I. Introduction and Context

Country Context

Severe pollution facing the country has driven China to speed up clean energy development in its energy and climate change strategy to address its environmental challenges. China’s fast economic development in the past three decades has relied heavily on coal consumption and the country is suffering from serious environmental pollution and its adverse impacts. The smoggy weather in more than 15 large cities in northern China and serious nationwide water, land, and air pollution have partially offset people’s welfare, accumulated in the past decades as a result of economic
development. China has to speed up development of clean energy and shift towards a less coal-dominated economy. Gas is one of the important sources to support this clean development in China.

Gas consumption still represents quite a small share in the overall energy mix, and the growth of gas consumption is well below its potential, suggesting gas could substantially replace coal consumption. In 2011, gas consumption represented only about 5% of total energy consumption, well below the average share in the world (about 24%) and the Asia Pacific region (11%), although it has experienced rapid growth since the early 2000s. China is not short on gas resources and China’s Ministry of Land and Resources, in its 2010 Dynamic Assessment on Oil and Gas Resources, says the nation has total natural gas reserves of 52 trillion cubic meters (tcm), of which 32 tcm is technically recoverable. The remaining technically recoverable natural gas that has been confirmed by domestic exploitation amounted to 3.78 tcm by the end of 2010, 40 times the actual production in 2010. These large gas resources suggest that a more rapid development in the use of gas to replace coal could be possible in the past decades.

The Government of China has set up an ambitious plan to accelerate gas development. In 2012, the National Development and Reform Commission (NDRC) updated the National Natural Gas Utilization Policy, the National Energy Administration issued the National Natural Gas Development 12th Five-Year-Plan (2011-15), and the State Council issued the National Energy Development 12th Five-Year-Plan (2011-15) aimed at increasing the share of gas consumption in primary energy to 7.5% by 2015. As a result, the population’s access to gas will increase from 188 million (14% of national total) in 2010 to 250 million (18% of national total) in 2015. To secure the gas supply, the government has urged domestic enterprises to expand exploration and develop both conventional and non-conventional gas (shale gas, coal bed methane, and coal-converted gas), in addition to expanding the import from countries in Central Asia, Myanmar, and Russia. Furthermore, pilot gas pricing reform has been initiated by NDRC, and private investments are encouraged for upstream gas development, especially for the exploitation of the non-conventional gas.

Sectoral and Institutional Context

The government of Shanxi Province has launched an encouraging provincial gasification program to shift its economic structure away from coal-dominated industries through clean energy development. Shanxi Province is the second largest coal producer among all provinces in China, producing about 25% of the national total in 2011. Economic development in the province has relied heavily on the coal industry, but this has created serious environmental problems. The provincial government has decided to promote the use of gas to transform its economic structure along a green path.

- **Targets:** The government issued its Gasification Program in late 2010 and plans to increase gas utilization from about 0.7 bcma in 2008 to 9.0 bcma in 2015 and 28.0 bcma in 2020. Total gas supply was estimated at about 12.0 bcma by 2015 and 36.0 bcma by 2020 when the gas export to other provinces was included.

- **Gas Sources:** The four main sources of gas in Shanxi province are indigenous coal bed methane (CBM), imported natural gas, coke gas, and local coal converted gas (“the Four Gases”). Both CBM and imported natural gas are the focus of the initiative as Shanxi has abundant coal bed methane resources and its reserve is about one-third of the national total reserves, and five main
natural gas trunk pipelines, operated by both PetroChina and SinoPec, pass through Shanxi province and can provide imported natural gas to the province. The provincial government also expects to make use of coke gas and coal converted gas as complementary sources to meet the booming gas market in Shanxi province. The coke gas is present in the province and is used separately (not injected to the provincial main pipelines), while coal gasification is still in an experimental stage.

- Targeted Market: The main markets targeted for gas utilization in Shanxi province are city gas, industrial, chemical, power generation, and transportation (both compressed natural gas (CNG) and liquefied natural gas (LNG) fuelled vehicles). Currently these consumers rely on coal, coal gas, LPG or diesel as their main fuels.

- Main Market Players: Both national and provincial State-owned-enterprises (SOEs) are engaged in this sector, as well as private local and foreign companies. The upstream gas developers include PetroChina, SinoPec, China CBM (a national SOE), Jincheng Mining Group (provincial SOE), and several international energy enterprises. The construction of gas transportation pipelines and associated infrastructure is lead by Shanxi Guoxin Energy Development Group (GXED) in participation with other provincial SOEs. GXED has built about 3,000 kilometers of main gas transmission network across the province, covering 94 of the total of 119 counties in Shanxi. Downstream gas utilization is diversified, and GXED’s subsidiaries are providing the gas distribution services in most of the counties.

Implementation of the provincial gasification program is not without challenges. National level gas regulation is still absent. The distorted gas pricing, quota system to allocate the use of gas, and government driven consumption have limited the growth of gas consumption in recent decades. To achieve the targets of the provincial program, the Shanxi provincial government should work closely with the central government to establish enabling gas policies and a regulatory framework to guide the sound development of the sector. Proper financing mechanisms are also required to fill in the gap in infrastructure development, mainly the distribution network in counties and townships. Furthermore, the affordability of gas by consumers needs to be assessed adequately to ensure the social risk is manageable.

The sharing of international good practice could provide very timely and useful support to improve the quality of the Shanxi Provincial Gasification Program. Considering the long history in both the United States and Europe in using gas, examples of international good practices in maintaining safety and efficient operation of the gas network, as well as lessons and experience in regulating the sector, could be extremely helpful for the program.

Relationship to CAS

The proposed project is fully consistent with the Country Partnership Strategy (CPS) for 2013-2016 (Report No. 67566-CN), discussed by the Board of Executive Directors on November 6, 2012, and is in line with the Strategic Theme One of the CPS, “Supporting Greener Growth”. The proposed project could contribute to Outcome 1.1: Shifting to a Sustainable Energy Path under this theme, and is also expected to contribute to China’s efforts to expand use of clean energy and mitigate climate change.

II. Proposed Development Objective(s)

Proposed Development Objective(s) (From PCN)
The proposed Project Development Objective (PDO) would be to increase gas utilization and displace coal use to reduce greenhouse gases emission in Shanxi province.

The proposed project would be part of the provincial gasification program and the objective would be achieved by the investment in both distributed gas-fired combined heat and power (CHP) and the expansion of the gas distribution network in selected counties. Technical assistance is agreed in the identification mission for both capacity building for the implementing agencies and support to the provincial gasification program.

Key Results (From PCN)
Achievement of the development objective will be assessed through the incremental gas consumption under the project (cubic meters) for power generation (gigawatt hours, GWh) and city use, and the avoided carbon emissions (tons of CO2 equivalent). The project indicators will be quantified during the project preparation stage.

III. Preliminary Description
Concept Description
The proposed project would be comprised of the following three components– two investment components and one technical assistance component:

a. Distributed Gas-fired CHP Component: Two subprojects with the same size have been proposed: Baode 2x60MW and Xiyang 2x60MW gas-fired CHP plants. Both subprojects are greenfield power plants and will be built for power generation and heating supply to the adjacent county level cities (Baode and Xiyang City). The gas source is the provincial gas network which has been extended to both cities. The provincial gas network is constructed and operated by Shanxi Natural Gas Company (SNGC), a subsidiary of GXED.

b. Expansion of Gas Distribution Network Component: Four subprojects have been proposed to expand the gas distribution network in four county cities, namely Qingxu, Tunliu, Xiangyuan and Changzhi County. The gas source is also from the provincial gas network, operated by SNGC. The provincial gas network has been extended to all four cities.

c. Technical Assistance (TA) Component: The technical assistance component is agreed to be included in the project during the identification mission. The component will most likely be linked to building capacity of the implementing agencies, assessing the safety and more efficient operation of the provincial gas network, securing gas sources, introducing international good practice in O&M of the plant and gas distribution network, and facilitating the provincial gasification program (such as through policy studies).

The proposed project is to be implemented by GXED and its three subsidiaries (Shanxi Natural Gas Company, Shanxi CBM (NG) Pipeline and Transportation Company, and Qingxu Kaitong Natural Gas Company). SNGC will implement the Distributed Gas-fired CHP Component; Qingxu Kaitong Natural Gas Company will implement the Qingxu subproject of the gas distribution component; and Shanxi CBM (NG) Pipeline and Transportation Company will implement the remaining three of the four subprojects of the gas distribution component in Tunliu, Xiangyuan, and Changzhi County. A Project Management Office (PMO) has been established, led by GXED and participated in by its
three subsidiaries, to be responsible for the coordination of the project preparation and implementation.

IV. Safeguard Policies that might apply

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V. Financing (in USD Million)

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Total: 270.00

VI. Contact point

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