baode can earn about 50,000, while an ordinary worker can only earn about 20,000. To meet such demand, the county labor and employment guidance center will provide special skill trainings for land loss farmers and their children. The training cover welding, mechanic, electrician, auto beauty, and home appliance repairs, so that more affected farmers and their children could find a steady job with their skills and have a sustainable livelihood.

**5) Developing new land with remaining fund: The village committee**

said they will use the remaining compensation to open up new land. To ensure that there is enough land for the third round of land contracting, Houzhuang Village is planning to use CNY500,000 from land compensation fund to develop about 50 mu of new farmland, which could be leased to affected households for farming.

In general, all affected indicated, they would use the compensation for investment first, spending it on something worthwhile after much deliberation.

After distributing all land compensation to the affected individuals and allocating required fund for new farmland development, the village will still have over CNY1 million left. The leader of the village indicated, to use the fund, a proposal would be formulated after discussion within the two village committees, and then voted by village representatives. According to the requirements in the *Measures of Shanxi Province on Distributing the Compensations for the Acquisition and Occupation of Land Collectively Owned by Rural Farmers*, the remaining compensation will be used for public welfare of village. Every item of expenditure is subject to the supervision of town government, and the account is disclosed to all villagers.

### **5.2.2 Compensation and Resettlement for People Affected by Temporary Land Acquisition**

Land acquisition in this project falls into two categories: one is for construction site, involving two heat and power plants; the other is for pipeline laying, involving 6 gas pipeline networks.

The construction period for the two plants is 2 years, and the compensation is paid by 3 years, which can fully cover the income loss of affected people. For land acquisition for pipeline laying, the construction period is short. When it is over, the project owner is to restore the original status of the land, and return the land to affected families. At most crops of 1 season are affected.

Based on estimation, the Changzhi pipeline network affects 10 towns and 37 villages, to whom 1.9 million yuan is paid as compensation. The Xiangyuan network affects 11 towns and 41 villages. Altogether CNY2.2646 million is paid to all affected villages; The Tunliu network affects 8 towns and 47 villages. Altogether CNY2.4515 million is paid; The Qingxu network affects 2 towns and 22 villages. Altogether CNY1.015 million is paid. The Xiyang plant affects 4 villages. Altogether CNY324100 is paid. The Baode plant affects 8 villages. Altogether CNY281,700 yuan is paid.

For temporary land acquisition, the guide price for farmland by the government is generally 1000-1500 yuan/mu. However, the executive price is higher than that, generally 1500-2500 yuan/mu. The compensation standard is agreed upon through discussion among the project owner, related county/town government, and village committee. The village committee will first consult with villagers before the agreement. The compensation is so divided that 20% is owned collectively by all villagers, and 80% is paid to villagers, that is,

1200-2000 yuan/mu.

Based on survey, the affected villages and the village representatives are all satisfied with the compensation standard. The local annual output value is 500-1000 yuan/mu averagely, and the compensation is much higher than the farming value. Therefore, the living standard of the affected will not be cut down, but improved.

After consulting with some construction companies, the RAP team was informed, though pipeline laying is a professional job, some temporary jobs will be created during project construction, such as digging, equipment watching, vehicle loading and unloading. Local labors can be hired for these subsidiary jobs. The daily income for such job can reach 120 yuan. Calculated by 3-month of construction period, each person can earn more than CNY10,000.

## **6. Budget of Land Compensation and Other Related Costs**

The 6 components under this project requires land compensation and other related costs, including land use-right transferring fee for construction site, rent for special facility, compensation for temporary land acquisition, land restoration cost, compensation for ground attachments, independent fee, and unpredictable cost. The total budget is 93.26 million RMB.

### **6.1 Land Use-Right Transferring Fee**

The land acquired permanently for the project is for industrial and operational purpose. In accordance with the *Law of Land Administration of the People's Republic of China* and *Rules on the Assignment of the State-owned Land Use Right by Means of Bid Tendering, Auction and Quotation* by the Ministry of Land Resources, the land of the two plants needs to be first acquired as construction land by the government, and then the use right of it can be transferred to the project owner through bidding, auction and quotation.

Research shows the transferring fee of construction land in Xiyang urban areas and Gucheng regions in Baode is about 150,000 yuan/mu. The Xiyang plant requires 101.07 mu, so the transferring fee will be 15.16 million RMB; The Baode plant requires 119.14 mu, so the transferring fee will be 17.87 million RMB. The total transferring fee for the two plants amounts to 33.03 million RMB. The compensation cost for affected people due to permanent land acquisition is included in the total transferring fee for two plants.

### **6.2 Space Rent for Regulators**

In the 4 pipeline networks, 3 of them require 30 regulators. The space rent for regulator costs about 300,000 yuan.

### **6.3 Compensation for Temporary Land Acquisition**

The 6 components altogether require 3501.06 mu for temporary use, among which 2,228.5 mu is dry land, 336 mu vegetable land, 103.5 mu gardening land, 568.86 mu unused land, 90 mu forest land, 136.71 mu county road, and 37.5 mu country road.

Among the dry land, 90 mu will be used as construction site and temporary living area. The construction period is 2 years, and the compensation is calculated by 3 years. The constructing period of pipeline installation is within 1 year, but the compensating period is calculated by 1 year. It is estimated that the total compensation for temporary land use is 8.2124 million RMB. For the budge, refer to Table 6.3-1.

Table 6.3-1 Compensation for temporary land use

| Component                  | Item  | Land category         | Quantity (mu) | Compensation standard (yuan/mu) | Compensation period (years) | Compensation cost (CNY10,000) |
|----------------------------|---|-----------------------|---------------|---------------------------------|-----------------------------|-------------------------------|
| Xiyang plant               | Water supply, gas supply, heating line, power line, construction site | Dry land              | 45            | 1500                            | 3                           | 20.25                         |
|                            |   | Dry land              | 63.1          | 1500                            | 1                           | 9.47                          |
|                            |   | Unused land           | 26.85         | 1000                            | 1                           | 2.69                          |
|                            |   | County road           | 23.16         | 10000                           | 1                           | 23.16                         |
|                            | <b>Sum</b>  |                       | <b>158.11</b> |                                 |                             | <b>55.56</b>                  |
| Baode plant                | Water supply, gas supply, heating line, power line, construction site | Dry land              | 45            | 1200                            | 3                           | 16.20                         |
|                            |   | Dry land              | 75            | 1200                            | 1                           | 9.00                          |
|                            |   | Unused land           | 148.71        | 200                             | 1                           | 2.97                          |
|                            |   | County road           | 113.55        | 10000                           | 1                           | 113.55                        |
|                            | <b>Sum</b>  |                       | <b>382.25</b> |                                 |                             | <b>141.72</b>                 |
| Changzhi pipeline network  | Gas pipeline network  | Dry land              | 492           | 1500                            | 1                           | 46.26                         |
|                            |   | Vegetable land        | 120           | 3000                            | 1                           | 36                            |
|                            |   | Gardening land        | 45            | 1500                            | 1                           | 6.75                          |
|                            |   | Unused land           | 91.5          | 1000                            | 1                           | 9.15                          |
|                            |   | Country road          | 6             | 1500                            | 1                           | 0.9                           |
|                            |   | Country concrete road | 7.5           | 53333.6                         | 1                           | 40                            |
|                            | <b>Sum</b>  |                       | <b>762</b>    |                                 |                             | <b>139.06</b>                 |
| Xiangyuan pipeline network | Gas pipeline network  | Dry land              | 816           | 1500                            | 1                           | 122.4                         |
|                            |   | Vegetable land        | 36            | 3000                            | 1                           | 10.8                          |
|                            |   | Unused land           | 77.1          | 1000                            | 1                           | 7.71                          |
|                            |   | Forest land           | 90            | 6793.96                         | 1                           | 61.15                         |
|                            | <b>Sum</b>  |                       | <b>1019.1</b> |                                 |                             | <b>202.06</b>                 |
| Tunliu pipeline network    | Gas pipeline network  | Dry land              | 660           | 1500                            | 1                           | 99                            |
|                            |   | Vegetable land        | 120           | 3000                            | 1                           | 36                            |
|                            |   | Gardening land        | 45            | 1500                            | 1                           | 6.75                          |

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|                         |                      |                       |              |         |   |               |
|-------------------------|----------------------|-----------------------|--------------|---------|---|---------------|
|                         |                      | Unused land           | 152.7        | 1000    | 1 | 15.27         |
|                         |                      | Country road          | 7.5          | 1500    | 1 | 1.13          |
|                         |                      | Country concrete road | 7.5          | 53333.6 | 1 | 40            |
|                         | <b>Sum</b>           |                       | <b>992.7</b> |         |   | <b>198.14</b> |
| Qingxu pipeline network | Gas pipeline network | Dry land              | 216          | 1000    | 1 | 21.6          |
|                         |                      | Vegetable land        | 60           | 3000    | 1 | 18            |
|                         |                      | Gardening land        | 13.5         | 1000    | 1 | 1.35          |
|                         |                      | Unused land           | 72           | 500     | 1 | 3.6           |
|                         |                      | Country road          | 1.5          | 1000    | 1 | 0.15          |
|                         |                      | Country concrete road | 7.5          | 53333.6 | 1 | 40            |
|                         | <b>Sum</b>           |                       | <b>370.5</b> |         |   | <b>84.7</b>   |
| <b>Total</b>            |                      |                       |              |         |   | <b>821.24</b> |

## 6.4 Compensation for Ground Attachments

The ground attachments affected by this project consist of 2,000 walnut trees, 100 date trees, 11,500 fruit trees, 1,800 poplar trees, and 14 tombs. Calculated by the actual quantity and the compensation standard, the compensation totals 1.691 million. For the budget, refer to Table 6.4-1.

**Table 6.4-1 Compensation for ground attachments**

| Component                  | Ground attachment | Quantity | Compensation standard | Compensation cost (CNY10,000) |
|----------------------------|-------------------|----------|-----------------------|-------------------------------|
| Xiyang plant               | Walnut seedlings  | 2000     | 50 yuan/tree          | 10                            |
|                            | Tombs             | 10       | CNY10,000/tomb        | 10                            |
| Baode plant                | Date trees        | 100      | 2750 yuan/tree        | 27.5                          |
|                            | Tombs             | 4        | 38,000 yuan/tomb      | 15.2                          |
| Changzhi pipeline network  | Fruit trees       | 5000     | 80 yuan/tree          | 40                            |
| Tunliu pipeline network    | Fruit trees       | 5000     | 80 yuan/tree          | 40                            |
| Qingxu pipeline network    | Fruit trees       | 1500     | 80 yuan/tree          | 12                            |
| Xiangyuan pipeline network | Poplar trees      | 1800     | 80 yuan/tree          | <b>14.4</b>                   |
| <b>Total</b>               |                   |          |                       | <b>169.1</b>                  |

## 6.5 Vegetation Restoration Cost

The project takes 90 mu for temporary use, and the vegetation restoration cost is CNY360,000.

## 6.6 Restoration Cost for Temporary Land Acquisition

The project requires 3501.06 mu land for temporary use, among which the farmland and unused land for which restoration security needs to be paid total 3364.36 mu. It is estimated the total restoration security amounts to CNY36.3903 million.

**Table 6.6-1 Restoration cost for temporarily used land**

| Land category | Quantity (mu) | Rate (yuan/mu) | Cost (CNY10,000) |
|---------------|---------------|----------------|------------------|
| Farmland      | 2795.5        | 12000          | 3354.6           |
| Unused land   | 568.86        | 5000           | 284.43           |
| Total         | 3364.36       |                | 3639.03          |

## 6.7 Independent Fee

The independent fee covers the operation and management cost of the resettlement implementation offices, RAP formulation fee, social impact evaluation fee, and RAP implementation supervision fee, amounting to CNY4.8 million.

- 1) Operation and management cost of the resettlement implementation offices

For land compensation and resettlement works, implementation offices must be established and then put into operation. Offices need to be rented, and vehicles and equipment must be prepared. The cost for implementation deployment must be covered. For each component, about CNY300,00 is required.

- 2) RAP formulation fee

To formulate a standard RAP, a special institution is hired to help with the related jobs. Each component requires about CNY150,000.

- 3) Social impact evaluation fee

To evaluate the social benefits and side effect of each component of the project in a comprehensible way, to fully understand each user's willingness and capability to pay, to prevent social risks and optimize the implementation scheme, a third party is needed. Each component requires CNY150,000.

- 4) Supervision and assessment cost by the third party

After resettlement work begins, a professional institution is needed to supervise and assess the implementation of RAP, each component requires about 200,000 RMB.

The 4 items above add up to CNY4.8 million.

## 6.8 Contingency Cost

The contingency cost is calculated by 10% of the total of land use-right transferring fee, compensation for temporary land acquisition, compensation for ground attachments, vegetation restoration cost, and independent fee, amounting to 8.47 million RMB. For the budget, refer to Table 6.8-1.

**Table 6.8-1 Contingency cost**

| SN | Item  | Cost (CNY10,000) | Remarks             |
|----|---|------------------|---------------------|
| 1  | Land use-right transferring fee             | 3303.15          |                     |
| 2  | Space rent for regulators                   | 30               |                     |
| 3  | Compensation for temporary land use         | 821.24           |                     |
| 4  | Compensation for ground attachments         | 169.1            |                     |
| 5  | Vegetation restoration                      | 36               |                     |
| 6  | Restoration security for temporary land use | 3639.03          |                     |
| 7  | Independent fee                             | 480              |                     |
| 8  | Contingency cost                            | 847.85           | 10% of total of 1-7 |

## 6.9 Budget of Land Compensation and Other Related Costs

The budget for land compensation and other related cost is 93.26 million RMB. As part of the total budget of the whole project, it is paid by the construction company. For list of the cost, refer to Table 6.9-1.

**Table 6.9-1 Total budget of land compensation and other related costs**

| SN           | Item  | Cost (CNY10,000) |
|--------------|---|------------------|
| 1            | Land use-right transferring fee             | 3303.15          |
| 2            | Space rent for regulators                   | 30               |
| 3            | Compensation for temporary land use         | 821.24           |
| 4            | Compensation for ground attachments         | 169.1            |
| 5            | Vegetation restoration                      | 36               |
| 6            | Restoration security for temporary land use | 3639.03          |
| 7            | Independent fee                             | 480              |
| 8            | Unpredictable cost                          | 847.85           |
| <b>Total</b> |   | 9326.37          |

## 7. Implementation of RAP

Based on the construction schedules of all components, the two plants process almost in the same pace, and the 4 networks almost synchronize with each other in progress.

Schedule of two plants: The Xiyang plant plans to start up in March 2014, and commission in May, 2015; The Baode plant plans to start up in April 2014, and commission in October 2015.

The land compensation and resettlement work for the two plants starts in December 2013, and ends in December 2014. The schedule is arranged under the following principles: The compensation and resettlement work need have been completed one month before the land is used. Before the construction starts, there must be enough time for land acquisition and resettlement procedures.

Schedule of 4 gas pipeline networks: The pipelines and regulators start to be installed in steps since September 2014. The Qingxu network will complete pipeline distribution in 2017. The networks in Changzhi, Tunliu and Xiangyuan will complete pipeline distribution and regulator installation in 2018.

The land compensation and resettlement work for the 4 networks plans to start in early 2014, first starting with the preliminary work for temporary land acquisition and space lease. Before the construction of every section of pipeline, it is reported to the County Land Resource Bureau for approval. The compensation for land acquisition and space lease is negotiated among the county government, village committee and construction company before a compensation agreement is signed.

### 7.1 Preliminary Works before Resettlement

#### 7.1.1 CHP Plants

##### 1) Defining the land scope

In accordance with project design and layout, define the scope of acquired land. Disclose land acquisition through conferences in the village committee, and advertise land acquisition in the village committee.

##### 2) Measuring the affected land and counting the affected ground attachments

Personnel from resettlement management office and the County Land Resource Bureau go to the affected village, measure or count the land and ground attachments, identify property features and rights, and record the information in detail.

##### 3) Drafting land acquisition and resettlement plan and identifying the budget

Update the RAP based on detailed design and measurement before land acquisition, resettlement and construction starts. Send the RAP to the World

Bank for review and approval. The project company prepares budget based on updated RAP, and then submit the plan and budget to the RAP leader team for review.

#### **4) Signing the agreement**

Xiyang and Baode Land Resource Bureaus sign agreements with affected villages, and the land use-right transferring fee is used to pay the land compensation fee. The resettlement management office signs the ground attachments compensation agreement with the affected property owner and pay as agreed.

The land acquisition and compensation agreement listed in the RAP should comply with the resettlement laws and regulations of the state, local government and World Bank.

### **7.1.2 Gas Pipeline Networks**

#### **1) Defining the land scope**

The project implementation office, related town government office, and leaders of affected village committee will survey on site, identify the location, 4-direction ranges, area and land category, and negotiate and agree upon compensation standards.

#### **2) Signing compensation agreement for temporary land acquisition**

The project implementation office signs a compensation agreement for temporary land acquisition with the affected village committee according to the land reconnaissance demarcation report. The agreement defines the acquisition period and compensation standard. It is co-signed by the leaders of the county government and village committee, and sealed for verification.

#### **3) Submitting applications to the County Land Resource Bureau**

The project implementation office or the construction company will submit applications to the related County Land Resource Bureau.

To apply for temporary land acquisition, the following documents should be provided:

*Application Form for Temporary Land Acquisition;*

*Reconnaissance demarcation map* drawn by a qualified survey and measurement company;

Compensation agreement for temporary land acquisition signed between the applicant and village committee;

If the land applied is within the range of urban planned area or uses irrigation facilities, or the land is forest land, the approval document from the planning department, irrigation department, or the forest administration department is needed. If the land is farmland, the restoration solution complied by a qualified land consolidation planning institution should be provided.

## **7.2 Work during Resettlement**

### **7.2.1 CHP Plants**

In accordance with the signed agreement, the County Land Resource Bureaus in Xiyang and Baode disburse the compensation to the special account of the

village, which is set up in the town financial bureau.

The village committee provides a list of affected villagers and the compensation handling scheme to the town government. The town financial bureau disburses the compensation to the accounts of affected villagers.

The resettlement management office of each component will pay the compensation for crops and ground attachments to the affected village. The compensation and resettlement team in the village will pay the compensation to affected families.

The resettlement unit under each PMO is responsible for internal monitoring. It submits a monitoring report every half year. A professional institution is hired for external monitoring as a third party, to submit a monitoring report to the World Bank every half year, and submit an assessment report every year. The purpose of external monitoring is to guarantee the affected villagers' income can be restored or improved as soon as possible. If the target is not met, strengthening measures have to be enforced.

## 7.2.2 Gas Pipeline Networks

In accordance with the temporary land acquisition agreement, the PMO of each component or the construction company pay the compensation cost to the village committee 1 month before the construction. The committee disburses 80% of fund to the affected families, leaving the other 20% untouched. The compensation for ground attachments is paid directly to the owner.

When the construction is over, the construction company restores the land to the original status according to the restoration scheme. The County Land and Resources Bureau, along with the agriculture department, the forestry bureau, and the environment protection bureau, will inspect the restoration and make acceptance.

## 7.3 Progress Schedule

The progress of land acquisition, compensation and resettlement actions of each component will proceed along with the construction plan. For more information, refer to Table 7.3-1.

**Table 7.3-1 Schedule of land acquisition, compensation and resettlement**

| Item  | Time                |
|---|---------------------|
| <b>I Permanent land acquisition compensation and resettlement</b> | Dec. 2013—Dec. 2014 |
| 1. Compensation disbursement to land contractors                  | Dec. 2013—Feb. 2014 |
| 2. Production resettlement and income restoration                 | Feb.2014—Dec. 2014  |
| <b>II Temporary land acquisition compensation</b>                 | Jan. 2014—Dec. 2018 |
| 1. Defining the land scope  | Jan. 2014—Mar. 2014 |

|  |                                |
|--|--------------------------------|
| 2. Signing compensation agreement for temporary land acquisition   | Mar.2014—Jun. 2014             |
| 3. Submitting applications to the County Land Resource Bureau      | Jun. 2014—Sept. 2014           |
| 3. Paying the land compensation and ground attachment compensation | Oct. 2014—Oct. 2016            |
| <b>II Land restoration</b>   | <b>Jan. 2015—Dec. 2019</b>     |
| <b>A. Land Restoration</b>   | <b>Jan 2015 ----- Oct 2019</b> |
| 1. Land Restoration for Xiyang and Baode CHP                       | Jan. 2015 -----Oct. 2015       |
| 2. Changzhi Gas Network Component                                  | Jan. 2015 -----Oct. 2019       |
| 3. Xiangyuan Gas Network Component                                 | Jan. 2015 -----Oct. 2018       |
| 4. Tunliu Gas Network Component                                    | Jan. 2015 -----Oct. 2018       |
| 5. Qingxu Gas Network Component                                    | Jan. 2015 -----Oct. 2017       |
| <b>B. Return the land to the owner</b>                             | <b>Jun. 2015—Dec. 2019</b>     |
| Return Land to Owners for Xiyang and Baode CHP                     | Jun. 2015 -----Dec 2015        |
| Return Land for Changzhi Gas Network Component                     | Jun. 2015 -----Dec 2019        |
| Return Land for Xiangyuan Gas Network                              | Jun. 2015 -----Dec 2018        |
| Return Land for Tunliu Gas Network Component                       | Jun. 2015 -----Dec 2018        |
| Return Land for Qingxu Gas Network Component                       | Jun. 2015 -----Dec. 2017       |

## 7.4 Fund Flow and Disbursement Plan

During the land acquisition process, the project owner needs to pay mainly the land use-right transferring fee, compensation for temporary land use, and independent cost.

After the project owner pays the transferring fee to the special account that the Land Resource Bureau have established at the financial bureau, the Land Resource Bureau will disburse the compensation to the special account that the affected village have established at the county financial bureau in accordance with the agreed standard. The financial bureau will disburse the compensation to individual accounts of villagers in accordance with the name list and compensation distribution scheme provided by the village committee.

The compensation for temporary land use is paid to the village committee by the project owner in accordance with the standard agreed. The village committee will disburse 80% of the fund to affected land contractors.

The independent cost is paid directly to the related institution by the project owner.

For the flow of compensations and related cost, refer to Figure 7.4-1.

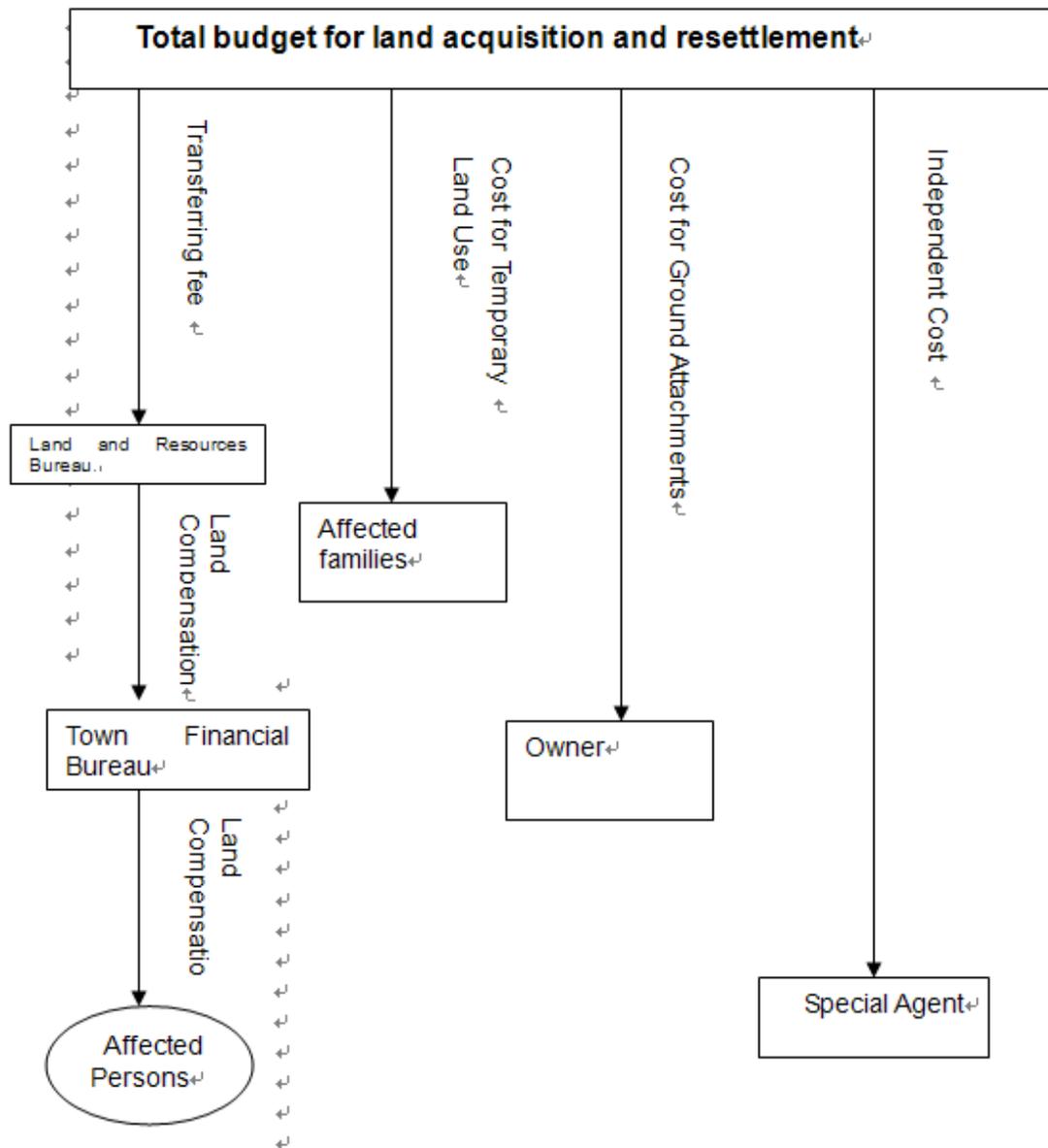


Figure 7.4-1 Flow of compensation and related cost

## **8. Institutional Framework**

### **8.1 Hierarchical Establishment**

To formulate the RAP of this project, ensure smooth proceeding and the expected prospect of compensation and resettlement work, and plan, manage, coordinate and supervise the compensation and resettlement actions, a hierarchical management structure as follows is needed:

- 1) Resettlement leading group
- 2) Resettlement management office
- 3) County-level resettlement team
- 4) County-level resettlement management office
- 5) Town-level resettlement coordination office
- 6) Village-level resettlement team
- 7) Third-party supervision and evaluation institution

### **8.2 Institution Components and Responsibilities**

#### **1. Resettlement leading group**

To ensure smooth proceeding of compensation and resettlement, senior managers from Shanxi Guoxin Energy, Shanxi Natural Gas, Shanxi CBM (Natural Gas) Pipeline and Qingxu Kaitong Natural Gas form a Resettlement Leading Group. It means to strengthen the management over the project, coordinate with the local government of each component, and ensure smooth proceeding of resettlement work. An office led by the team is set up, processing routine affairs. The office is under the PMO of Guoxin Energy.

#### **2. Resettlement management office**

The office is composed of personnel who are good at communications and coordination, and are responsible for the following jobs:

- (1) Push and review the formulation and implementation of RAP of each component;
- (2) Provide training for related persons;
- (3) Push each component to hire a third-party supervision institution and examine its jobs;

#### **3. County-level resettlement team**

The team is composed of personnel from construction companies of 6 components and officials of functional agencies in relevant counties. It is to resolve issues rising from land acquisition, compensation and resettlement, coordinate between the construction company and the affected villages, and handle the complaints of affected residents.

#### **4. Town-level resettlement coordination office**

Town-level resettlement coordination offices are established to coordinate between the construction company and the affected villages, organize the

related parties for onsite survey, measure the land, demarcate the border, identify the affected degree, negotiate the compensation standard, and handle complaints.

**5. Resettlement office of each component**

The office comprises staff experienced in resettlement. As a management office for compensation and resettlement, it has the following jobs:

- (1) Commission the related party to identify the impact in numbers and record the information;
- (2) Process temporary land acquisition procedures;
- (3) Cooperate with the construction company and village committee in compensation negotiations;
- (4) Accept and handle complaints of residents or report them to their superior office;
- (5) Organize and review internal monitoring activities, and formulate the resettlement progress report;

**6. Village-level resettlement team**

The team comprises members from the village party branch, village committee, and villager representatives. It has the following jobs:

- (1) Participate in the surveys on socioeconomic impact by the project;
- (2) Organize negotiation meetings, and advertise land compensation policies;
- (3) Feed villagers' comments back to the PMO and superior offices;
- (4) Report the resettlement progress;
- (5) Provide help for affected vulnerable groups;

**7. Independent third-party supervision and assessment institution**

The project owner will hire an independent third-party to fully know the implementation of RAP, and provide RAP monitoring and assessment report to the World Bank via the PMO. This job will be described in detail in the later chapter.

## 8.3 Staffing

For smooth proceeding of land compensation and resettlement work, the project owner has established a hierarchical management structure staffed with professionals and experienced administrative persons to form an unimpeded information channel. For more information, refer to Table 8.3-1.

**Table 8.3-1 Staffing of land compensation and resettlement institution**

| Institution and office                     | Members      | Position                                  | Post             | Jobs and specialties      |
|--|--------------|---|------------------|---------------------------|
| Compensation and resettlement leading team | Liu Jun      | Team leader from Guoxin Energy Group      | Team leader      | Planning and coordination |
|  | Ding Youjian | Vice team leader from Guoxin Energy Group | Vice team leader | Project management        |
|  | Sun Libin    | Director of PMO from Guoxin Energy Group  | Vice team leader | Financial management      |
|  | Chen         | Vice director of PMO                      | Vice             | Project                   |

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|   |                 |  |                  |                                    |
|---|-----------------|--|------------------|------------------------------------|
|   | Guoqing         | from Guoxin Energy Group   | team leader      | management                         |
|   | An Guoxia       | General manager of Shanxi CBM (Natural Gas) Pipeline and vice director of PMO of Guoxin Energy Group | Vice team leader | Project management                 |
| Compensation and resettlement management office | Sun Libin       | PMO from Guoxin Energy Group   | Director         | Coordination                       |
|   | Li runjie       | PMO from Guoxin Energy Group   | Office worker    | Public relation                    |
|   | Niu yongfeng    | PMO from Guoxin Energy Group   | Office worker    | Public relation                    |
| Xiyang resettlement coordination team           | Zhangchi        | Chief of Xiyang county government  | Team leader      | Administrative management          |
|   | Deng Qingshan   | Director of county Land and Resources of bureau  | Vice team leader | Land management                    |
|   | Qu Hongwei      | Director of Xiyang DRC   | Vice team leader | Economic control                   |
|   | Ma Zhijun       | Director of Xiyang Housing and Rural-Urban Development Bureau  | Vice team leader | Project management                 |
|   | Liu bo          | Director of Xiyang PMO   | Vice team leader | Project management                 |
| Xiyang resettlement management office           | Liu bo          | Vice director of Xiyang PMO  | Director         | Land compensation and resettlement |
|   | Wang yunpeng    | Resettlement division under Xiyang PMO   | Vice director    | Land compensation and resettlement |
| Baode resettlement coordination team            | Ning Guorong    | Deputy chief of Xiyang county government   | Team leader      | Administrative management          |
|   | Zhang Shurong   | Director of Baode Land and Resources Bureau  | Vice team leader | Land management                    |
|   | Zhang Weihui    | Director of Baode DRC  | Vice team leader | Project management                 |
|   | Kang Zhizhong   | Director of Baode Forestry Bureau  | Vice team leader | Forestry management                |
|   | Du yu           | Director of Baode PMO  | Vice team leader | Project management                 |
| Baode resettlement management office            | Du yu           | Director of Baode PMO  | Director         | Land compensation and resettlement |
|   | Li Jinguo       | Vice director of Baode PMO   | Vice director    | Land compensation and resettlement |
| Changzhi resettlement                           | Zhang Xiangdong | Deputy chief of Changzhi county  | Team leader      | Administrative management          |

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|  |                   |   |                  |                                    |
|--|-------------------|---|------------------|------------------------------------|
| coordination team                        |                   | government                                      |                  |                                    |
|  | Chang Linshan     | Director of Changzhi Land and Resources Bureau  | Vice team leader | Land management                    |
|  | Li Wenxiao        | Director of Changzhi DRC                        | Vice team leader | Economic control                   |
|  | Gao Yu            | Director of Changzhi PMO                        | Vice team leader | Land management                    |
| Changzhi resettlement management office  | Gao Yu            | Director of Changzhi PMO                        | Director         | Project management                 |
|  | Zhang Jinghai     | Vice director of Changzhi PMO                   | Vice director    | Land compensation and resettlement |
| Xiangyuan resettlement coordination team | Wang Shoucheng    | Deputy chief of Xiangyuan county government     | Team leader      | Administrative management          |
|  | Zhang Shuangcheng | Director of Xiangyuan Land and Resources Bureau | Vice team leader | Economic control                   |
|  | Xue Zhimin        | Director of Xiangyuan DRC                       | Vice team leader | Land management                    |
|  | Wang Xianjun      | Director of Xiangyuan forestry bureau           | Vice team leader | Forestry management                |
|  | Wang Rui          | Director of Xiangyuan PMO                       | Vice team leader | Project management                 |
| Xiangyuan resettlement management office | Wang Rui          | Director of Xiangyuan PMO                       | Director         | Project management                 |
|  | Li Bin            | Vice director of Xiangyuan PMO                  | Vice director    | Land compensation and resettlement |
| Tunliu resettlement coordination team    | Qu Weihua         | Deputy chief of Tunliu county government        | Team leader      | Administrative management          |
|  | Yang Qingchun     | Director of Tunliu DRC                          | Vice team leader | Economic control                   |
|  | Li Guoxi          | Director of Tunliu Land and Resources Bureau    | Vice team leader | Land management                    |
|  | Tan Qingchun      | Director of agriculture bureau                  | Vice team leader | Agricultural management            |
|  | Chen JIbin        | Director of Tunliu PMO                          | Vice team leader | Project management                 |
| Tunliu resettlement management office    | Chen JIbin        | Director of Tunliu PMO                          | Director         | Project management                 |
|  | Jin Xin           | Vice director of Tunliu PMO                     | Vice director    | Land compensation and resettlement |
| Qingxu resettlement                      | Zhang Wenhua      | Deputy chief of Qingxu county government        | Team leader      | Administrative management          |

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|                                       |               |  |                  |                                    |
|---------------------------------------|---------------|--|------------------|------------------------------------|
| coordination team                     | Niu Jianzhong | Director of Qingxu Land and Resources Bureau | Vice team leader | Land management                    |
|                                       | Wang Xiangang | Director of Qingxu DRC                       | Vice team leader | Project management                 |
|                                       | Zuo Xiaochun  | Director of Qingxu agriculture bureau        | Vice team leader | Agriculture management             |
|                                       | Fangfei       | Qingxu Kaitong Natural Gas                   | Vice team leader | Project management                 |
| Qingxu resettlement management office | Fangfei       | Qingxu Kaitong Natural Gas                   | Director         | Project management                 |
|                                       | Fan Wenchao   | Qingxu Kaitong Natural Gas                   | Office worker    | Land compensation and resettlement |
|                                       | Liu Shaoming  | Qingxu Kaitong Natural Gas                   | Office worker    | Project management                 |

## **9. Public Participation and Communication**

### **9.1 Public Participation**

The importance has been attached to public participation and communications in the process of compiling the resettlement action plan. The public participation will be further encouraged in implementation phase.

#### **9.1.1 Public Participation during RAP Compiling Phase**

Since April – May 2013, the RAP team and the PMO of each component went to 6 counties, Changzhi, Tunliu, Xiangyuan, Qingxu, Xiyang, and Baode for socioeconomic survey. During the survey, importance was attached to public participation, especially view exchanges with affected residents. Their attitudes towards project construction, comments and demands for compensation and resettlement were inquired. Common comments and suggestions were included in this report. Table 9.1-1 summarizes public opinions during this survey.

Besides motivating public participation during onsite survey, the RAP team also made phone calls, sent emails. In May-June, the team members communicated and exchanged views with leaders and key persons from related county, town and village departments on many occasions. They held discussions on project impact, compensation standards for all categories of objects, resettlement of affected residents, and measures of mitigating negative impact, and passed their comments timely to the project owner and the feasibility research party.

**Table 9.1-1 Summary of onsite surveys and public participation information**

| Time       | Location | Personnel   | Form                    | Participating people   | Description   |
|------------|----------|---|-------------------------|--|---|
| April15-16 | Changzhi | RAP team of 8 members comprising 4 women and 3 from the PMO | Visit                   | Leaders and office worker from related county government departments a totle of 10 people                  | The RAP team visited the local Land and Resources Bureau, the Civil Affair Bureau, the Statistical Bureau, and the Housing and Urban-Rural Development Bureau to understand social and economical development in Changzhi, urbanization status of Changzhi, local compensation and resettlement policies and regulations, women's social and economic status and women's role in society and family in Changzhi. All bureaus expressed their support for the project, and they would try their best to provide help within their duties.            |
|            |          |   | Meeting                 | Village committee members and villager representatives of Sudian village, Sudian Town a totle of 15 people | The survey team held a meeting with secretary of village branch party, director of village committee, the accountant, director of Women's Federation, and some villager representatives. People expressed their views towards the project, and opinions on compensation and rehabilitation measures, They all support project construction, and believe there are no negative impacts upon village environment. They hope the project owner can avoid the spring and autumn, and make compensations timely. Women particularly support the project. |
|            |          |   | Questionnaire and visit | Villager representatives of Sudian village a totle of 11 people  | Questionnaires and conversations were made among some villagers. They all support this project, and hope the project can be completed as soon as possible.  |

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|             |        |   |                         |   |   |
|-------------|--------|---|-------------------------|---|---|
|             |        |   | Meeting                 | Village committee members and villager representatives of Liling village, Handian Town a total of 11 people | The survey team held a meeting with secretary of village branch party, director of village committee, the accountant, director of Women's Federation, and some villager representatives. People exchanged their views towards the project, and opinions on compensation and resettlement. All supports project construction, and believe there are not ill impacts upon village. They hope for civilized, professional actions from the construction company, as well as guaranteed quality of land restoration, and timely compensation deliverance. Women hope the project can create jobs for them, and they can use the gas at an earlier time. |
|             |        |   | Questionnaire and visit | Villager representatives of Liling village a total of 8 people  | Questionnaires and conversations were made among some villagers. Almost all support this project, and hope the access fee can be reduced as a special favor.  |
|             |        |   | Questionnaire and visit | County residents a total of 10 people   | Questionnaires and conversations were made among some villagers. They all support this project, and believe the use of gas can save money.  |
|             |        |   | Visit                   | Some enterprises a total of 3 people  | The survey team visited some enterprises and institutions, including Shanxi Zhengdong Group, and Shanxi Chenggong Vehicle Parts. They all supports project construction and can bear the costs.   |
| April 17-18 | Tunliu | RAP team of 8 members comprising 4 women and 4 from the PMO | Visit                   | Leaders and office worker from related county government departments a total of 9 people                    | The RAP team visited the local Land and Resources Bureau, the Civil Affair Bureau, the Statistical Bureau, and the Housing and Urban-Rural Development Bureau to understand local social and economical development, urbanization status, local compensation and resettlement policies and regulations, women's social and economic status and women's role in society and family. All bureaus expressed their support for the project, and they would try their best to provide help within their duties.  |

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|  |  |  |                         |  |  |
|--|--|--|-------------------------|--|--|
|  |  |  | Meeting                 | Village committee members and villager representatives of Changdong village, Lucun town a total of 10 people | The survey team held a meeting with secretary of village branch party, director of village committee, the accountant, director of Women's Federation, and some affected villagers. People exchanged their views on attitudes towards the project, compensation and resettlement wills, project impacts, and measures mitigating or eliminating ill impacts. They all support project construction, and hope the project can create jobs for them. Women hope they can use the gas at an earlier time, and the government can pay access fee for families in poverty.                                   |
|  |  |  | Questionnaire and visit | Villager representatives of Changdong village a total of 6 people  | Questionnaires and conversations were made among some villagers. Almost all support this project, and hope the access fee can be reduced as a special favor.   |
|  |  |  | Meeting                 | Village committee members and villager representatives of Dongjia village, Xijia town a total of 12 people   | The survey team held a meeting with secretary of village branch party, director of village committee, the accountant, director of Women's Federation, and some affected villagers. People exchanged their views on attitudes towards the project, compensation and resettlement wills, project impacts, and measures mitigating or eliminating ill impacts. They all support project construction, and believe their living standard will be improved, especially for women. They hope the project can be completed at an earlier time, and the government can pay access fee for families in poverty. |
|  |  |  | Questionnaire and visit | Villager representatives of Dongjia village a total of 7 people  | Questionnaires and conversations were made among some villagers. Almost all support this project, and hope the access fee can be reduced as a special favor.   |
|  |  |  | Questionnaire and visit | County residents a total of 10 people  | Questionnaires and conversations were made among some residents. They all support this project, but believe poor families cannot afford their bills.   |

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|             |           |   |                         |  |   |
|-------------|-----------|---|-------------------------|--|---|
|             |           |   | Visit                   | Some enterprises a total of 5 people   | The survey team visited some enterprises and institutions, including Wangzhuang branch office of Shanxi Luan Group, and Changcun Mine of Shanxi Luan Group. They all support project construction and can bear the costs.   |
|             |           |   | Interview               | Pipeline construction team   | The survey team interviewed the project manager of construction team, and got information about compensation for temporary land acquisition due to pipeline laying, impact upon residents' life during construction, and prevention measures.   |
| April 19-20 | Xiangyuan | RAP team of 8 members comprising 4 women and 2 from the PMO | Meeting                 | Related government offices of Xiangyuan a total of 8 people  | The RAP team held a meeting with the local Land and Resources Bureau, the Civil Affairs Bureau, the Statistical Bureau, the Housing and Urban-Rural Development Bureau, Poverty Relief Office and DRC to understand local social and economic development, urban planning, central heat supply planning, local compensation and resettlement policies and regulations, women's social and economic status and women's role in society and family. All bureaus expressed their support for the project, and they would try their best to provide help within their duties. |
|             |           |   | Meeting                 | Village committee members and villager representatives of Qiaotou village, Xiadian town a total of 10 people | The survey team held a meeting with secretary of village branch party, director of village committee, the accountant, director of Women's Federation, and some affected villagers. People exchanged their views on attitudes towards the project, compensation and resettlement wills, project impacts, and measures mitigating or eliminating ill impacts. They all support project construction, and believe their living standard will be improved, especially for women. They hope the project can be completed at an earlier time.                                   |
|             |           |   | Questionnaire and visit | Villager representatives of Qiaotou village a total of 6 people  | Questionnaires and conversations were made among some villagers. Almost all support this project, and hope the access fee can be reduced as a special favor.  |
|             |           |   | Meeting                 | Village committee members and  | The survey team held a meeting with secretary of village branch party, director of village committee, the accountant, director of Women's Federation, and some affected villagers. People exchanged their views   |

Shanxi Gas Utilization Project

|             |        |   |                         |   |  |
|-------------|--------|---|-------------------------|---|--|
|             |        |   |                         | villager representatives of Shangcun village, Wangcun town a total of 13 people   | on attitudes towards the project, compensation and resettlement wills, project impacts, and measures mitigating or eliminating ill impacts. They all support project construction. They believe it is beneficial to the village, and there is not ill impact except some land is taken. They hope the project can be completed at an earlier time.   |
|             |        |   | Questionnaire and visit | Villager representatives of Wangcun town a total of 8 people                      | Questionnaires and conversations were made among some villagers. They all support this project, and hope the access fee can be reduced as a special favor.   |
|             |        |   | Questionnaire and visit | County residents a total of 10 people   | Questionnaires and conversations were made among some county residents. They all support this project, but they think government should provide subsidies for poor families.   |
|             |        |   | Visit                   | Enterprises a total of 3 people   | The survey team visited some enterprises and institutions, including Xiangzi Hand-woven Cloth, and Shanxi Zhongheng Wheels, and Xiangyuan Renda Electromechanical. They all supports project construction and can bear the costs.  |
|             |        |   | Interviews              | Project manager of pipeline construction team under Shengli company               | The survey team interviewed the project manager of construction team, and got information about compensation for temporary land acquisition due to pipeline laying, impact upon residents' life during construction, and prevention measures.  |
| April 23-24 | Qingxu | RAP team of 8 members comprising 3 women and 5 from the PMO | Visit                   | Leaders and office worker from related county government departments a total of 5 | The survey team visited the local Land and Resources Bureau, the Civil Affair Bureau, the Statistical Bureau, and the Housing and Urban-Rural Development Bureau to understand local social and economical development, local compensation and resettlement policies and regulations, and compensation standard for temporary land acquisition. All bureaus expressed their support for the project. |

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|  |  |                          |  |  |
|--|--|--------------------------|--|--|
|  |  |                          | people   |  |
|  |  | Meeting                  | Village committee members and villager representatives of Nanguan village, Xugou town a total of 10 people     | The survey team held a meeting with secretary of village branch party, the accountant, director of Women's Federation, and some villager representatives. People exchanged their views on attitudes towards the project, compensation and resettlement wills, project impacts, and measures mitigating or eliminating ill impacts. They all support project construction. They believe it is beneficial to the village, and there is not ill impact. They hope the project can be completed at an earlier time.                      |
|  |  | Questionnaires and visit | Villager representatives of Nangou a total of 8 people   | Questionnaires and conversations were made among some county residents. They all support this project, and hope gas can be used at an earlier date.  |
|  |  | Meeting                  | Village committee members and villager representatives of Zhangchuwang village, Xugou town a total of 8 people | The survey team held a meeting with 10 others, including secretary of village branch party, the accountant, director of Women's Federation, and some villager representatives. People exchanged their views on attitudes towards the project, compensation and resettlement wills, project impacts, and measures mitigating or eliminating ill impacts. They all support project construction. They believe it is beneficial to the village, and there is not ill impact. They hope the project can be completed at an earlier time. |
|  |  | Questionnaire and visit  | Villager representatives of Zhangchuwang village a total of 6 people   | Questionnaires and conversations were made among some villagers. They all support this project, and hope the gas can be available as soon as possible.   |

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|          |        |   |         |   |   |
|----------|--------|---|---------|---|---|
| May 31   |        |   | Meeting | Government leaders of Jiyi town, and related office workers a total of 3 people           | The survey team got knowledge on social and economic development in the town and its governing villages, employment structure and income sources, and attitude and comments of county government for the project. The leaders indicated the project construction will stimulate local development, and they would provide all-round support for the project.  |
|          |        |   | Meeting | Taoyuanbao Village, Jiyi Town a total of 10 people  | The survey team held a meeting with 10 others, including secretary of village branch party, the accountant, director of Women's Federation, and some villager representatives. People exchanged their views on attitudes towards the project, compensation and resettlement wills, project impacts, and measures mitigating or eliminating adverse impacts. They all support project construction. They believe it is beneficial to village environment. Due to gas network, housework burden on women can be reduced, and their rest and entertainment time can be increased.  |
|          |        |   | Meeting | Yangliqing village, Jiyi Town a total of 6 people   | The survey team held a meeting with 8 others, including secretary of village branch party, the accountant, director of Women's Federation, and some villager representatives. People exchanged their views on attitudes towards the project, compensation and resettlement wills, project impacts, and measures mitigating or eliminating adverse impacts. They all support project construction. They hope they can use gas at an earlier date, and the access fee can be reduced for poor families, so that the whole village can enjoy the benefit of gas network.   |
| April 25 | Xiyang | RAP team of 7 members comprising 3 women and 1 from the PMO | Meeting | Leaders and office worker from related county government departments a total of 12 people | The survey team held a meeting with persons from the government office, the DRC, the poverty relief office, the local Land and Resources Bureau, the Civil Affair Bureau, the Statistical Bureau, and the Housing and Urban-Rural Development Bureau and Xiyang Xiangyuan Gas Company to understand local social and economical development, local compensation and resettlement policies and regulations, and compensation standard for temporary land acquisition, women's social and economic status and women's role in society and family. All parties expressed their support for the project, and they would try their best to provide help within their duties. |

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|          |       |   |                |  |   |
|----------|-------|---|----------------|--|---|
|          |       |   | Meeting        | Leaders and related personnel from Dazhai Town government a total of 5 people                    | The survey team held a meeting with the town governor, deputy governor, and director of Women's Federation. All parties indicated the construction would benefit local economy, and they would support the project with all their effort.   |
|          |       |   | Meeting        | Village committee members and villager representatives of Houzhuang village a total of 18 people | The survey team held a meeting with secretary of village branch party, director of village committee, the accountant, director of Women's Federation, and some villager representatives. People exchanged their views on attitudes towards the project, compensation and resettlement wills, project impacts, and measures mitigating or eliminating adverse impacts. They all support project construction, and hoped the project could be completed at an earlier date, so that they can use central heating. The survey team verified the land acquisition scope and impact scope. |
|          |       |   | Questionnaires | Affected villagers in Houzhuang village a total of 15 people                                     | Questionnaires were performed among affected villagers. They hoped the compensation could be disbursed timely in full amount, and they could have opportunity to earn some cash during project construction.  |
|          |       |   | Interviews     | Affected villagers in Houzhuang village a total of 15 people                                     | Some affected villagers were interviewed, and they expressed their support for the project. They hoped the compensation could be disbursed soon and they would invest the money for more profit.  |
| April 27 | Baode | RAP team of 6 members comprising 3 women and 1 from the PMO | Meeting        | Related departments of county government a total of 12 people                                    | The survey team held a meeting with persons from the government office, the DRC, the poverty relief office, the local Land and Resources Bureau, the Civil Affair Bureau, the Statistical Bureau, and the Housing and Urban-Rural Development Bureau and Baode Heating Company to understand local social and economical development, local compensation and resettlement policies and regulations, central heating planning, and compensation standard for temporary land acquisition, women's social and economic status and women's role in society and                            |

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|  |  |  |                |   |
|--|--|--|----------------|---|
|  |  |  |                | family. All parties expressed their support for the project, and they would try their best to provide help within their duties.   |
|  |  |  | Meeting        | <p>Leaders of Yangjiawan town government, and related personnel a total of 3 people</p> <p>The survey team held a meeting with the town governor, deputy governor, and director of the party branch office. All parties expressed the project construction would greatly push development of local economy, and would provide support with all their effort.</p>  |
|  |  |  | Meeting        | <p>Village committee members and villager representatives of Gucheng village a total of 13 people</p> <p>The survey team held a meeting with secretary of village branch party, director of village committee, the accountant, director of Women's Federation, and some villager representatives. People exchanged their views on attitudes towards the project, compensation and resettlement wills, project impacts, and measures mitigating or eliminating adverse impacts. They all support project construction, and hoped the project could bring job opportunities for young people. They indicated the dry land used by the project had a little impact on affected families.</p> |
|  |  |  | Questionnaires | <p>Affected villagers in Gucheng village a total of 10 people</p> <p>Questionnaires were performed among affected villagers. They hoped the compensation could be disbursed timely in full amount, and the government could provide some skill training.</p>  |
|  |  |  | Interviews     | <p>Affected villagers in Gucheng village a total of 6 people</p> <p>Some affected villagers were interviewed, and they expressed their support for the project. They hoped they could participate in the construction to earn some money.</p>   |

The pictures below show some sessions of public participation during the survey.



The survey of RAP team covers all involved counties, villages affected by the 2 plants, and towns and villages affected by the earlier phase of the gas networks in relevant counties. The surveyed people are widely representative, and the survey result is highly credible and truly represents the wills of local

residents. For survey result and public comments, refer to Table 9.1-2 Table 9.1-3.

**Table 9.1-2 Summary of comments on the power and heat plant**

| SN | Question   | Options                              | Result (%) |
|----|--|--------------------------------------|------------|
| 1  | When was the earliest time you knew about this project?  | (1) long time ago                    | 24         |
|    |  | (2) half a year ago                  | 28         |
|    |  | (3) 3 months ago                     | 24         |
|    |  | (4) 1 month ago                      | 4          |
|    |  | (5) this moment                      | 20         |
| 2  | How do you know about this project?  | (1) words from neighbors             | 60         |
|    |  | (2) village meetings                 | 28         |
|    |  | (3) social surveyor(s)               | 4          |
|    |  | (4) others                           | 8          |
| 3  | Do you agree with the construction of this project?  | (1) Yes                              | 100        |
|    |  | (2) No                               | 0          |
|    |  | (3) Don't know                       | 0          |
| 4  | What do you think about the impacts of the project on the environment where you live?          | (1) Improve                          | 44         |
|    |  | (2) Degrade                          | 8          |
|    |  | (3) No impact                        | 24         |
|    |  | (4) Don't know                       | 24         |
| 5  | What is your opinion on the impact of the project on the economic development of your village? | (1) Promote the economic development | 84         |
|    |  | (2) Affect the development           | 0          |
|    |  | (3) Don't know                       | 16         |
| 6  | Do you think the project will benefit yourself?  | (1) yes                              | 80         |
|    |  | (2) no                               | 0          |
|    |  | (3) Don't know                       | 20         |

From Table 9.1-2, it is clear that all the villagers knew about the project. All people agreed with the project to be constructed within the village, 84% believed that the project would promote the economic development for the village, and 80% thought the project would bring benefits to the villagers.

**Table 9.1-3 Summary of comments on the gas pipeline network**

| SN | Question  | Options             | Result (%) |
|----|---|---------------------|------------|
| 1  | Do you know the difference between natural gas, liquefied petroleum gas, and CBM? | (1) Yes             | 39.7       |
|    |   | (2) Just a little   | 35.5       |
|    |   | (3) No              | 24.8       |
| 2  | When was the earliest time you knew about this project?                           | (1) long time ago   | 47.1       |
|    |   | (2) half a year ago | 26.4       |

Shanxi Gas Utilization Project

|   |  |                                      |      |
|---|--|--------------------------------------|------|
|   |  | (3) 3 months ago                     | 4.1  |
|   |  | (4) 1 month ago                      | 4.1  |
|   |  | (5) this moment                      | 18.3 |
| 3 | How do you know about this project?  | (1) Newspaper                        | 9.1  |
|   |  | (2) TV                               | 24.8 |
|   |  | (3) Radio                            | 0    |
|   |  | (4) Words of others                  | 37.2 |
|   |  | (5) Meetings                         | 12.4 |
|   |  | (6) Social surveyors                 | 15.7 |
|   |  | (7) Others                           | 0.8  |
| 4 | Do you agree with the construction of this project?  | (1) Yes                              | 96.7 |
|   |  | (2) No                               | 0    |
|   |  | (3) Don't know                       | 3.3  |
| 5 | What do you think about the impacts of the project on the environment where you live?          | (1) Improve                          | 57.1 |
|   |  | (2) Degrade                          | 7.6  |
|   |  | (3) No impact                        | 18.5 |
|   |  | (4) Don't know                       | 16.8 |
| 6 | What is your opinion on the impact of the project on the economic development of your village? | (1) Promote the economic development | 83.3 |
|   |  | (2) Affect the development           | 0    |
|   |  | (3) Don't know                       | 16.7 |
| 7 | Do you think the project will benefit yourself?  | (1) yes                              | 84.3 |
|   |  | (2) no                               | 1.7  |
|   |  | (3) Don't know                       | 14.0 |

From Table 9.1-3, it is clear that all the villagers knew about the project. 96.7% people agreed with the project to be constructed within the village, 83.3% believed that the project would promote the economic development for the village, and 84.3% thought the project would bring benefits to the villagers.

**Table 9.1-4 Summary of comments on resettlement of the 2 plants**

| Question  | Options   | Result (%) |
|---|---|------------|
| 1. What kind of compensation would you prefer in case that your land will be expropriated?  | (1) Cash compensation                                 | 100        |
|   | (2) Replacement of land of the same area and quality  | 0          |
| 2. Do you know about the state regulations and policies on compensation for land requisition and/or property loss?                        | (1) very familiar                                     | 20         |
|   | (2) relatively familiar                               | 33.6       |
|   | (3) know a little                                     | 20         |
|   | (4) do not know                                       | 26.7       |
| 3. In case you are quite familiar with the relevant regulations and policies, what is (are) the source(s) for you to get the information. | (1) Popularity campaign by the project owner.         | 6.7        |
|   | (2) Popularity campaign by the government             | 20         |
|   | (3) Popularity campaign by the villager officials     | 6.7        |
|   | (4) Words from the relatives, friend and/or neighbors | 13.3       |

|   |                   |      |
|---|-------------------|------|
|   | (5) self-teaching | 20   |
| 4. Do you know how to file complaints and grievance in case you are unfairly treated in land requisition process? | (1) Yes           | 66.7 |
|   | (2) No            | 33.3 |

The results show that 26.7% of farmer households knew little about the policies on the compensations for land requisition in terms of rights protection, and 33.3% did not how to file complaints and grievance in case of unfair treatment in land requisition process prior to the survey. In response to this, the 2 PMOs and the RAP team for compiling the resettlement action plan performed broad popularity campaign on the relevant regulations and policies. At the end of the survey, all the villagers had become familiar with the policies on land compensation and knew about how to protect their rights when unfairly treated. They all expect the policies and standards for land compensation to be carried out in accordance with the relevant state and provincial directives.

In terms of the mode of compensation, 100% of villagers prefer cash payment.

**Table 9.1-5 Summary of comments on the gas pipeline networks**

| Question  | Options   | Result (%) |
|---|---|------------|
| 1. Do you know the laws and regulations of the state and Shanxi province on land compensation?                    | (1) very familiar                               | 23.1       |
|   | (2) relatively familiar                         | 22.0       |
|   | (3) know a little                               | 17.1       |
|   | (4) do not know                                 | 37.8       |
| 2. What kind of compensation would you prefer in case that your land will be expropriated?                        | (1) Cash compensation                           | 76.5       |
|   | (2) Replacement of land                         | 9.9        |
|   | (3) Joining in rural social endowment insurance | 11.1       |
|   | (4) Others                                      | 2.5        |
| 3. Do you know how to file complaints and grievance in case you are unfairly treated in land requisition process? | (1) Yes   | 52.4       |
|   | (2) No  | 47.6       |

The results show that 37.8% of farmer households knew little about the policies on the compensations for land requisition in terms of rights protection, and 47.6% did not how to file complaints and grievance in case of unfair treatment in land requisition process prior to the survey. In response to this, the 4 PMOs and the RAP team for compiling the resettlement action plan performed broad popularity campaign on the relevant regulations and policies. At the end of the survey, all the villagers had become familiar with the policies on land compensation and knew about how to protect their rights when unfairly treated. They all expect the policies and standards for land compensation to be carried out in accordance with the relevant state and provincial directives.

In terms of the mode of compensation, 76.5% of villagers prefer the cash payment. In the future the PMO and the resettlement office will take the following measures in strengthening the popularity campaign and encouraging public participation.

---- Publicizing the Resettlement Action Plan

Following the laws and regulations in China, and World Bank policies, efforts had been made by the project sponsor to disclose the contents of this RAP, including the scope of project impacts, compensation policies, and rehabilitation program, as well as grievance procedures. On September 2

2013, the RAP had been disclosed on the web site of Guoxin Energy, and RAP documents had been placed in the offices of PMO and offices of concerned town governments to be reviewed by concerned people. The disclosure details had also been published on local newspaper to inform the public in the project areas and enable them to review and comment. After approval, the RAP will also be disclosed by the World Bank. Prior to RAP implementation, more detailed information will be disclosed to affected people by distributing information booklet to all villages affected by the project.

---- Calling for meetings

Prior to the implementation of the land compensation and resettlement, the events will be arranged to explain the relevant policies, regulations, and the standards for compensation, etc., to provide villagers with access to information and make proper arrangements as soon as possible.

---- The popularity campaign also includes the dissemination of project content, progress and resettlement policy through mass media such as TV, radio, and newspaper.

## **9.1.2 Public Participation during the Implementation of the RAP**

The public participation will be encouraged throughout the implementation process of the RAP.

### **A. Public Participation during Land Acquisition Approval**

Prior to submit final land acquisition application, county land resources bureau will arrange public hearing to be participated by relevant town government officials, governor of people congress, discipline secretary and relevant village officials and individuals in order to seek comments and opinions regarding land acquisition and compensation.

### **B. Public Participation in the Process of Compensation Distribution**

Prior to sign compensation agreements with affected individuals and delivery of compensation, affected villages will hold village meeting to be participated by affected people and village representatives in order to seek opinions and confirmation on compensation distribution scheme and rehabilitation measures.

### **C. Public Participation in Use and Monitoring Compensation Fund in the Affected Villages**

According to relevant regulations and decrees, land compensation paid to affected villages belongs to the collectives, and no individuals shall take and transfer such funds. Prior to use such funds, village-wide meetings should be held and plans for using land compensation should be developed, and the use of such funds should be monitored by village representatives.

### **D. Participation during Project Construction**

In order to ensure affected people to be benefitted from participating in project construction, during construction, the contractor should give high priority for employing local residents, particularly affected people, women and vulnerable,

and using local produced construction materials based on consultations with affected villages.

## 9.2 Grievance Mechanism and Channels

The public participation is always encouraged in both phases of compilation and implementation of the RAP. However, it is inevitable to encounter more or less problems in actual process. Therefore, it is necessary to timely solve these problems to ensure the smooth progress in project construction, land acquisition and resettlement. In addition to the existing governmental channels for filing complaints and grievance (including the offices of complaints and appeals at county, municipal and provincial levels, the law enforcement departments of supervision, jurisdiction and prosecution, and the department of disciplinary inspection), a public and effective assess to filing the complaints and grievance has been provided specifically for this project. The procedures are as follows.

Stage 1: Any person aggrieved by any aspect of land acquisition and resettlement can lodge an oral or written grievance to the resettlement team of affected village, or project resettlement office. The oral grievance shall be dealt with by the village authorities in two weeks and the written records shall be kept.

Stage 2: In case the aggrieved person is not satisfied with the decision of the village authorities or project resettlement office at Stage 1, s/he can present the case to the township government, who shall make the responsive decision in two weeks.

Stage 3: In case the aggrieved person is still dissatisfied with the decision in Stage 2 s/he may present the case to the Bureau of Land Recourses of the County for administrative arbitration, which shall be made in ten days.

Stage 4: In case aggrieved person is still dissatisfied with the arbitration made by the corresponding administrative department, s/he may file the lawsuit to civil court in accordance with the *Civil Procedure Act*.

The aggrieved person is eligible for filing lawsuit on any aspect of the resettlement, including the standards for compensation.

The procedures for filing complaint and grievance will be included into the *Booklet of Information on Land Compensation* to keep the villagers informed about their rights of appeals and petitions.

## **10. Monitoring and Evaluation**

In order to ensure the smooth implementation of the resettlement action plan, the whole process will be monitored in perspectives of land requisition, resettlement and rehabilitation in the project. Both the internal and external monitoring will be applied.

### **10.1 Internal Monitoring**

#### **10.1.1 Institution and Staffing**

The internal monitoring will be directed by PMO of each component, and implemented by the village compensation and resettlement team. In order to facilitate the internal monitoring process, all the staffs have the experience in participating in the compilation and implementation of the RAP. They will practice the internal monitoring in the progress of implementing the RAP.

#### **10.1.2 Monitoring Items**

The monitoring items are listed as follows:

- (1) Execution of policies regulated in RAP;
- (2) Complaints of affected residents;
- (3) Participation and negotiations of affected residents during execution of RAP during resettlement;
- (4) Support for vulnerable groups;
- (5) Quality and quantity of land restoration;

#### **10.1.3 Execution Procedures**

The PMO of each component sets up a basic database on compensation and resettlement, and monitors the whole process of resettlement preparation and execution.

During the execution, each level of resettlement office will set up a corresponding database, update it dynamically in accordance with actual execution, report in real time to its superior office actions and execution progress, to keep monitoring resettlement execution in a continuous way.

A form of prescribed format will be formulated for the operation of above mechanism, so that information can flow continuously from the lower levels to higher levels of institution. The PMO will check and verify the operation periodically.

## 10.2 Independent External Monitoring and Evaluation

### 10.2.1 Goals and Tasks

The external monitoring includes the periodical supervision and assessment on the activities of land compensation and resettlement by a third-party institution to assess the achievement to the goals and objectives of the resettlement. Through the external monitoring, the comments and suggestions will be proposed on the restoration of production and living standard among the villagers. It also functions as a pre-warning system to the construction management departments, and as a channel for the villagers to submit their comments.

### 10.2.2 Main Indices for Monitoring and Evaluation

1. Progress: covering the preparations for land requisition, implementation of land compensation, resettlement and restoration, etc.;
2. Quality: covering the satisfaction of the villagers in land compensation process, etc.;
3. Fund: covering the allocation and use of the fund for land compensation and resettlement, etc.; and,
4. Displaced persons: covering the development of household-based economy and productive activities before and after the resettlement among the families impacted by the land requisition;

### 10.2.3 Monitoring and Evaluation Methods

The monitoring and assessment will be based on the survey data provided by the institution responsible for the resettlement under the project. The assessment will be performed by surveying the comprehensive situations, in which the sampling method and rapid appraisal method will be used.

The independent institution for monitoring and evaluation will also perform the tasks as follows:

#### 1). Surveys on the Living Standard of the Resettled People

The benchmark survey will be thoroughly performed for obtaining the baseline formation on the production and living among the local people, including the representative samples. The survey on living standard will be performed 1~2 times a year to keep track on the changes of the sampled subjects. The methods include the periodical investigation, causal talk, and *in-situ* observation for obtaining the necessary information. The statistical analysis will be performed and assessment will be made.

The questionnaire of living standard will contain the indices for measuring the production and living conditions. The same indices are used for indicating the dynamics in productive activities and living standards before and after the resettlement. The design of the indices will be tested in the benchmark survey and modified according to the baseline data for obtaining the comprehensive and realistic data that truly reflects the production and living standard both qualitatively and quantitatively among the resettlement people.

Sample size: 10% of the resettled people, and 30% of villagers in the

village impacted by the project.

2). Collecting and submitting the comments and suggestions from the resettled people

The independent monitoring institution will meet with the administrative departments responsible for resettlement at village and township levels to consult for the comments and suggestions of the villagers. The formal and informal talks will also be held with the villagers with complaints. The desires and demands from the villagers and organizations impacted by the project will be submitted to the relevant departments, and the proposals for improvement will also be made.

3). Other responsibilities

The independent monitoring institution monitor the activities as follows.

- (1) Network devolvement of the resettlement organizations;
- (2) Payment and amount of the land compensations;
- (3) Support for vulnerable groups;
- (4) Production settlement and restoration;
- (5) Labor employment and revenue growth;
- (6) Use of land compensation and benefits of resettled people.

#### **10.2.4 Working Procedures**

- 1) Compiling the framework of monitoring and assessment process;
- 2) Compiling the survey framework and forms, and the records for typical villages and households;
- 3) Design of sampling methods;
- 4) Establishing the information system of monitoring and assessment;
- 5) *In-situ* monitoring and surveys:
  - Local socioeconomic survey;
  - Surveys on typical villages;
  - Surveys on typical households;
  - Surveys on other typical targets;
  - Monitoring the institutions responsible for resettlement.
- 6) Data processing and document keeping, and establishing database;
- 7) Contrasting analysis;
- 8) Compiling the annual assessment report.

**Annex 1: Due Diligence Report on Land Acquisition for Associated Projects for:**

**China  
Shanxi Coal Bed Methane/Natural Gas Utilization  
Project**

**Resettlement Action Plan**

**Shanxi Academy of Social Science, Sociology Institute, for  
Shanxi Provincial Guoxin Energy Group Co., LTD.  
September .2013**

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## 1. Introduction to the Project

### 1.1 Project Background and Overview

In 2012, the Shanxi Provincial Guoxin New Energy Group Co., LTD. decided to develop 6 projects for coal bed methane (CBM, or natural gas) utilization financed by the World Bank. The purpose is to facilitate the reconfiguration of energy composition in Shanxi province, to incubate new industries, to protect ecological environment, to raise the living standard of urban and rural residents (esp. those in countryside), to develop energy conservation and emission reduction, to cope with the climate change, and to promote the socioeconomic development. Table 1.1-1 presents the overviews of the 6 projects.

**Table 1.1-1 Overview of Coal Bed Methane (Natural Gas) Utilization Project**

| Project Name                                       | Construction Company                         | Project Overview  | Construction Content   | Land use (mu)  | Total Investment (million RMB) |
|--|--|---|--|--|--------------------------------|
| Thermal-power cogeneration in Xiyang County        | Shanxi Natural Gas Limited Liability Company | A set of 2 CBM-circulation thermal turbines and 1 power generator in 120MW with annual operation time of 5,500 hours. The thermal load for heating period is 55.12MW for 1.1 million m <sup>3</sup> in 149 days a year. | <ul style="list-style-type: none"> <li>● Factory area</li> <li>● Road to factory</li> <li>● Water pipeline</li> <li>● Gas pipeline</li> <li>● Power line</li> <li>● Heat supply pipeline</li> <li>● Heat exchange station</li> <li>● Pump station</li> <li>● Inspection shaft</li> </ul> | The total land use is 259.28 mu, including 101.07 mu for permanent acquisition, and 158.21 for temporary occupation. |                                |
| Thermal-power cogeneration in Baode County         |  | A set of 2 CBM-circulation thermal turbines and 1 power generator in 120MW with annual operation time of 5,500 hours. The thermal load for heating period is 33.6MW for 0.7 million m <sup>3</sup> in 149 days a year.  |  | The total land use is 501.4 mu, including 119.14 mu for permanent acquisition, and 382.25 for temporary occupation.  |                                |
| CBM Pipeline grid in townships of Changzhi County  | Shanxi Coal Bed Methane Co. Ltd.             | The short-term plan is to the year of 2020 and the long-term plan is to 2030. The gas supply will cover 30,800 households in total amount of 89.7271 million m <sup>3</sup> a year.                                     | <ul style="list-style-type: none"> <li>● The main pipeline at sub-high pressure in 52.7km</li> <li>● 12 gas pressure regulator cabinets</li> </ul>   | A total of 578.4 mu for temporary occupation.  | 56.7175                        |
| CBM pipeline grid in townships of Xiangyuan County |  | The short-term plan is to the year of 2020 and the long-term plan is to 2030. The gas supply will cover 88,100 households in total amount of 62.9502 million m <sup>3</sup> a year.                                     | <ul style="list-style-type: none"> <li>● The main pipeline at sub-high pressure in 83.2km</li> <li>● 10 gas pressure regulator cabinets</li> </ul>   | A total of 1019.09 mu for temporary occupation.  | 60.7012                        |
| CBM pipeline grid in townships of Tunliu County    |  | The short-term plan is to the year of 2020 and the long-term plan is to 2030. The gas supply will cover 12,210 households in total amount of 84.8362 million m <sup>3</sup> a year.                                     | <ul style="list-style-type: none"> <li>● The main pipeline at sub-high pressure in 86.4km</li> <li>● 8 gas pressure regulator cabinets</li> </ul>  | A total of 992.70 mu for temporary occupation.   | 55.7267                        |
| CBM pipeline grid in townships of Qingxu County    | Qingxu County Kaitong Natural Gas Co. Ltd.   | The short-term plan is to the year of 2015 and the long-term plan is to 2020. The gas supply will cover 6,500 households in total amount of 6.6247 million m <sup>3</sup> a year.                                       | <ul style="list-style-type: none"> <li>● The main pipeline at sub-high pressure in 31.7km</li> </ul>   | A total of 370.5mu for temporary occupation.   | 14.8173                        |

### 1.2 Introduction to the Associated Projects

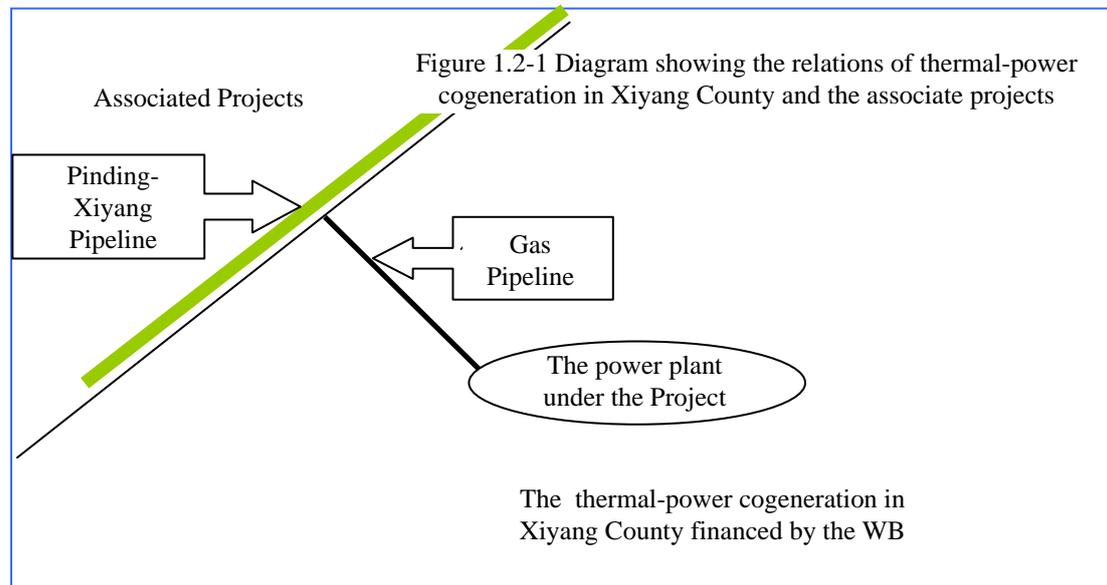
There are associated projects for all the 6 projects. The associated projects include 1 primary CBM (natural gas) station and 5 gate stations and a 33.2km-long pipeline. The compensations for land acquisition and resettlement in all the associated projects have so far been completed or close to end. This “Due Diligence Report on Resettlement in Associated Projects” is prepared in accordance with the World Bank, and as part of RAP report.

#### 1.2.1 The Associated Project to the project of heat and power cogeneration in Xiyang County

The associated project to the project of heat and power cogeneration in Xiyang County financed by the WB is the Zhangzhuang—Xiyang natural gas pipeline, which was constructed

by the Shanxi Compressed Natural Gas Company, Ltd.

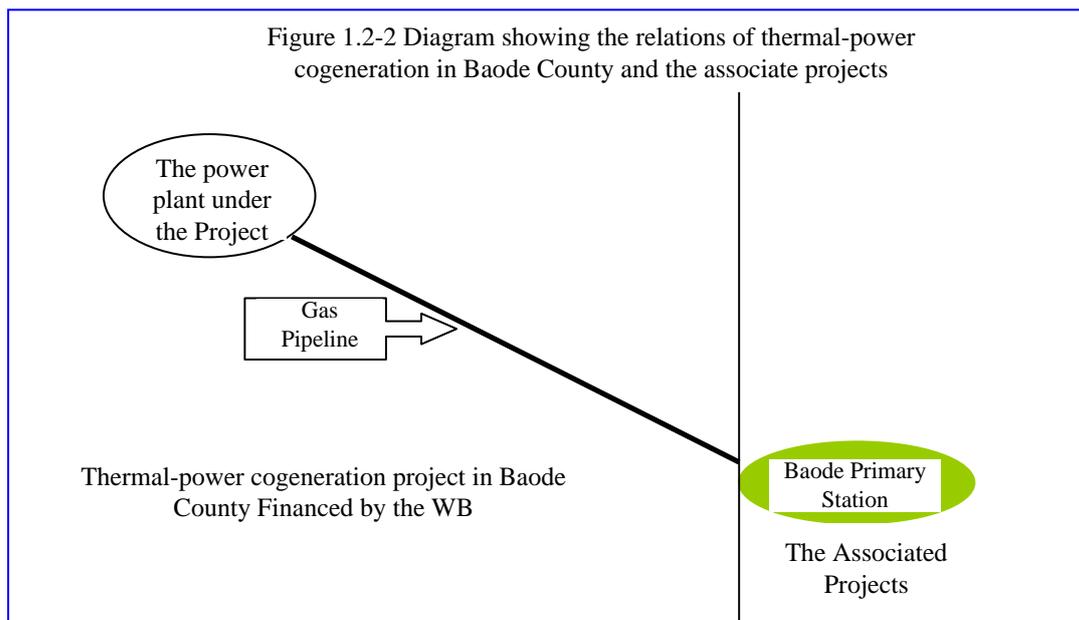
The gas source for the heat and power cogeneration in Xiyang County will be from the Zhangzhuang—Xiyang natural gas pipeline at the northwest side of the heat power plant. The 12.2-km gas pipeline was constructed in 2012 by the Shanxi Compressed Natural Gas Company, Ltd, as a part of the main Yangquan-Pingding-Xiyang pipeline. The pipeline is directly associated with the thermal-power cogeneration project, as shown in Figure 1.2-1.



### 1.2.2 The Associated Project to the Heat and Power Cogeneration in Baode County

The associated project to the project of heat and power cogeneration in Baode County financed by the WB is the existing Baode CBM Primary Station which was constructed by the Shanxi Natural Gas Company Ltd.

The gas source for the heat and power cogeneration in Baode County will be from the Baode CBM Primary Station which is 7km to the southeast of the thermal power plant. The Baode CBM Primary Station was constructed in 2013, and is directly associated with the heat-power cogeneration project, as shown in Figure 1.2-2.

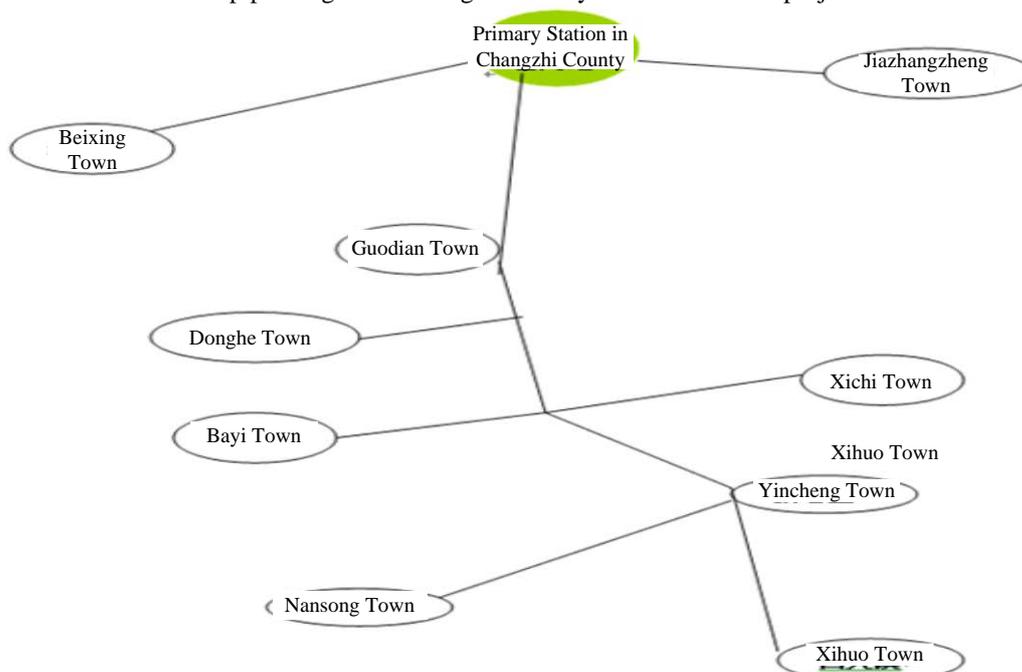


### 1.2.3 The Associated Project to the Gas Network Component in Changzhi County

The associated project to the WB-financed Gas Network Component in Changzhi County is the Gate Station of Changzhi County, which was constructed in 2012 by the Shanxi Coal Bed Methane Co. Ltd.

The gas source for the Gas Network Component in Changzhi County will be from the main Jincheng—Changzhi Pipeline, which was constructed by the Shanxi Coal Bed Methane Co. Ltd. The gas will be regulated to proper pressure in the Gate Station of Changzhi County and then sent to the pipeline grid in the proposed project. This makes the Gate Station of Changzhi County as the associated project. Figure 1.2-3 shows their association, in which the black lines indicate the gas pipeline grid to be constructed.

Figure 1.2-3 Diagram showing the relations of the project of town gas pipeline grid in Changzhi County and the associate projects

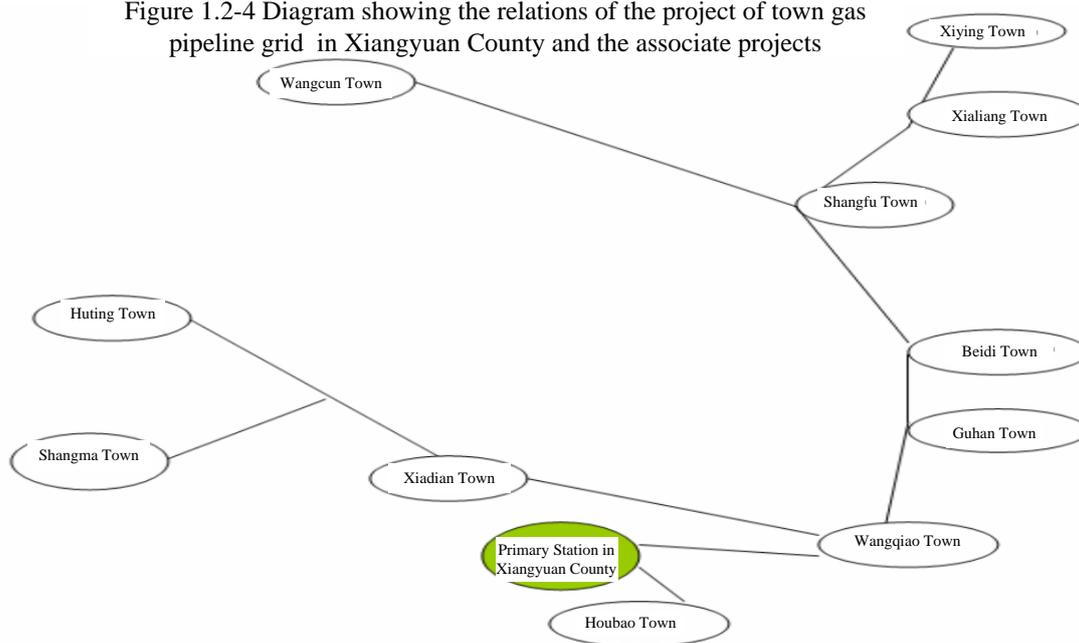


**1.2.4 The Associated Project to the Gas Network Component in Xiangyuan County**

The associated project to the WB-financed Gas Network Component in Xiangyuan County is the Gate Station of Xiangyuan County, which was constructed by the Shanxi Coal Bed Methane Co. Ltd.

The gas source for Xiangyuan Gas Network Component will be from the main Tunliu—Xiangyuan Pipeline, which was constructed by the Shanxi Coal Bed Methane Co. Ltd. The gas will be regulated to proper pressure in the Gate Station of Xiangyuan County and then sent to the pipeline grid in the proposed project. This makes the Gate Station of Xiangyuan County as the associated project. Figure 1.2-4 shows their association, in which the black lines indicate the gas pipeline grid to be constructed.

Figure 1.2-4 Diagram showing the relations of the project of town gas pipeline grid in Xiangyuan County and the associate projects

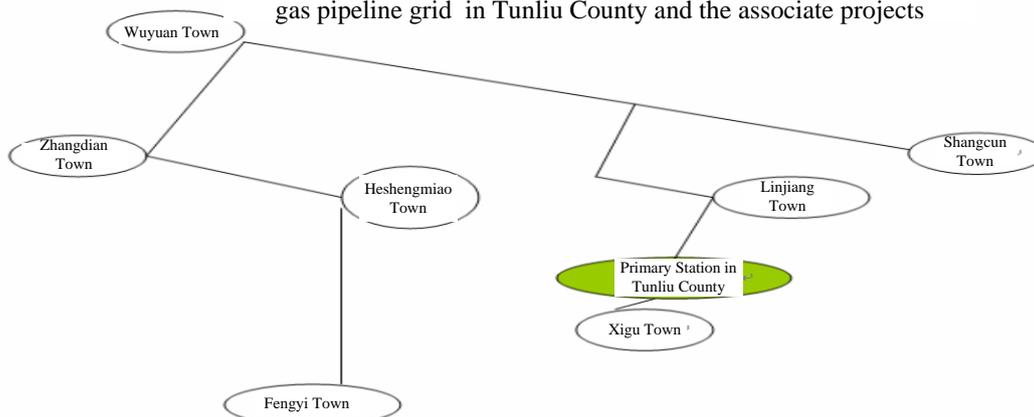


**1.2.5 The Associated Project to the Gas Network Component in Tunliu County**

The associated project to the WB-financed Gas Network Component in Tunliu County was constructed in 2012 by the Shanxi Coal Bed Methane Co. Ltd.

The gas source for the CBM (natural gas) pipeline grid in townships of Tunliu County will be from the main Tunliu—Xiangyuan Pipeline, which was constructed by the Shanxi Coal Bed Methane Co. Ltd. The gas will be regulated to proper pressure in the Gate Station of Tunliu County and then sent to the pipeline grid in the proposed project. This makes the Gate Station of Tunliu County as the associated project. Figure 1.2-5 shows their association, in which the black lines indicate the gas pipeline grid to be constructed.

Figure 1.2-5 Diagram showing the relations of the project of town gas pipeline grid in Tunliu County and the associate projects

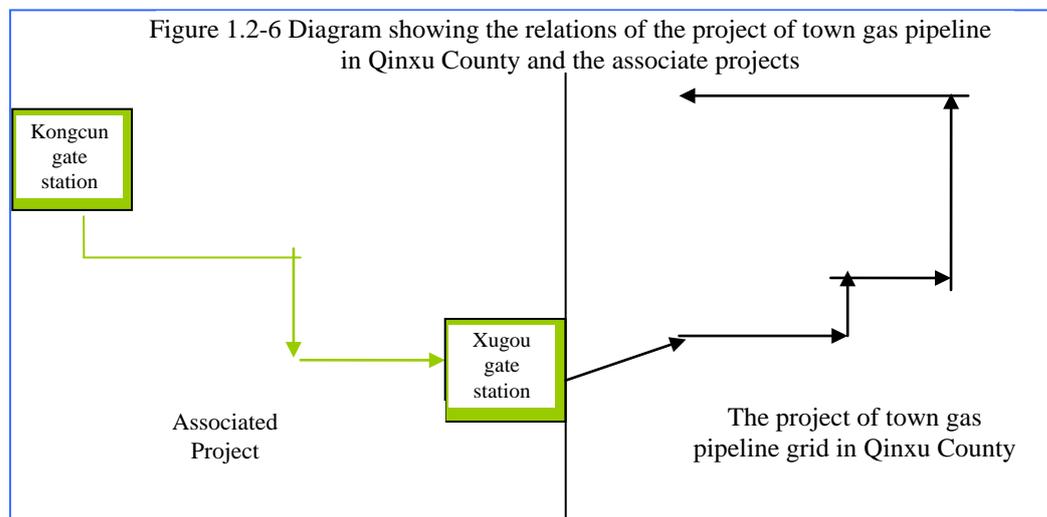


### 1.2.6 The Associated Project to the Gas Network Component in Qingxu County

The associated projects to the WB-financed Gas Network Component in Qingxu County are the Kongcun Gate Station, Xugou Gate Station, and the connecting pipeline in 21 km, which were constructed in 2011 by the Qingxu County Kaitong Natural Gas Co. Ltd.

The main gas source for the Qingxu County Gas Network Component will be from the main Taiyuan—Pingyao pipeline owned by the Shanxi Natural Gas Limited Liability Company. The gas is regulated to proper pressure in Xugou Gate Station and sent to the CBM (natural gas) pipeline grid in townships of Qingxu County. In addition, the backup gas source is from Kongcun—Gujiao CBM pipeline. The gas goes through the Kongchun Gate Station and the connecting pipeline from Kongcun Gate Station to Xugou Gate Station, then to the CBM (natural gas) pipeline grid in townships of Qingxu County. Therefore, the associated projects include the two gate stations and their connecting pipeline. Figure 1.2-6 presents a diagram showing their association, in which the black lines indicate the gas pipeline grid.

Figure 1.2-6 Diagram showing the relations of the project of town gas pipeline in Qingxu County and the associate projects



### 1.3 Compensation for Land Acquisition and Resettlement in the associated projects

Among all the associated projects, the compensations for land acquisition and resettlement have been completed for the construction of 4 gate stations. The compensations for temporary land occupation for laying the 33.2-km-long pipeline have been finished. The compensations for land acquisition and resettlement for 1 gate station and 1 primary station are in progress.

### 1.3.1 Compensations for permanent land acquisition and resettlement

The construction of 5 gate stations and 1 primary station involved permanent land acquisition of 181.24 mu, including 175.59 mu of farmland and 5.65 mu of unutilized land, and affecting 275 persons in 69 households.

#### (1) Baode Primary Station

The Baode Primary Gate Station is at the Shantou Village of Yangjiawan Town in Baode County. The station occupies the land of 41.15 mu. The permanent land acquisition affected 42 persons in 12 households. So far the fund of compensations for land acquisition has been transferred to the account of the Finance Station of Yangjiawan Town.

#### (2) Gate Station of Changzhi County

The Gate Station of Changzhi County is at the east part of the Sudian Village of Sudian Town in Changzhi County. The station occupies the land of 13.74 mu, which has been approved as the land for public facilities by Shanxi Province Department of Land Resources.

The permanent land acquisition for the gate station affected 42 persons in 11 households. The fund of compensation for land acquisition has been paid to the affected households and the resettlement has been completed.

#### (3) Gate Station of Xiangyuan County

The Gate Station of Xiangyuan County is at the south part of the Qiaotou Village of Xiadian Town in Xiangyuan County. The station occupies the land of 82 mu. The permanent land acquisition affected 90 persons in 20 households. So far the fund of compensation for land acquisition has been transferred to the account of the Finance Station of Xiadian Town.

#### (4) Gate Station of Tunliu County

The Gate Station of Tunliu County is at the south part of the Dongjia Village in Xijia Town, Tunliu County. The station occupies the land of 9.8 mu. The permanent land acquisition affected 8 persons in 2 households. So far the fund of compensation for land acquisition has been paid to the affected villagers in March, 2013, and the resettlement has been completed.

#### (5) Kongcun Gate Station and Xugou Gate Station

The Kuncun Gate Station is at the east side of the Kongcun Village of Qingyuan Town in Qingxu County. The station occupies the land of 22.34 mu. The Xugou Gate Station is at the southeast part of the Xichuwang Village of Xugou Town in Qingxu County. The station occupies the land of 12.21 mu. The land for the two stations has been approved as the land for public facilities by Shanxi Province Department of Land Resources. The total area of the land for the two stations is 34.55 mu, including 28.9 mu of non-irrigated farmland and 5.65 mu of unutilized land.

The permanent land acquisition for the two gate stations affected 93 persons in 24 households. The fund for land acquisition has been paid to the affected households in November, 2009 and in June, 2010, and the resettlement has been completed. Table 1.3-1 presents the people and households affected by the land acquisition for the primary gate station and 5 gate stations.

**Table 1.3-1 people and households affected by the land acquisition 5 gate stations**

| Project                         | Location                           | Land acquisition and land category |                        |                 | Affected households and persons |         | Payment for land acquisition   |                 |
|---------------------------------|------------------------------------|------------------------------------|------------------------|-----------------|---------------------------------|---------|--------------------------------|-----------------|
|                                 |                                    | Subtotal                           | Non-irrigated farmland | Unutilized land | Households                      | persons | Compensation standard (RMB/mu) | Payment time    |
| Baode Primary Station           | Shantou Village of Yangjiawan Town | 41.15                              | 41.15                  |                 | 12                              | 42      | 24,000                         | To be paid soon |
| Gate Station of Changzhi County | Sudian Village of Sudian Town      | 13.74                              | 13.74                  |                 | 11                              | 42      | 24,600                         | 2012.12         |
| Gate                            | Qiaotou                            | 82                                 | 82                     |                 | 20                              | 90      | 28,000                         | To be           |

## Shanxi Gas Utilization Project

|                               |                                  |               |               |             |           |            |          |           |
|-------------------------------|----------------------------------|---------------|---------------|-------------|-----------|------------|----------|-----------|
| Station of Xiangyuan County   | Village of Xiadian Town          |               |               |             |           |            |          | paid soon |
| Gate Station of Tunliu County | Dongjia village of Xijia Town    | 9.8           | 9.8           |             | 2         | 8          | 28,576.8 | 2012.3    |
| Kongcun Gate Station          | Kongcun Village of Qingyuan Town | 22.34         | 20            | 2.34        | 13        | 50         | 30,000   | 2010.12   |
| Xugou Gate Station            | Xichuwang Village of Xugou Town  | 12.21         | 8.9           | 3.31        | 11        | 43         | 21,420   | 2010.6    |
| <b>Total</b>                  |                                  | <b>181.24</b> | <b>175.59</b> | <b>5.65</b> | <b>69</b> | <b>275</b> |          |           |

### 1.3.2 Compensations for temporary land occupation

A total of 398.4 mu will be temporarily occupied for laying the 33.2-km gas pipeline, including 219.84 mu (55.2%) of non-irrigated farmland, 24 mu (6%) of vegetable farmland, 12 mu of orchard (3%), 24 mu (6%) of country road, and 118.56 mu (29.8%) of unutilized land. The temporary land occupation affects 621 persons of 173 households in 22 villages.

The project of 33.2-km gas pipeline was completed in 2012, and the fund of compensations for temporary land occupation has been paid to the affected households in accordance with the negotiated amount.

## 2. The Impacts of the Associated Project

### 2.1 Scope of Impact

The permanent land acquisition and temporary land occupation affected 28 villages of 7 towns in 8 counties. Specifically, the permanent land acquisition involved in 6 villages of 6 towns in 5 counties, and the temporary land occupation involved in 22 villages of 7 towns in 3 counties, as presented in Table 2.1-1.

**Table 2.1-1 The Scope of Impact**

| Project                       | County     | Town  | Village   |
|-------------------------------|------------|---|---|
| Primary station, gate station | Baode      | Yangjiawan  | Shantou   |
|                               | Changzhi   | Sudian Town                                       | Sudian Village  |
|                               | Xiangyuan  | Xiadian Town                                      | Qiaotou Village   |
|                               | Tunliu     | Xijia Town  | Dongjia Village   |
|                               | Qingxu     | Qingyuan Town, Xugou Town                         | Kongcun Village, Xichuwang Village                                    |
| Gas pipeline                  | Pingding   | Zhangzhuang Town                                  | Zhangzhuang   |
|                               | Xiyang     | Lijiazhuang Town                                  | Beiduhai, Xilijiazhuang, Pugou, Cuifunao                              |
|                               |            | Dazhai Town                                       | Qingyantou, Qianlongfengnao, Shutiaoyu, Liuzhuang, Gaojialing, Mengbi |
|                               | Qingxu     | Qingyuan Town                                     | Kongcun Village, Wennanshe  |
|                               |            | Xigu Town   | Xiluobai, Xiluobai, Jianchangying                                     |
|                               |            | Mengfeng Town                                     | Nanliwang   |
|                               | Xugou Town | Taohuaying, Gaohua, Nanyiwu, Nanneidao, Xichuwang |   |

### 2.2 The impact of permanent land acquisition

Six villages were impacted by the 6 gas stations including the Baode Primary Station, the Gate Station of Changzhi County, the Gate Station of Xiangyuan County, the Gate Station of Tunliu County, Xugou Gate Station and the Kongcun Gate Station in Qingxu County. The

stations called for permanent land acquisition of 181.24 mu, including 175.59 mu of non-irrigated farmland and 5.65 mu of unutilized land. The permanent land acquisition had impact on 275 rural residents of 69 households. The details are presented in Table 2.2-1.

**Table 2.1-1 The impact of land acquisition for 5 gate stations.**

| Project                          | Location                          | Land acquisition and land category |                        |                 | Number of persons and households impacted |            |
|----------------------------------|-----------------------------------|------------------------------------|------------------------|-----------------|---|------------|
|                                  |                                   | subtotal                           | Non-irrigated farmland | Unutilized land | households                                | persons    |
| Baode Primary Station            | Shantou Village of YangjiawanTown | 41.15                              | 41.15                  |                 | 12  | 42         |
| Kongcun Gate Station             | Kongcun Village of Qingyuan Town  | 22.34                              | 20                     | 2.34            | 13  | 50         |
| Xugou Gate Station               | Xichuwang Village of Xugou Town   | 12.21                              | 8.9                    | 3.31            | 11  | 43         |
| Gate Station of Changzhi County  | Sudian Village of Sudian Town     | 13.74                              | 13.74                  |                 | 11  | 42         |
| Gate Station of Xiangyuan County | Qiaotou Village of Xiadian Town   | 82                                 | 82                     |                 | 20  | 90         |
| Gate Station of Tunliu County    | Dongjia Village of Xijia Town     | 9.8                                | 9.8                    |                 | 2   | 8          |
| <b>Total</b>                     |                                   | <b>181.24</b>                      | <b>175.59</b>          | <b>5.65</b>     | <b>69</b>                                 | <b>275</b> |

### 2.3 The impact of temporary land occupation

The temporary land occupation covered 398.4 mu for 33.2-km-long gas pipelines, imposing impacts on 621 persons of 173 households in 22 villages. Table 2.3-1 presents the details.

**Table 2.3-1 Impacts of the 21-km-long gas pipelines**

| Town             | Villages impacted | Land occupation and land category (mu) |                        |                |         |            | Number of households impacted |            |            |
|------------------|-------------------|--|------------------------|----------------|---------|------------|-------------------------------|------------|------------|
|                  |                   | subtotal                               | Non-irrigated farmland | Vegetable land | Orchard | Rural road | Unutilized land               | households | persons    |
| Zhangzhuang Town | Zhangzhuang       | 25                                     |                        |                |         |            | 25                            |            |            |
| Lijiazhuang Town | Beiduhai          | 9                                      | 9                      |                |         |            |                               | 6          | 19         |
|                  | Xilijiazhuang     | 10.4                                   | 10.4                   |                |         |            |                               | 5          | 14         |
|                  | Pugou             | 8                                      | 8                      |                |         |            |                               | 4          | 12         |
|                  | Chuifunao         | 10                                     | 10                     |                |         |            |                               | 5          | 16         |
| Dazhai Town      | Qingyantou        | 20                                     |                        |                |         |            | 20                            |            |            |
|                  | Qianlongfengnao   | 12                                     | 12                     |                |         |            |                               | 7          | 22         |
|                  | Shutiaoyu         | 7                                      | 7                      |                |         |            |                               | 3          | 10         |
|                  | Liuzhuang         | 10                                     | 10                     |                |         |            |                               | 4          | 13         |
|                  | Gaojialing        | 20                                     | 6.44                   |                |         |            | 13.56                         | 2          | 5          |
|                  | Mengbi            | 15                                     | 15                     |                |         |            |                               | 8          | 21         |
| <b>Subtotal</b>  |                   | <b>146.4</b>                           | <b>87.84</b>           |                |         |            | <b>58.56</b>                  | <b>44</b>  | <b>132</b> |
| Qingyuan Town    | Kongcun Village   | 5                                      |                        |                |         | 5          |                               |            |            |
|                  | Wennanshe         | 6                                      |                        |                |         | 6          |                               |            |            |
| Xigu Town        | Xiluobai          | 38                                     | 38                     |                |         |            |                               | 24         | 82         |
|                  | Dongluobai        | 42                                     | 42                     |                |         |            |                               | 35         | 132        |
|                  | Jianchangying     | 62                                     | 52                     |                |         |            | 10                            | 43         | 172        |

## Shanxi Gas Utilization Project

|                 |            |     |     |    |    |    |    |     |     |
|-----------------|------------|-----|-----|----|----|----|----|-----|-----|
| Mengfeng Town   | Nanliwang  | 7   |     |    |    | 7  |    |     |     |
| Xugou Town      | Taohuaying | 42  |     |    | 12 |    | 30 | 7   | 26  |
|                 | Gaohua     | 6   |     |    |    | 6  |    |     |     |
|                 | Nanyiwu    | 10  |     |    |    |    | 20 | 6   | 23  |
|                 | Nanneidao  | 14  |     | 14 |    |    |    | 8   | 31  |
|                 | Xichuwang  | 20  |     |    |    |    | 10 | 6   | 23  |
| <b>Subtotal</b> |            |     |     |    |    |    |    | 129 | 489 |
| <b>Total</b>    |            | 252 | 132 | 24 | 12 | 24 | 60 | 173 | 621 |

### 3. Analysis on the Impact of the Associated Projects

The land acquisition by the associated projects reduced area of farmland in the relevant villages and influenced the production activities and livelihood of local villagers to some extent. However, such impacts are relatively slight due to the characteristics of the projects and of local farmland resources. The geographic scope of impact is small due to the size of the primary gas station and the 5 gate stations, each affecting 1 village mostly by permanent land acquisition. The impact scope is comparatively large for pipeline laying, covering 22 villages in 7 towns. Since the impact is mostly from temporary land occupation, the time period is relatively limited.

#### 3.1 Impact of permanent land acquisition

##### 3.1.1 The impact of land acquisition for Baode Primary Station

The Baode Primary Station is at the Shantou Village of Yangjiawan in Baode County. This village hosts 571 residents of 163 households and the agricultural land of 6,100 mu, including 2,100 mu of farmland, 200 mu of orchard, 1,050 mu of wood land, 800 of grassland, and 1950 mu for miscellaneous agrarian purposes. The averaged land availability is 3.68mu/person. In 2012, the net per capita income was 4,280 RMB in average. The residents are not divided into villager's groups.

The permanent land acquisition for Baode Primary Station involved 41.15 mu of farmland in Shantou Village, influencing 42 persons in 12 households. The averaged land expropriation is 3.43 mu per household or 0.98 mu per person, accounting for 26.6% of the contracted farmland area.

The surveys show that all the land acquired for the Baode Primary Station is non-irrigated farmland, which yield the net income of 500~600 RMB/mu a year. That is to say that the land expropriation would reduce the annual net income by 2,000 RMB per household or 500 RMB per person, accounting for about 10% of the total revenue.

Shantou village is geographically mountainous with a large area. Although the per capita arable land is relatively large, most are the non-irrigated farmland in flat or sloped areas with low unit agricultural yield and total output. Like most villages, the residents of labor age worked in towns and cities. The recent years saw the increasing number of labors working within the county with the rapid economic growth in Baode, as witnessed by ascending income among the villagers. The survey shows that around 1/2~1/3 of family income is from agricultural activities.

##### 3.1.2 Impact of land acquisition for the Gate Station of Changzhi County

The Gate Station of Changzhi County is at the Sudian Village of Sudian Town which hosts people's government of Sudian Town. The village is in the north part of Changzhi County, 4 km from the Chengnan Square of Changzhi City. The Changling Road is a part the provincial highway stretches through the village. The village, which is the largest in Changzhi County, hosts 6,090 residents of 1,740 households and has 4750 mu of farmland. In 2012, the per capita income was 10,000 RMB.

In Sudian Village there are 5 collective enterprises and more than 20 private businesses,

mostly in plastic moldering, metal smelting, manufacturing and material processing. The animal farming and crop plantation are in constant development as well. More than 20 households are engaged in large-scale animal farming or crop plantation, and more than 30 household are in animal farming in smaller scale. The farm animals include swine, chicken, cattle and special animals. The plantations include the florist nurseries, tree seedlings, and greenhouse vegetables. The florist nurseries and tree seedlings cover more than 1,000 mu of land, and there are more than 100 greenhouses for vegetable production. The tertiary industry is well developed and catering services are common in the village.

In Sudian village the residents are found in 6 villager's groups. The land acquired for the gate station was originally contracted by the No. 4 Villager's Group, which has 998 persons of 285 households and 850 mu of farmland. The land availability is 0.85 mu/person in average. The area of 13.74 mu of non-irrigated farmland was acquired for the gate station, accounting for 1.62% of the total area of the Group and influencing 42 people in 11 households with averaged farmland loss of 1.25 mu per family or 0.33 mu per person. However, the expropriated land accounts for 38% of the farmland in the 11 households, imposing comparatively great impact on the families due to the lower averaged land availability in the Group in spite of the relatively small area of land loss. On the other hand, the survey shows that the secondary and tertiary industries are well developed in the suburb village, where the villagers gain most income from non-agricultural businesses and wages, and the agriculture yields only 10% of the total revenue. The acquired land is mostly the non-irrigated farmland which yields the annual net income of 800 RMB. The land expropriation would cause the loss of 1,000 RMB/year/household or 300 RMB/year/person, accounting for about 3% of total income.

### **3.1.3 Impact of land acquisition for the Gate Station of Xiangyuan County**

The Gate Station of Xiangyuan County is at the Qiaotou Village of Xiadian Town in the southwest part of Xiangyuan County. The village hosts 760 residents of 190 households found in 4 villager's groups, and has 1,400 mu of farmland or 1.84 mu per person. In 2012 the per capita net income was 9,000 RMB in average.

The permanent land acquisition for the gate station involved in 82 mu, which was originally contracted by the No. 2 and No.3 villager's group. The two groups include 400 persons of 100 households and have more than 750 mu of farmland or 1.88 mu per person. The land expropriation would affect 90 persons of 20 families with the farmland loss of 4.1 mu/household or 0.9 mu/person. The expropriated land accounts for 48% of the farmland in the 20 households, imposing comparatively great impact on the per capita land availability.

The survey shows that most expropriated land is non-irrigated farmland, which yields the net income of 800 RMB/mu/year. That is to say the economic losses for the impacted families would be 3,000 RMB/year/household or 700 RMB/year/person, accounting for 8% of the total revenue.

The survey in Qiaotou Village shows that more than 100 male labors work in local coal mines with annual income of 20,000~30,000 RMB. More than 10 households are engaged in transportation business with annual income of 100,000 RMB. Many mid-aged and young women worked in the local agricultural parks with annual income of 10,000 RMB. In the village, 70% of families have annual income of more than 30,000 RMB. The agriculture yields around 25% of household income.

### **3.1.4 Impact of land acquisition for the Gate Station of Tunliu County**

The Gate Station of Tunliu County is at Dongjia Village of Xijia Town in southeast part of Tunliu County. The village hosts 1,202 residents of 302 households found in 4 villager's groups. There are 2,420 mu of farmland or 2.01 mu per person. In 2012 the net per capita income was 8,000 RMB.

The permanent land acquisition for the gate station involved in 9.8 mu, which was originally contracted by the No.3 villager's group. The group has 360 persons of 98

households and 600 mu of farmland. The land expropriation would affect 8 persons of 2 families with the farmland loss of 4.9 mu/household or 1.2 mu/person. The expropriated land accounts for 60.4% of the farmland in the 2 households, imposing comparatively great impact on the per capita farmland availability.

The surveys show that all the land acquired for the gate station is non-irrigated farmland, which yields net income of 800 RMB/mu a year. That is to say that the land expropriation would reduce the annual net income by 4,000 RMB per household or 1,000 RMB per person, accounting for about 12.25% of the total revenue.

### **3.1.5 Impact of land acquisition for the Kongcun Gate Station**

The Kongcun gate station is at the Kongcun village of Qingyuan Town in the northwest part of Qingxu County. The village hosts 2,600 persons of 670 households, and has 3,100 mu of farmland or 1.19 mu per person. In 2012 the net per capita income was 10,000 RMB in average. There are 9 villager's groups in the village.

The permanent land acquisition for the gate station involved 22.34 mu of farmland including 20 mu of non-irrigated farmland, which was originally contracted by No. 5 villager's group. The group includes 300 persons of 75 households and has 350 mu of farmland, or 1.17 mu per person. The land expropriation affects 50 persons of 13 households, with the farmland loss of 1.5 mu/household or 0.4 mu/person. The expropriated land accounts for 35% of the total farmland area for the 13 households.

The surveys show that all the land acquired for the gate station is non-irrigated farmland, which yields net income of 1,000 RMB/mu a year. That is to say that the land expropriation would reduce the annual net income by 1,500 RMB per household or 400 RMB per person, accounting for about 4% of the total revenue.

The Kongcun village used to depend on agricultural production and was known as the "Flag of Agriculture in the County" in 1960s and 1970s. The recent years saw the development of market economy and many people left the home for urban employment or for own businesses, partially as a result of its geographic location close to the county township and the convenient transportation. Therefore, the villagers' main source of income is from non-agricultural activities. In average the agriculture yields about 12% of total revenue.

### **3.1.6 Impact of land acquisition for the Xugou Gate Station**

The Xugou gate station is at the Xichuwang village of Xugou Town in the southeast part of Qingxu County. The village hosts 2,661 persons of 725 households, and has 6,763 mu of farmland or 2.54 mu per person. In 2012 the net per capita income was 11,000 RMB in average. The Xichuwang village is the prominent production base of organic vegetables for Taiyuan City.

In Xichuwang village, the villagers mainly depend on crop production and transportation services. The crops include vegetables and grains. The green houses cover up to 1,000 mu of land. In average the agriculture yields 28% of total revenue.

In 2009 the Shanxi Dahe New Agriculture Science and Technology Company, Ltd. settled down in Xichuwang Village. The company is engaged in crop production, research, and sightseeing services for low-carbon and high-tech development. The company further promotes the growth of the collective economy in the village, brings in the advanced technology for crop production and management, and creates employment opportunities for the villagers.

There are 4 villager's groups in Xichuwang Village. The permanent land acquisition involved in 12.21 mu of farmland including 8 mu of non-irrigated land, which was originally contracted to No.4 villager's group. The group include 660 persons of 180 households and has 1,700 mu of farmland or 2.58 mu per person. The land expropriation affects 43 persons of 11 households. In average the land loss is 1.11 mu/household or 0.28 mu/person. The survey shows that the agricultural yield of such farmland is 1,200 RMB/mu. That is to say that the land expropriation would result in the loss of 1,300 RMB/household/year or 350

RMB/person/year, accounting for 3.0% of the total revenue.

### **3.2 Impact of temporary land occupation**

In spite of the large areas of land to be temporarily occupied for laying the 33.2-km-long gas pipelines, the impact on the villages would not be significant. This is because 1/3 of the area is the unutilized land, the construction is arranged after autumn in case of farmland, and the construction period is relatively short. In addition, the amount of compensation was determined through the negotiation between the construction company and the villager's committee. The compensation for the impacted households was higher than the average yield of the farmland. Therefore, the economic losses of the impacted households and the villages are recovered by the higher amount of compensation.

## **4. Policy Framework for Resettlement**

### **4.1 Policies and regulations**

The following regulations and policies are applicable to the compensations for land expropriation and resettlement.

- ◆ “The Law of Land Administration of the People's Republic of China” (enacted in June 1986, and amended in 1988, 1998 and 2004);
- ◆ State Council's Decision of Deepening Reform and Being Strict with the Management of Land (State issue [2004] No.28)
- ◆ “Regulations of Shanxi Province on Implementing the ‘The Law of Land Administration of the People's Republic of China’” (Adopted On September 26, 1999, revised in 2008)
- ◆ “Measures of Shanxi Province on Distributing the Compensations for the Acquisition and Occupation of Land Collectively Owned by Rural Farmers” (effected on December 1, 2005)
- ◆ Notice of Shanxi People's Government on Promulgating the Uniform Standard of Annual Land Output Values in Land Acquisition (Jinzhengfa [2009] No. 38)
- ◆ “Regulations on Land Reclamation” (enacted on February 22, 2011, and promulgated and effected on March 5)

### **4.2 Unit price of Compensation and the Total Amount of Compensation**

#### **4.2.1 The unit price and total amount of compensation for permanent land acquisition**

The surveys show that the amount of compensation were determined through the negotiations between the project owner and the villager's committees, usually higher to some extent than the uniform baseline of annual land output values and the compensation for land acquisition defined by the Shanxi people's government.

##### **(1) The unit price and total amount of compensation for permanent land acquisition for Baode Primary Station**

In March 2012, Shanxi Natural Gas Limited Liability Company and the Villager's Committee of Shantou Village reached the agreement on the compensation for land acquisition for the Baode Primary Station. The area of expropriated land was 41.15 mu at the unit price of 24,000 RMB/mu, which made the total amount of compensation 987,600 RMB. Other compensations were also made, 35,200 RMB for standing crops and 32,000 RMB for ground attachments such as scattered economic trees and a tomb.

##### **(2) The unit price and total amount of compensation for permanent land acquisition for the Gate Station of Changzhi County**

In January 2012, the Shanxi Coal Bed Methane Co. Ltd. and the Villager's Committee of Sudian Village reached the agreement on the compensation for land acquisition for the Gate Station of Changzhi County. The area of expropriated land was 13.74 mu at the unit price of

46,000 RMB/mu, which made the total amount of compensation 632,040 RMB, covering the costs for the land and coordination activities.

**(3) The unit price and total amount of compensation for permanent land acquisition for the Gate Station of Xiangyuan County**

In August 2012, the Shanxi Coal Bed Methane Co. Ltd. and the Villager’s Committee of Qiaotou Village reached the agreement on the compensation for land acquisition for the Gate Station of Xiangyuan County. The area of expropriated land was 82 mu at the unit price of 45,000 RMB/mu. The expropriated farmland previously contacted with the villagers was compensation at the unit price of 28,000 RMB/mu. The enterprise management cost was 17,000 RMB/mu. Therefore, the total amount of compensation was 3.69 million RMB.

**(4) The unit price and total amount of compensation for permanent land acquisition for the Gate Station of Tunliu County**

In January 2012, the Shanxi Coal Bed Methane Co. Ltd. and the Villager’s Committee of Dongjia Village reached the agreement on the compensation for land acquisition for the Gate Station of Tunliu County. The area of expropriated land was 13.73 mu (9.8 mu was actually acquired) at the unit price of 67,479.97 RMB/mu, which made the total amount of compensation 926,500 RMB (from which 265,871 RMB was returned by the villager’s committee), covering the ground attachments (mostly 12 green houses) and costs for the land and coordination activities.

**(5) The unit price and total amount of compensation for permanent land acquisition for Xugou Gate Station**

In May 2009, the Kaitong Natural Gas Co. Ltd. of Qingxu County and the Villager’s Committee of Xichuwang Village reached the agreement on the compensation for land acquisition for the Xugou Gate Station. The area of expropriated land was 12 mu at the price of 410,000 RMB, covering all the costs including the ground attachments.

In October 2009, the Kaitong Natural Gas Co. Ltd. of Qingxu County and the Villager’s Committee of Xichuwang Village reached the supplementary agreement on the compensation for land acquisition. In accordance with the suggestions by the designing institution, the area of the gate station was expanded southwards, which make the area of expropriated land from 12 mu to 12.21 mu. The Kaitong Natural Gas Co. Ltd. paid to Xichuwang Village for the extra land at 30,000 RMB, which covered all the costs including ground attachments.

In summary, the total area of permanent land acquisition for the Xugou Gate Station was 12.21 mu; and the amount of compensation for farmland was 440,000 RMB (36,000 RMB/mu), covering all the costs including ground attachments.

**(6) The unit price and total amount of compensation for permanent land acquisition for Kongcun Gate Station**

In November 2009, the Kaitong Natural Gas Co. Ltd. of Qingxu County and the Villager’s Committee of Kongcun Village reached the agreement on the compensation for land acquisition for the Kongcun Gate Station. The area of expropriated land was 20 mu at the price of 600,000 RMB, covering all the costs including the ground attachments.

In February 2010, the Kaitong Natural Gas Co. Ltd. of Qingxu County and the Villager’s Committee of Kongcun Village reached the supplementary agreement on increasing the compensation for land acquisition. An extra 600,000 RMB was paid in addition to the original amount of compensation, covering all the costs including ground attachments.

In 2011, the Kaitong Natural Gas Co. Ltd. of Qingxu County and the Villager’s Committee of Kongcun Village reached the another supplementary agreement on increasing the compensation for land acquisition. The company acquired 2.34 mu of land next to the Kongcun Gate Station at the cost of 140,400 RMB.

In summary, the total area of permanent land acquisition for the Kongcun Gate Station was 22.34 mu; and the amount of compensation for farmland was 1.3404 million RMB (60,000 RMB/mu in average), covering all the costs including ground attachments.

Table 4.2-1 presents the summary of the unit price and total amount of compensations for permanent land acquisition for all the gate stations.

**Table 4.2-1 Unit price for permanent land acquisition and compensation for the gas stations**

| Project                       | Villages affected | Land acquisition (mu) | Unit price of compensation | Subtotal of compensation (×10,000RMB) |
|-------------------------------|-------------------|-----------------------|----------------------------|---------------------------------------|
| Baode Primary Station         | Shantou V.        | 41.15                 | 24000                      | 105.48                                |
| Gate Station of Changzhi Co.  | Sudian V.         | 13.74                 | 46000                      | 63.20                                 |
| Gate Station of Xiangyuan Co. | Qiaotou V.        | 82                    | 45000                      | 369                                   |
| Gate Station of Tunliu County | Dongjia V.        | 9.8                   | 67479.97                   | 66.06                                 |
| Xugou Gate Station            | Xichuwang V.      | 12.21                 | 36036                      | 44                                    |
| Kongcun Gate Station          | Kongcun V.        | 22.34                 | 60000                      | 134.04                                |

#### 4.2.2 The unit price and total amount of compensation for temporary land occupation

(1) The unit price of the compensation for temporary land occupation for laying the Zhangzhuang—Xiyang pipelines

According to the construction team the unit price of the compensation for temporary land occupation was: 1,500 RMB/mu for non-irrigated land and 800 RMB/mu for unutilized land. A total of 146.4 mu of land found in 11 villages of 3 towns were temporarily used, at the total cost of 178,600 RMB.

According to the construction team the unit price of the compensation for temporary land occupation was: 1,000 RMB/mu for non-irrigated land, orchard and country road; 3,000 RMB/mu for vegetable farmland; and 500 RMB/mu for unutilized land. A total of 252 mu of land found in 11 villages of 4 towns were temporarily used, at the total cost of 270,000 RMB.

### 5. Compensation and Rehabilitation

The resettlement mostly involved in the compensations, the reclamation of conditions for production activities, and recovery of income sources, for the people impacted by the permanent land expropriation for the 6 gas stations and the temporary land occupation for laying the 33.2-km-long pipelines.

#### 5.1 Compensation and rehabilitation for permanent land expropriation

So far the compensation and resettlement for the land expropriation for Kongcun and Xugou gate stations have been completed, and those for the gate stations of Changzhi and Tunliu county is close to end. As for the Baode primary gate station and the gate station of Xiangyuan county, the plan has been completed and is being carried out.

##### 5.1.1 Compensation and resettlement for permanent land expropriation for Xugou Gate Station

The survey shows that Xichuwang village authorities decided to distribute 60% of the compensation to the households of land expropriation, and the payment was made at 21,420 RMB/mu.

According to the records and interviews with the families of land expropriation, the Villager's Committee of Xichuwang Village and the relevant households signed the agreement on land compensation (see the Annexes) in June 2010, and the full payment was made on the spot. All the villagers of land expropriated agreed with the amount of compensation.

The Xichuwang Village received 440,000 RMB for land compensation, from which 190,700 RMB was distributed to the households of land expropriation and the rest 249,300 RMB was kept in village's account.

The survey shows that the rest amount of land compensation was later used for road construction and street maintenance in the village. The use of the fund was jointly approved by the leaders and assembly of villager representatives; and the process was supervised by the town government and monitored by the villagers.

**Table 5.1-1 Distribution of compensations for land acquisition in Xichuwang Village**

| No.   | Name          | Land Expropriated (mu) | Unit price of land compensation (RMB/mu) | amount of land compensation (RMB/mu) |
|-------|---------------|------------------------|--|--------------------------------------|
| 1     | Tian Fuyu     | 0.5                    | 21420                                    | 10710                                |
| 2     | Li Ruiye      | 0.43                   | 21420                                    | 9210.6                               |
| 3     | Tian Hu'er    | 1.32                   | 21420                                    | 28274.4                              |
| 4     | Tian Er'tie   | 0.606                  | 21420                                    | 12980.52                             |
| 5     | Guo Xinnian   | 0.503                  | 21420                                    | 10774.26                             |
| 6     | Tian Hailiu   | 0.896                  | 21420                                    | 19192.32                             |
| 7     | Guo Guiqing   | 0.503                  | 21420                                    | 10774.26                             |
| 8     | Yuan Shouming | 1.164                  | 21420                                    | 24932.88                             |
| 9     | Tian Xiuming  | 1.714                  | 21420                                    | 36713.88                             |
| 10    | Guo Sannian   | 0.712                  | 21420                                    | 15251.04                             |
| 11    | Tian Liulin   | 0.555                  | 21420                                    | 11888.1                              |
| Total |               | 8.903                  | 21420                                    | 190702.3                             |

Note: This table is prepared according to the agreements on land expropriation separately signed with individual household provided by the villager's committee of Xichuwang Village.

The interviews with the villagers of land expropriation show that they took the compensation as a large sum of revenue for the family and were cautious in its spending. Most households spent or plan to spend it on investment for production for recovering and increasing the income.

For example, Mr. Tian Xiuming from Xichuwang Village spent the compensation fund on purchasing three-wheeled farm vehicle for transporting the home-grown vegetables, fruits and the like, which saved transportation cost of more than RMB1,000 a year. In addition, he earns around 2,000 RMB a year by transporting goods for others. The activities fully recovered the loss from the land expropriation for the family. Most other villagers used the compensation fund for the procurement of production materials such as seeds, chemical fertilizer, mulch, and vehicles; and some built green houses for increasing income. Anyway, the investment was made after careful considerations on reasonable cost and return.

### 5.1.2 Compensation and rehabilitation for permanent land expropriation for Kongcun Gate Station

The survey shows that Kongcun village authorities decided to distribute 50% of the compensation to the households of land expropriation, and the payment was made at 30,000 RMB/mu.

According to the survey the Villager's Committee of Kongcun Village and the relevant households signed the agreement on land compensation and the full payment was made later.

The interviewees indicated that they received the compensation fund for land expropriation at the beginning of 2010. Since the expropriated farmland are non-irrigated, of poor soil quality, and not good for crop production, the agricultural yield was as low as 500~800 RMB/mu. The piece of land is far away from the village. Therefore, the villagers all agreed with the land expropriation and accepted the compensation amount.

**Table 5.1-2 Distribution of compensations for land acquisition in Kongcun Village**

| No. | Name         | Land Expropriated (mu) | Unit price of land compensation (RMB/mu) | amount of land compensation (RMB/mu) |
|-----|--------------|------------------------|--|--------------------------------------|
| 1   | Zhang Haifa  | 1.58                   | 30000                                    | 47400                                |
| 2   | Zhang chunfa | 1.33                   | 30000                                    | 39900                                |
| 3   | Ma Guifa     | 1.4                    | 30000                                    | 42000                                |

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|              |                 |           |       |               |
|--------------|-----------------|-----------|-------|---------------|
| 4            | Zhang Shengying | 1.2       | 30000 | 36000         |
| 5            | Guo Jinbiao     | 1.78      | 30000 | 53400         |
| 6            | Guo Wenhui      | 1.4       | 30000 | 42000         |
| 7            | Kang Diaoyun    | 1.5       | 30000 | 45000         |
| 8            | Guo Xiaobing    | 1.66      | 30000 | 49800         |
| 9            | Chang Wuhuo     | 2.1       | 30000 | 63000         |
| 10           | Chang Junya     | 1.35      | 30000 | 40500         |
| 11           | Chang Junbing   | 1.55      | 30000 | 46500         |
| 12           | Chang Junwu     | 1.6       | 30000 | 48000         |
| 13           | Chang Er'mao    | 1.55      | 30000 | 46500         |
| <b>Total</b> |                 | <b>20</b> |       | <b>600000</b> |

Note: This table is prepared according to the information on land expropriation provided by the villager's committee of Kongcun Village.

The Kongcun Village received 1.3404 million RMB for land compensation, from which 600,000 RMB was distributed to the households of land expropriation. The rest 740,400 RMB was later used for road construction street maintenance in the village, and the holiday allowances for the villagers, etc. According to the vice director of the villager's committee, the use of the fund was jointly approved by the leaders and assembly of villager representatives; and the process was supervised by the town government and monitored by the villagers.

According to the survey, most labors are kept busy in jobs in cities or in businesses without time for agricultural production, which was mostly sustained by the elderly family members at home. Although the land expropriation reduced part of their farmland, the compensation fund not only recovered their loss, but also alleviated the working burden for the elders, for which they fully agreed with the deal. Kongcun Village is close to the county township, most families combined the land compensation fund with their previous cash deposits as the current asset for production activities; and some purchased vehicles for transportation. Because most villagers are engaged in business activities in the County Township, the land compensation fund is likely be used for space renting, current asset, and vehicles, etc. Three families used the land compensation fund for running business in the county township, and the increased cash flow facilitates the growth in revenue.

### 5.1.3 Compensation and rehabilitation for permanent land expropriation for the Gate Station of Changzhi County

The Gate Station of Changzhi County is at the Sudian Village of Sudian Town. The survey shows that the Sudian village authorities decided to distribute the land compensation fund to the relevant households at 24,600 RMB/mu,.

The records and interviews with the households of land expropriation show that Sudian Village has transferred the land compensation fund to the relevant villager's accounts. The villagers all agreed with the amount of compensation.

The Sudian Village received 632,040 RMB for land compensation, from which 338,000 RMB was distributed to the households of land expropriation, and the rest 294,000 RMB was kept in the village's account.

In addition, the project owner paid the households of land expropriation 179,950 RMB for ground attachment, including 599,500 RMB for greenhouses and 120,000 RMB for tombs.

According to the director of Sudian villager's committee, the villager leaders and villager's assembly agreed to using the rest compensation fund for public facilities such as the maintenance of streets and water supply system. All the expenditures were publicized for villager's supervision. According to the Land Resource Bureau of the County, all expenditures

in villages were subject to the audit and monitoring by the audit bureau and disciplinary commission, including the use land expenditure fund in Sudian Village.

In Sudiain Village, the area of expropriated land among the relevant households was about the same, and they all received land compensation fund in amount of about 300,000 RMB. Most families deposited the fund in bank for production activities. The survey shows that most such families are engaged in not only crop production and animal farming, but also in business, catering service, and transportation. The crop production main involves in florist nursery, tree seedlings and greenhouse vegetables. They indicated the common shortage of current asset in their family-based intermediate or small businesses, due to the hardships in obtain bank loan and the burden of loan interests. In case the land compensation fund is used in production activities the rate of return is at least 10%, which translates the annual income of 3,000 RMB, much higher than the grain yields from the non-irrigated farmland.

#### **5.1.4 Compensation and rehabilitation for permanent land expropriation for the Gate Station of Tunliu County**

The Gate Station of Tunliu County is at Dongjai Village of Xijia Town. The survey shows that the Dongjai Village authorities decided to distribute the land compensation fund to the relevant households at 28,576.8 RMB/ mu. Dongjai village authorities distributed the land compensation fund to the relevant households in two installments. The first installment was paid at 20,000 RMB/mu in end of 2012, and the second installment was paid at 8,576.8 RMB/mu in March 2013.

The interviews with the households of land expropriation show that they all agreed with the amount of land compensation.

The Dongjia Village received 926,500 RMB for land compensation, from which 280,000 RMB (including the cost for 12 greenhouses) was distributed to the households of land expropriation, and the rest 646,400 RMB was kept in the village's account.

According to the secretary of the CCP branch in Sudian villager's committee, the villager leaders and villager's assembly agreed to use the rest compensation fund for the maintenance of renovation of irrigation works and village streets. All the expenditures would be monitored by the town government and the accounts would be publicized to villagers for supervision.

In Dongjia Village the land expropriation involved in only two households, who received compensation fund of 140,000 RMB. The survey shows that one family owns an animal farm which is small in scale, with poor facilities and low economic return. The family decided to renovate the facilities based on market survey and was about to apply for bank loans. The land compensation fund timely satisfies the needs. At present the local authorities are helping the family to make implementation plan, which is expected to assist in the smooth expansion of the animal farm and to lower the operation risk under the professional guidance.

Another family have been prominent in crop production and contracted more than 30 mu of farmland from other households who has no time for crop production. However, the agricultural yield was only 1,000 RMB/mu due to the lack of fund for implementing his cherished plan for developing the special crops. The family plans to use the land compensation fund for purchasing farm equipment, building greenhouses, and hiring workers to grow decorative flowering plants, tree seedlings and vegetables. The expected revenue would be 3,000~5,000 RMB. At present, the family is assisted by the villager's committee in making the design and planning under the guidance of the department of agricultural department in the county.

#### **5.1.5 Compensation and rehabilitation for permanent land expropriation for the Gate Station of Xiangyuan County**

The Gate Station of Xiangyuan County is at Qiaotou Village of Xiadian Town. In August 2012 the Shanxi Coal Bed Methane Co. Ltd. and the Villager's Committee of Qiaotou Village signed the agreement on land compensation, which defined the land compensation at 28,000/mu, Equivalent to 62% of the land compensation fund

In August 2012, the project owner transferred land compensation fund to the Qiaotou village's account kept in Finance Station of Xiadian Town. The Qiaotou villager's committee is measuring the actual area of land expropriated in each family to determine the amount of compensation, which will be submitted to the Finance Station for transferring the fund the corresponding villager's account.

The Qiaotou Village totally received 3.69 million RMB for land compensation, from which 2.296 million RMB will be distributed to the households of land expropriation and the rest 1.349 million RMB be kept in the village's account.

According to the secretary of CCP branch of the village, the rest amount of land compensation will be used in ways as follows. First, the village's leaders will collectively make the plan and submit it to the assembly of villagers for decision making. By following the "Measures of Shanxi Province on Distributing the Compensations for the Acquisition and Occupation of Land Collectively Owned by Rural Farmers" the fund will all be used for public goods in the village. Each transaction of expenditure will be supervised by the town government and the account will be publicized to the villagers.

Since many households are impacted by the land expropriation in Qiaotou Village, the villager's committee makes the commitment to invite the county's administrative departments of agricultural technology, forestry, and animal husbandry to provide guidance on making investment plans for production activities. This will enable the use of land compensation fund in production activities for timely recovery from land loss, and for maintaining and increasing living standard year by year.

#### **5.1.6 Compensation and rehabilitation for permanent land expropriation for the Baode Primary Station**

The Baode Primary Station is at the Shantou Village of Yangjiawan Town. According to the "Notice of the General Office of Baode County on Issuing the Standards for Compensation for Building Demolition, Plant Removal, and Land Expropriation for Business Operation Purposes" (Baozhengban [2010] No. 157), the unit price of land compensation is 24,000 RMB/mu. The survey shows that the village decided to distribute 80% of the land compensation (i.e. 19,200 RMB/mu) to the relevant households.

In August 2012, the project owner transferred land compensation fund to the Shantou village's account kept in Finance Station of Yangjiawan Town. The Shantou village committee is measuring the actual area of land expropriated in each family to determine the amount of compensation, which will be submitted to the Finance Station for transferring the fund the corresponding villager's account.

The Shantou Village totally received 987,600 RMB for land compensation, from which 790,000 RMB will be distributed to the households of land expropriation and the rest 198,000 RMB be kept in the village's account.

According to the secretary of CCP branch of the village, the rest amount of land compensation will be used for public goods in the village in accordance with the "Measures of Shanxi Province on Distributing the Compensations for the Acquisition and Occupation of Land Collectively Owned by Rural Farmers". Each transaction of expenditure will be supervised by the town government and the account will be publicized to the villagers.

Shantou villager's committee has made the commitment to contact with the county's placement guidance center to provide training on job skills according to the opinions of the villagers of land expropriation. Meanwhile, the committee will invite the relevant administrative departments in the county to provide guidance on making investment plans for production activities. This will enable the use of land compensation fund in production activities for timely recovery from land loss, and for maintaining and increasing living standard year by year.

## **5.2 Compensation and rehabilitation for temporary land occupation for laying gas pipelines**

The land for laying the 33.2-km-long gas pipelines was all temporarily occupied, which impacted 621 persons of 173 households at 22 villages in 7 towns. The compensation was timely paid to the villages and villagers in construction period.

After the temporary land use the project owner leveled and reclaimed the land prior to returning it to the villages and land contractors. The amount of compensation was determined through the negotiations among the project owner, the relevant town governments and the villager's committees which consulted the villagers before the talks. The compensation for temporary land occupation is usually distributed in such a way that the village authorities retains 20% and the relevant villagers obtains 80%, i.e. 800~1,200 RMB/mu.

The interviews with the representatives of the villagers impacted by the project, they were all satisfied with the amount of compensation. The non-irrigated farmland annually yields the value of 800~1,000 RMB/mu. Since the construction period was in autumn and winter after crop harvest, the actual loss is trivial. Therefore, the project does not lower, but may increase the income of relevant families.

According to the construction company, although laying gas pipeline requires special technical skills, there are auxiliary work like digging holes, guarding equipment, and loading vehicles, etc, offering opportunities of temporary job for local people. For such job the daily wage is up to 100~120 RMB. The construction period of 3 months brought the income of more than 10,000 RMB to each temporary worker.

### **6. Effect of the Rehabilitation**

The survey shows that the project owner attached importance to negotiating with the villager's committees and resettled residents. All the resettlement agreements were signed only after the acceptance of all the households to be impacted by the project. As a result, the resettlement process went smoothly, with very good effect.

The interviews with the villagers impacted by the project show that the villagers of land expropriation were satisfied with the amount of compensation and resettlement plan. No complaints were filed. After receiving the compensation the families spend or plan to spend the fund on production activities.

The households who spend the compensation fund on production activities, either in agriculture or business, have the satisfactory rate of return above 10%. The loss from land expropriation has been roughly recovered.

The families who has not used land compensation fund are planning the investment on production activities to recover the loss from land expropriation. Generally speaking, they take the land compensation fund as the large sum of family income and are cautious about investment, which calls for broad and in-depth market survey to select proper business for reliable and sustainable return.