Evaluation Summary

District Heating Projects in Jinzhong and Taiyuan

Country: **China**

Sector: **Environmental policy and administrative management**

Evaluator: **James J. Qin, Haijiang Chen, Wu Wang (HJI Group Corporation)**

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Key data on AFD's support

Projet number: CCN 1028

Amount: Jinzhong: €28 million – Taiyuan: €40 million in sovereign loans

Disbursement rate: Jinzhong: 100% – Taiyuan: 85%

Signature of financing agreement: Jinzhong: November 2010 – Tiayuan: May 2011

Completion date: Jinzhong: September 2013 – Tiayuan: November 2014

Total duration: Jinzhong: 2 years and 10 months – Tiayuan: 3 years and 6 months

Context

The Government of the People's Republic of China embarked on a plan to promote collective and centralized district heating and to use cogeneration power plants as heat source. This supported the national goal of reducing carbon intensity by 40% per unit of GDP by 2020 in comparison with 2005 .

This policy will both improve energy efficiency and increase the number of residential units supplied by urban heating networks.

Actors and operating method

The projects were implemented and operated respectivelyby the Jinzhong Ruiyang Cogeneration Heating Company (JHC) and Taiyuan Heating Power Company (THPC).

Jinzhong Public Investment and Infrastructure Construction Company (JPIICC), the parent company of JHC and THPC, is the beneficiary of the projects. It retains the ownership of the assets financed under the AFD's loan.

Objectives

1. **To improve public services in urban heating.**
2. **To foster dialogue on institutional reform.**
3. **To favour commercial and institutional partnerships between France and China.**

Expected outputs

The building of a primary district heating networks.

- **for Jinzhong:**
  - **97.5 km of pipe network and 87 heat exchange stations covering a heating area of 10.15 m²**
  - **To replace 80% of the small scale boiler and 20% of district boiler rooms**
  - **To build an energy management center with SCADA system**
- **for Taiyuan:**
  - **9.6 km of primary networks, 46 km of secondary network, one large heat exchange station and 42 heat exchange stations**
  - **To replace 254 small scale heat-only boilers**

Performance assessment

Relevance

The two projects were designed and implemented based on a close alignment with the national Five Year Plan and the government's own development objectives in Shanxi province, as well as with the AFD's country strategy in China, which gave priority to the mitigation of climate change and the building of binational relationships.

The project design took into account the sector trends learned in past projects and made significant breakthrough on core technical solution and energy management methods. Given these findings, the two projects are both rated highly relevant.

Effectiveness

Overall achievement rate reaches 109% for Jinzhong and 112% for Taiyuan.

Most expected outputs of the two projects has been realized or nearly realized, including the construction of heat exchange stations, the heating areas covered and the number of boilers replaced, although some outputs, like pipeline network, are not fully achieved.

The two projects are both rated effective.

Efficiency

Jinzhong project proceeded fast in procurement, implementation and disbursement, while potential risks were clearly identified in the audit report on financial and compliance issues.

Some work packages were slowed down during the procurement process of the Taiyuan project, resulting in delay in implementation and disbursement.

Overall, the two projects are both rated efficient.

Impact

The impact of the two projects has been substantial based on GHG emissions reduction. Comparing two scenarios, with or without the project, the reductions induced by the projects are estimated at 834,853 tons for CO_2, 2,688 tons for SO_2 and 2,340 tons for NO_x.

The environmental impact has been substantial, contributing to a major and sustained improvement in desulphurization and environment acceptance.

Social impacts of the project have been mitigated: affected people are now compensated and properly transferred to new positions.

Impact is rated highly satisfactory for the two projects.

Sustainability

The financial internal rate of return (FIRR) of Jinzhong is 17.78%, which is much higher than expected. The FIRR of Taiyuan is 1%, which is not financially sustainable. The technical sustainability is satisfactory thanks to the new applied energy management system.

Both projects have completed the environmental acceptance, and the institutional operation is performing in a good manner.

Jinzhong is thus assessed most likely sustainable and Taiyuan likely sustainable.

Added value of AFD's contribution

An innovative energy efficiency solution was applied for the first time within the Jinzhong project, with significant support from AFD. Brand-new energy management systems and high-energy efficient pumps were deployed by French companies. This will bring follow-up contracts to them.

Jinzhong is thus rated highly satisfactory and Taiyuan is rated satisfactory.

Conclusions and lessons learnt

Overall, the Jinzhong and Taiyuan projects **meet the established targets and even exceed expectations in some aspects**. The main goals were met, an efficient and innovative type of urban heating has been developed, which has helped improve the heat supply quality of Jinzhong and Taiyuan.

The Jinzhong project became nationally known since its completion, attracting numerous district heating companies and institutions to visit it. Their excellent technical performance leads the **new trend in the Chinese district heating sector**.

Many of the issues and lessons could be mitigated by **increasing capacity building activities**. AFD should put more emphasis on **technical assistance** and capacity building. **AFD should monitor the project performance indicators more closely**.