Shanxi Coal Bed Methane/Natural Gas
Utilization Project
Yangcheng Natural Gas Pipeline Network

Social Assessment Report

December 2016
Executive Summary

1. To change the energy consumption structure of Yangcheng County for environment protection, promote energy conservation and emission reduction, improve the life quality and health level of residents, and achieve sustainable development in society and economy, resource and environment with better investment environment, Yangcheng County government pushes and regulates the natural gas industry for orderly progress. On February 25, 2016, guided by the gas development policy of the county government, Shanxi Guoxin Zhonghaosheng Natural Gas Co., Ltd (hereinafter called Guoxin Zhonghaosheng) was granted franchise rights on the committee meeting of Yangcheng County government. It allows Guoxin Zhonghaosheng to reconstruct the gas source in the county precinct, and unify its pipeline network. The project is listed as one key project in 2016 in Shanxi Province, and also serves as an important part in execution of Guoxin Energy Group’s gas development policy. To push the execution of the project, Guoxin Energy Group takes the opportunity of midterm reconstruction, and ranks the Yangcheng pipeline network as a new component in Shanxi Coalbed Methane/Natural Gas Utilization Project.

2. Commissioned by Guoxin Zhonghaosheng, 5 researchers from Institute of Sociology, Shanxi Academy of Social Sciences formed a team to perform social assessment. From December 5 to 8, 2016, with the help from PMO officers of Zhonghaosheng, they made comprehensive social and economic research in Yangcheng County. The team organized extensive public participation activities, inquired comments and suggestions among affected persons, and learned social benefits and side effects of the project, in order to optimize the design scheme of the project, extend its social benefit to the maximum and eliminate side effects. Based on above research, the social assessment report was formulated.

3. During onsite research, the assessment team mainly used 5 methods, document research, household interviews, meetings, questionnaires, observation through participation activities. Based on their understanding on local social and economic development, the team interviewed affected residents, and called for extensive public participation on matters as project necessity, benefits, side effects, and willingness and ability to pay. They held 4 meetings with 72 residents, among whom 39 were women, 7 lived in poverty, and 2 were disabled. They held 3 meeting with 18 people from institutes. They surveyed 55 households through questionnaires and interviewed 22 people. This summary covers: 1) Overview; 2) Overview on local nature, and social and economic development; 3) Research on affected villages and households; 4) Affected persons and their attitude and needs; 5)
Poverty analysis of affected regions; 6) Social gender of affected regions; 7) Minority groups; 8) Willing and ability to pay; 9) Land acquisition impact; 10) social risks analysis and addressing measures.

A. Overview

4. The pipeline network in Yangcheng will be built by Guoxin Zhonghaosheng. It has 3 wholly-owned subsidiaries, Senzhong Gas Co., Ltd, Jinneng Energy Co., Ltd, and Zhongtai Gas Co., Ltd, and its main business involves construction, operation and management of compressed natural gas stations, and natural gas pipeline networks in Yangcheng County. Natural gas has been widely used in Yangcheng, with over 60000 household users, and over 200 commerce users and public welfare organizations in 6 towns.

5. The new pipeline network will be 27.8 km in length by design, and some gas facilities built in early ages will also be updated or reconstructed to eliminate potential risks. The construction consists of the following 3 items:

(1) Pipeline network from Anyang gas station to the Dongye Town, with design pressure 0.8MPa, total length 20.2 km, annual gas supply 56.2798 million m³/a. The network starts at the Anyang station in the north, and ends at the west of the Dongye Village in the south, traveling through the Beianyang Village of the Fengcheng Town, Hongshang Village, Laoquan Village, He Village, Zhangzhuang Village, and Baisang Village of Baisang Town, and Shangbaisang Village, Wanan Village, Hougetuo Village, Panlong Village, Taitou Village, Xiyu Village, Nanpo Village, Shijiu Village, Beiyao Village, Nabyao Village, Dongyu Village, Jianping Village of the Manghe Town, and Dongye Village of Dongye Town, altogether 19 villages of 3 towns. This future network will provide gas for more than 6000 households in the 17 villages, and a carbon disulfide plant of 90,000 tons per year to be built in the Manghe Town, targeting the designed supply scale in 2031.

(2) Pipeline network from Lanhua No. 151 valve well to the Yanli Township, with design pressure 0.4MPa, 7.59 km in length. The network starts at the No. 151 valve well of Lanhua Group, and ends at the Shangli Village of Yanli Town, traveling through 5 villages, Huwagou, Xianyi, ShangQingchi, Yanli and Shangli. The future network will play as the second gas source for the residents and commerce in the town.

(3) Potential risks are to be examined along the existing gas facilities, upgrading or reconstructing the old that does not comply with safety requirements. About 10 villages, 13,411 households in 11 communities in the Fengcheng Town will be involved. Outdoor membrane gauges will be replaced with indoor Intelligent Card (IC) gauges, as well as the pipeline connecting to the gauge. Existing equipment with potential risks will be removed and replaced with new one complying with new gas entrance standards.

The networks cost CNY 66.872 million, with the construction taking up CNY 65.2277 million.
6. Upon construction completion, 2 categories of people will be benefited: 
   (1) Residents involving facility reconstructing; 
   (2) Residents with new gas access; 
   All residents involving facility reconstructing live in 10 villages governed by the Fengcheng Town, 38892 residents from 13411 households. The new gas users live in 17 villages of the Baisang Township, Manghe Town, Dongye Town, 15800 residents from over 6000 households. Altogether, 54,692 residents from 19,411 households will be benefited by the network.

B. Social and Economy Status of Affected Region

7. The construction takes place in the Yangcheng County of Jincheng City. The affected region consists of 34 villages of 5 towns governed by Yangcheng, among which 10 villages of Fengcheng Town, and 7 villages of Fengcheng, Baisang and Yanli, involve reconstructing of existing network, 17 villages of Baisang and Manghe and Dongye involve new gas access.

8. In 2015, the per capita disposable income of residents in Yangcheng County was CNY 16,589, CNY 24,629 for urban residents, and 10,777 for rural residents. The per capita disposable income of rural residents in Baisang Township was CNY 9098, higher than the average of Shanxi Province CNY 9,454); The per capita disposable income of rural residents of Manghe Town was CNY 9,235, lower than that of Jincheng City (CNY 10,914), Yangcheng County (CNY 10,777), and Shanxi Province (CNY9,454). The per capita disposable income of rural residents of Dongye Town was only CNY 5000, much lower than that of Jincheng (CNY9,454), Yangcheng County (CNY 10,777), and Shanxi Province (CNY9,454).

C. Energy consumption and expenditure of affected residents

9. With the improvement of economy, family income and living standard, the energy structure of rural households is optimizing, and electric power and LNG become accessible. Generally ordinary households use electric power and coal (coal balls) for cooking and hot water, but use coal uniquely for winter heating. A few poor families are still using brushwood in cooking. In the county, residents use electromagnetic or LNG in cooking mostly, and central heating or collective heating by community is provided.

   (1) Regions with new gas access mainly involve rural residents, and they use electric power, coal or LNG as fuel. Coal is mostly used, with LNG and electric power as supplementary. A few part of families use LNG or electric power mostly, and brushwood is not used. LNG or electric power is used for hot water. All families use coal for winter heating, and only some also use electric power when indoor temperature is low. The survey shows the average expenditure on living energy is CNY 1,874, about 3.9% of total income (CNY 47,646), where CNY 894 is for electricity, 47.7% of total energy
consumption; CNY 91 for natural gas, 4.9% of the total energy consumption; CNY 889 for coal, 47.4% of the total energy consumption.

(2) **Network reconstructing regions** mainly involve urban residents. Families in this region mainly use natural gas and electric power for cooking and hot water. Some families are connected to the central heating system. Self-built houses use coal for heating. Some families use gas and electricity for heating. Generally the cost with natural gas and electricity is higher. The survey shows the average expenditure on living energy is CNY 3107.5, about 5.2% of total average income (CNY 60,050), where CNY 1554 is for electricity, 50% of total energy consumption; CNY 1173.5 for natural gas, 37.8% of the total energy consumption; CNY 380 for coal, 12.2% of the total energy consumption.

D. **Affected persons and their attitude and requirements**

10. The affected persons include residents planning to use network service, enterprises, public welfare institutes, groups affected by land acquisition, vulnerable groups (people in poverty and women), government institutions, and other institution. Guoxin Energy Group, Guoxin Zhonghaosheng, the construction company, the county government, town government, community committees, village committees, residents planning to use network service, enterprise and institutions are all benefited by the project, especially women. The families in poverty may be benefited, but also suffer from the cost.

11. All affected groups expressed their support for the project, and all women looked forward to network completion. The network’s establishment and operation can strengthen the project owner in natural gas business and bring more revenue. The construction can bring income for the construction company. The energy consumption expenditure of affected residents will be reduced, as well as women’s housework. The living environment and residents’ health level will be improved. With natural gas in use, corporate users can improve their products’ quality. Therefore, the investment environment is improved along with other advantages as energy conservation, emission elimination, and boost in local social and economical development. It serves as an achievement of civil infrastructure for the local government. Meanwhile, some groups also expressed their concerns, as unaffordable access cost for poor families. They hoped the access fee could be reduced or free of charge by the project owner or the government. Residents along the pipeline concerned about safety, and they hoped pipeline maintenance can be done well.

E. **Social impact of project**

12. Positive effects:
(1) Ensure life and assets safety of residents. As the network construction in early years was not standard due to pipeline quality, management and pipeline maintenance, some gas facilities have shown risk potentials. After network reconstructing, life and assets safety can be ensured.

(2) Improve living environment. The deployment of the network will make affected persons' life more convenient and more energy saving. It provides an efficient and clean option that will change the traditional way of cooking and heating. There will be no more coal powders and ashes. The life style will be more scientific, modern and healthy.

(3) Reduce housework and promote women's development. Residents will no longer need to buy coal, ignite coal stove and home-made heating system. Women's work load is greatly reduced. They have more time seeking self-development and improving capabilities for more income.

(4) Reduce occurrence of illness. The residents in the affected regions mainly use coal for cooking and heating. Pollution caused by coal combustion is harmful. Living in such environment tends to catch respiratory disease. The network enables replacement of traditional fuel as coal and brushwood, effectively reducing air pollution and carbon monoxide poisoning, specially preventing and eliminating coal-burning fluorosis.

(5) Facilitate energy and cost saving, emission reduction, and product quality improvement. The network will greatly reduce air pollution in the affected regions and improve living environment, making Yangcheng more beautiful and habitable. The efficiency and reliability of natural gas will also improve production quality, and strengthening competitions of corporate users.

(6) Increase employment. The implementation of network construction will create some employment opportunities, such non-technical jobs as tunnel digging for pipeline installation, facility watch, truck unloading and loading. Upon completion, there will posts like drivers, cleaners and dining hall service man/woman.

(7) Promote equal access to public services and narrow the gap between urban and rural areas. The deployment of the network will further promote equal access to public services and narrow the gap between urban and rural residents. More and more rural households will be as clean and sanitary as urban households, and they both can enjoy healthy and modern life style.

13. Side effects of the project:
(1) Aggravate payment burdens of poverty stricken families. Facility reconstructing requires each household replace a new gas gauge at CNY 480.
That is a certain amount of burden to a poor family. An access fee of CNY 2800 to 3000 is required for newly connected users. To use natural gas for heating, a wall-mounted gas boiler (about CNY 6,000 to 10,000) needs to be equipped, along with the mounting fee. High access fee will bring great burden for poverty stricken families (5-gurantee families, minimum substance allowance families, and destitute families) on minimum subsistence allowance or subsidies.

(2) New network requires farmland acquisition. It will affect the production of farmers, and land fertility. Most acquisition of the project is for temporary use, about over 500 mu is required in pipeline installation, among which 357.48 mu is farmland (taking up 71.46% of the total land use). Whether or not the acquired land is cultivated, it requires some time for land fertility restoration. If the land is cultivated at time of construction, income of the year will be affected.

(3) Gas facility reconstructing may cause some trouble for households, because the structures of houses are different from each other, location of the gauge is also different, and reconstructing is of high requirements. The outdoor membrane gauge is replaced with indoor Intelligent Card (IC) gauge, and the gauge needs to be installed in an air ventilated location, safe and convenient for related personnel to check. The new pipeline connected to the gauge should not be hidden in the wall, and the wall the pipeline is next to cannot be of flammable materials as wood. The pipeline needs to be short, not to pass through the living room as much as possible. If it is inevitable to pass through the living room, protection casing is required. Therefore, the reconstructing difficulty and work load are all different from house to house. Household with greater work load may require one day finishing the job. A member of the household needs to stay at home while the reconstructing is done. Installation location for the gauge and pipeline needs to be prepared, and gas is cut off during the reconstructing time. These will all cause trouble for daily life of residents.

(4) The construction of new lines may bring inconvenience for the residents nearby, as it is inevitable to bring noise, traffic jams and risks potentials.

(5) After the reconstructing, there can also be some inconveniences. IC gauge is used instead, whose embedded monolithic microprocessor will automatically collect gas flow data, meter, display, control the valve and prompt alarms. When the user’s payment is lower than the set value, the gauge displays “Time to buy” on the LCD and prompt with alarms. When the payment is used up, the valve is automatically shut off until reinserting the card after new payment is made. Such pre-paid function of the IC gauge is
convenient for corporate management over users, but it will cause inconvenience for users. The card can only be recharged at the service hall. When there are few branches, the inconvenience can be much greater.

**F. Public participation and grievance mechanism**

14. The assessment team learned during the survey, the project owner held extensive public participation activities when collecting the reconstructing cost and installation fee.

15. The survey shows all groups of different interest support the project. 90.9% of the surveyed residents believed the network would benefit the community, 69.1% believed the network can improve the living environment, and 69.1% believed the network can boost local economy. Most of them can understand the adverse impact caused by the construction. The result of questionnaires shows 81.8% residents approve the construction, and hope early gas access.

16. Through interviewing the affected residents, and inquiring their comments on the installation fee, the assessment team found 109 people of 116 surveyed people, that is, 94.3% could accept CNY 3000 – 3500 installation fee. Among the 7 households that cannot accept such cost, 6 people of 3 households are elderly people above 60. They did not wish to add extra payment burden to their children, and were not willing to learn how to use the new equipment. The other 1 people seldom live in the village. In general, most surveyed residents are willing to pay for the installation cost and look forward early network deployment, in order to improve life quality.

17. During interviewing the residents in the reconstructing region, most residents realized potential risks of existing gas facilities, and were willing to make the reconstructing and pay some cost. However, they hoped the project owner could bear half of the cost based on cost transparency. Some residents think the existing membrane gauge has been used for only a short time, and it is still usable, and do not want to pay for a new one.

18. The affected persons may be unfairly treated during identifying the compensation standard for temporary land use, payment of fee, and land use process. To address such issues, the project owner and local government will set up convenient and effective grievance channels, and opinion groups comprised of residents (including women and poor families), officers from all level of local government, and personnel from project owner, construction company and PMO to discuss views from all parties.

19. Before project construction, the project owner and the government have established a grievance mechanism and grievance channels. The
affected persons can complaint through the following channels in case of any dissatisfaction and grievance:

Stage 1: Any person aggrieved by any aspect during the deployment, can lodge an oral or written grievance to the affected village committee, community committee, or marketing office of Guoxin zhonghaosheng. The oral grievance shall be dealt with in one week and the written records shall be kept.

Stage 2: In case the aggrieved person is not satisfied with the decision at Stage 1, s/he can present the case to the deputy governor of the town, who shall make a 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 City Construction Bureau 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 arbitration department, s/he may file the lawsuit to civil court in accordance with the Civil Procedure Act.

F. Project and poverty stricken persons

20. In the affected region, there are poor families in the Dongye Village of Dongye Town and the Xiyu Village of Manghe Town. Dongye Village has 20 people in 10 households living in poverty, and 2 people of 1 household live on subsistence allowance. Xiyu has 166 people in 74 households living in poverty, and 9 people out of 6 household live on subsistence allowance. 17 villages out of 3 towns, Baisang, Manghe and Dongye have 488 people living on subsistence allowance, 186 people living in poverty. In together, there are 663 people living in poverty, taking up 3.36% of the total population of the affected regions, except 11 people are both poor and living on allowance. The villages whose poverty occurrence rate is higher than the average rate are Shangbaismang, Wanan, Nanpo, Xiyu, Panlong, Beiyao and Dongyu of Manghe Town, especially Xiyu, whose poverty rate reaches 20%.

21. Based on the field survey in Taitou, Shijiu, Dongye and Dongguan, the assessment team found the reasons of poverty are as follows: lack of work force for senior age, lack of technology, disease (chronic disease or serious disease), education expenditure burdens, lack of fund, lack of development motives. The team also found physical disability and diseases are the main reason of poverty besides lack of work force. Respiratory disease ranks the first among the diseases caught by the poverty stricken residents, and it is probably caused by the coal used in these families.

22. The families in poverty receive minimum subsistence allowance. In 2016, the minimum subsistence allowance is CNY 3,000 a year for a rural resident in Yangcheng, for a urban resident is CNY 498 a month. Except the minimum subsistence allowance, such family can have medical aid, housing aid, education aid, legal aid, and employment aid. The families on minimum subsistence allowance and the 5-gurantee families receive subsidy on energy
consumption, CNY 7.16 for each household every month. The families on minimum subsistence allowance in Dongye Town can also use 15 kh electricity free of charge. The rural family on minimum subsistence allowance can have 1 ton of coal in every winter as heating subsidy. Now the subsidy is paid in cash, CNY 300 in 2015. Each family on minimum subsistence allowance in the Yangcheng County is given CNY 700 by the government if the family uses gas through the pipeline network.

23. For a poor family, CNY 2800-3000 installation fee is still a big sum of money. Some elderly people said they did not want gas access, it was not safe and they were not able to use it. They also said it could not solve the heating problem in winter. Some middle-aged poor people agree with network deployment, and they want gas access to improve sanitary conditions and relieve some housework. They understand why the installation fee is charged, but it is a real burden to them to pay CNY 3000 at one time. They hope they can be aided by the government, the project owner or the village committee, by paying less, or paying by installment, or giving them some chance to make some money.

G. Project and women

24. Shanxi Association for Women and Children Protection is a coordination institution to push forward the execution of Law of the People's Republic of China on the Protection of Rights and Interests of Women, Measures of Shanxi Province on the Execution of Law on the Protection and Rights of Women, Program for Chinese Women and Children Development, Planning for Shanxi Women and Children Development, and other related laws. All levels of the institution at province, city, county, town, community and village, are responsible for maintenance of women's right. Women are equal in rights and opportunity in economy, politics, society, culture and family.

25. The survey result shows that among the population of the affected regions, women's education is generally lower than men. In the urban area, compared with men, women's education degree at junior high school, senior high school, and vocational school is higher, about 56.5% of the total population. Women's education degree at college or university is relatively lower, only 8.7%. In the rural area, compare with men, women mostly graduated from junior high and senior high, about 70.5% of the total population. In general, women's employment rate is lower than men, respectively lower by 6.6% and 25.4%. Women in rural areas mainly work as farmers, or in the private companies or are self-employed. These women take up 64.1% of the total working women. Women in the urban areas mainly work in the state-owned enterprises, taking up 50.0% of the total working women. Usually it is women who do the housework, and men act as the breadwinner in most families. The average income of women is much lower than that of men. In
urban areas, women’s average income is lower than that of men by 71.0%. In the rural areas, women’s average income is lower than men by 38.8%.

26. On family affairs, most families make decision after discussions between the husband and wife. The survey shows that women mostly do the housework. In both rural and urban areas, women are responsible for cleaning, cooking, laundry, taking care of children and elderly. Men are expected to do some tasks of labor intensity, such as buying coal and furniture repairs. Due to traditions, women’s actual participation in important affairs is weaker than men.

27. Women share the greatest advantage after the pipeline is connected. Women can get rid of a series of dirty and troublesome housework, as stove ignition, ash removal, and coal adding. The living condition and sanitary condition are improved. Cleaning and laundry will be also reduced. Women and children’s health level will be greatly improved. Women will have more time for leisure, working, skill training, and self-growth.

28. It is recommended to call for women to participate in project promotion activities. Special women’s meetings can be held if necessary, so that women can have clear understanding on the purpose, meaning and benefits of the project. In this way, women can actively participate, ensuring smooth implementation of project. Women’s participation in every phase of the project, from preparation works, project execution to operation and management should be guaranteed. Their comments need to be consulted with and respected. They should be organized in skill and service trainings, aid should be provided for their employment and self-employment to improve their income and social position.

H. Project and ethnic minority groups

29. The assessment team have consulted with the head of the Ethnic and Religious Affairs Bureau of Yangcheng, and learned the distribution of ethnic minorities in the affected areas. There are 24 minority groups in the county, altogether 814 people, taking up 0.21% of the total population. They are mainly Hui, Yi, Tujia, Lagu, Miao, Zhuang, Man and Yao. Among them, Hui people, 607 in total number, takes up 75%. Minority groups are distributed all over 17 towns of the county. Fengcheng, one relatively developed town, has the most, 528 altogether, taking up 64.86% of the total. There are 2 villages inhabited by ethnic minorities, Nanguan and Dongguan of Fengcheng town. They are both within the affected region.

30. The survey shows the ethnic minorities who live in Yangcheng, whether they are natives or moved here, mix with Han people and communicate with each other, and have assimilated into Han people and local life, and had the same life style, except different religion and diet custom. The assessment team made questionnaires and in-depth interviews with two minority families in Dongguan. It is found that they shared the same view as
the Han people on the project, and required the same as the Han people. Dongguan and Nanguan involve only facility reconstructing. The operation procedure is simple, not related with any religion and living habits. The charge for replace of gauge is the same as Han people. The villagers, both Han and minority people, in Dongguan and Nanguan, enjoy relatively high income. The reconstructing will not cause any burden for these minority people. The assessment team believes both the minority and Han people are equally benefited, OP4.10 policy is not applicable here, and another single RAP for minorities is not necessary.

I. Land acquisition impact

31. Based on the research, the impact of the project involves temporary land use for pipeline installation, ground attachment, families affected by temporary land acquisition, and long-term land lease for cabinets. There are 2 pipelines, requiring 500.22 lands for temporary use during installation. The land acquisition involves 24 villages of 5 towns. The installation also requires 45 mu forest lands of poplar trees and miscellaneous trees for temporary use. 9 cabinets need to be equipped, occupying about 1.62 lands. By initial estimation, 858 people of 373 residents will be affected by temporary land use. As the affected households cannot be identified at this time, the research made a survey on the existing households on minimum subsistence allowance, households of minorities, households with a woman as head in several villages (as Baisang, Taitou and Dongye) along the new pipeline. There is no household of minorities in these villages. Based on age, health, employment and income of affected families, the project owner will identify the vulnerable groups, and then compare and check the information with what are recorded in the civil administration department for further accuracy. All village committees promised a certain amount of subsidy will be paid to the vulnerable families from the land compensation for the village. The project owner also promised that vulnerable families would have priority in temporary employment.

32. In general, the affected region is wide, involving 24 villages of 5 towns, as well as a great area of farmland, and a great number of households. Estimated by one season, the loss on dry land is about CNY 178,700 (estimated by CNY 500 /mu). Some trees need to be cut down or transplanted. As pipeline installation only uses the land temporarily, the affected time is short. Each section of pipeline takes about 3-4 months, and the construction will try to avoid spring and autumn. Upon completion, the land used will be restored to the original condition for farming strictly in accordance with the reclamation scheme approved by the land resource department. Even the farm land is taken for temporary use, planting and harvesting will not be affected. Therefore, the affected degree to the households and villages is light.
J. Residents’ willingness and ability to pay

33. Residents’ willingness and ability to pay for reconstructing cost: The reconstructing cost consists of a new gauge, pipeline connected to the gauge, and engineering cost. By initial estimation, each household takes about CNY 1000. The project owner plans to charge only CNY 480 for gauge replacement. During the survey in Pengcheng, a relatively developed village with higher average income, the team learned that the access cost of all villagers was paid by the village community. Most villagers are willing to reconstruct the facilities that have been used for a long time and have risk potentials, but they are not willing to pay for it, or pay only 30% to half of the cost.

34. Residents’ willingness and ability to pay for installation fee: As use of gas is lower in cost than use of other fuel, all surveyed residents are able to pay for it. By survey, most ordinary families can afford CNY 2800-3000 installation fee. For poverty stricken families, though not totally unaffordable, it is still a burden. 94.3% families can accept the installation fee, and hope for early deployment. 5.7% families do not want to pay for the installation fee fully or partially. These families, with a woman as the head, depend on farming mainly and live in poverty. They think the government, should pay for the access fee, or the government, the project and the user can share the cost.

35. Residents’ willingness and ability to pay for gas fee: Based on the introduction of the project owner, and field survey by the assessment team in the villages that have been using natural gas and in the villages to have pipeline newly established, cooking expenditures on different fuels are roughly as follows: For a family of 4 people, the cost per month using electricity is CNY 45-60; Using coal or coal balls, the cost is CNY 50-60; Using LNG, the cost is CNY 80-90; Using natural gas, the cost is CNY 24-30. The cost using electricity, coal and LNG is respectively 2, 2 and 3 times of the cost using natural gas. For a house of 100 m², using coal or coal balls for winter heating of 5 months, the cost will be CNY 2500-3000; Using natural gas, the cost will be about CNY 3000. The accurate cost varies with requirements for indoor temperature. As the gas cost is lower than the cost of any other fuel, and the using amount is metered. Therefore, 88.6% households are willing to use and pay for natural gas.

K. Social risks and recommended measures

36. After research and analysis, the assessment team believe the project has the following social risks:

(1) Social risk incurred by charging residents for gas facility reconstructing

The project involves not only gauge replacement but also reconstructing of pipelines connecting to the gauge. The IC gauge and the pipeline need to be removed from outdoors to indoors, which involves great work load and high cost. If some residents refuse to pay for the replacement cost during network deployment, the project may be paused. If the project owner forces the residents to pay by shutting off the gas, the residents may lodge petitions and cause a collective event.

(2) Risk that some residents refuse IC gauge update
Some residents may refuse to change to the IC gauge. The reconstructing area is mainly in the county. Compared to rural residents, urban residents live densely where information and news travel fast, and have strong sense of law regulation and right protection. If they refuse the update, and select the original gas gauge, the network implementation cannot go on. If the project owner forces the update, the residents may lodge petitions and cause a collective event.

(3) Risks incurred by inconvenience in making indoor check by the gas company

Due to gas supply safety, no matter IC gauges or ordinary gauges, it is required to make indoor check on the gas facilities periodically. As the IC gauge will shut off the gas when payment is due, and the gas is resumed upon payment, residents do not worry about overdue fine and some may not cooperate in indoor checks. Without indoor checks, where will be no feedback on gas usage and gauge safety information. Once leakage occurs, the safety of the household and the entire network is under risk. After the network is deployed, there can be gas access without permission or even gas stealing by removing the gauge, not only leading to great loss to the gas supplier, but also pipeline explosion caused by gas leakage. Such inappropriate actions may incur casualties among residents, and have great safety risks.

(4) Social risks incurred by low ability to pay for the installation fee

Each new gas user needs to pay for the installation fee, of which Most people expressed their understanding. Even there is a subsidy of CNY 500 for each household by the county government, CNY 2800-3000 is a large sum for an ordinary family without reliable income. Especially to the family in poverty, it is unaffordable. For recent years, the coal industry on which Shanxi heavily relies is rather depressed, it has greatly affected the employment and income of rural residents. Therefore, the access may not be prospective when the network is finished. The company may suffer great loss.

Meanwhile, low-income families may not be benefited by this clean energy because they are unable to pay. The significance of the project, which is built as a public welfare, is discounted. The target to develop gas and improve the ecological environment in the whole county cannot be achieved, and the government may face public censure and disapproval.

(5) Social risks incurred during the land compensation, land reclamation and construction process

The pipeline network involves only temporary land use. For temporary land acquisition, it is possible for the villagers to obstruct the construction, intercept the road, claim for compensation, lodge petitions if the project owner and construction company do not take public participation seriously, do not determine the compensation standards through active negotiations with the affected villages and families, do not pay the compensation in a timely way, do not push forward so that the affected can receive the compensation timely and fully, or do not perform land reclamation in a timely way or in a qualified way.

In addition, the construction requires using the mechanical digger for pipeline trenches, and using vehicles to transport materials. Noise will be made, and traffic jams will be caused, as well as potential safety risks and
inconvenience for residents. If the construction process do not avoid or mitigate such side effects, conflicts with residents may occur.

37. To address the above social risks, the assessment team put forward the following suggestions:

(1) Before network deployment, the project owner needs to explain to residents the reasons and basis to charge the facility reconstructing fee. It is proposed to charge CNY 480 for the gauge to be replaced. As some residents question the reasonability of the charge, the project owner needs to consult with the related government department on the basis of the charge and charging standard. If the basis is sound, and the charging standard can be approved by the government, such knowledge need to be publicized through bulletin notes in the communities, consulting service in the operation hall, or hotlines, to enable affected residents to learn project implementation and related policies, so that they can truly understand and support the project.

(2) Advertise the advantages of the IC gauge, and select reliable products. Currently, prepayment IC gauges have been widely used in many cities. Some cities have achieved outdoor gauge reading. Some cities are even trying remote gauge reading, operated fully through a computer control system. The gas company can easily learn usage rate and gauge safety through LCD display, avoiding the trip for gauge reading. Therefore, it is a trend to use IC gauges. It is a long term option. Though IC gauges have been widely used in China, many users still do not have such information. The project owner needs to advertise the knowledge on gauges before network deployment to ensure smooth implementation.

Gauges vary with categories and manufacturers. Each has its own merits. A user in another city complained on Internet that the IC gauge reading is not accurate, users were overcharged, and there was no reasonable explanation from the gas company. Therefore, in selecting the gauge, the project owner need to rank quality as priority, choose and examine the product carefully.

(3) Take multiple measures to reduce cost of new users, especially families in poverty.

Collecting installation fee from new users is a means of cost compensation for enterprises. Generally, the pipeline network should be paid by the government as public financial investment. However, most local governments have limited financial resources, and cannot provide great fund or financial aid for network construction. Enterprises invest huge fund for network construction, and therefore cost compensation is allowed. Collecting installation fee to compensate investment cost is a universal measure in China. This method is adopted in many places of Shanxi.

As the installation fee cannot be aborted, and a great number of households cannot afford fully the installation fee, patient explanation to the public is recommended. Meanwhile, related charging documents from the pricing bureau need to be provided, to convince as many as possible users to overcome the temporary difficulty, prepare the fund early, and pay for the fee timely. Installment can also be adopted to ease the difficulty from abrupt fund raising. Employment can be provided for poor families so that the wages can be used to pay for the access fee. Such information can be reported to the
government to win subsidies from multiple channels. In this way, the willing but poor families can have a chance of gas access.

(4) Hand out timely the compensation in accordance with defined standards, and take land reclamation seriously.
- To make most affected satisfied, the compensation standards need to be reasonable, and handing out of compensation needs to be timely.
- The compensation standards should be identified after full discussion between the town government, project owner or the construction company, affected village committee and villager representatives.
- The county government or the land resource department needs to issue a document regulating the compensation standards.
- The county government needs to monitor the handing out process to ensure the compensation is in position and in full before the construction.
- It is recommended to hand out the compensation directly to the bank card of the affected.
- After the construction, land reclamation must be performed in a qualified way. If not, land reclamation needs to be carried out again after collapse by rain or snow. The work needs to be satisfied by the affected.

(5) Constantly improve the IC recharging channels to provide convenience for users.

As the IC uses prepayment, the gas company need not urge users for payment. Although every IC gauge raises alarms once there is not enough payment, and it will not shut off the gas before reaching the threshold, it is possible that users may miss the alarms out of various reasons. Currently, to recharge the IC, mostly users take the card to Community Property Management Center, convenience store, or operation hall. Users may not recharge time after gas shutoff due to limited recharging channels. If more convenient way, such as recharging through the Internet, can be provided, the IC mode will be smoother in extensive implementation.

(6) Strengthen safety check and extend gas use knowledge.

The project owner has established a whole set of safety check system. Upon network completion, experiences should be summarized to improve the existing system. Safety check needs to be strengthened to ensure network safety and villager safety. In addition, gas use knowledge should be extended to improve residents’ awareness towards the serious impact from pipeline damages or inappropriate gas use, and to motivate residents to maintain the network facilities voluntarily.

(7) Eliminate the construction impact on resident work and life.

Field management should be strengthened during construction to reduce sewage in the field. When mechanical equipment is used, maintenance should be performed to eliminate oil dripping or leakage. A simple settling bank needs to be prepared to remove inorganic suspended solids before discharging the sewage water. The noise during construction complies with the regulations in *Noise Emission Standards at Borders of Industrial Enterprises*.
The construction needs to be well organized, with prevention measures. The construction time should be scheduled to avoid resident disturbing. It should be avoided to disturb residents’ work and life in digging a road. If the construction is in the rural area, the time should be scheduled to avoid the spring and autumn, so as not to affect planting and harvesting even there is land acquisition. The construction team needs to remain excellent communications with local residents, resolve problems timely and avoid conflicts.

38. The assessment team believes the project is applicable to the affected regions based on the economical and social development levels. It addresses the needs of affected persons for environment and life quality improvement. Their ability and willingness to pay can meet the financial budget requirements. Poverty stricken families can also be benefited by the project, thanks to preferential policies of the government and project owner. The network brings largest benefit to women, with health improved and more free time. Ethnic minorities will be equally benefited as Han people. The potential social risks the assessment team identified can be evaded through preliminary work and project design optimization.