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Energy Conservation and Greenhouse Gas Emissions Reduction in

Chinese Township and Village Enterprises – Phase II

Evaluation of the RCF Mechanism

Contract No. 16001064

FINAL REPORT

Beijing HuiWenHua

December 2006

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CONTENTS

Executive Summary

This report presents the findings of the evaluation for the RCF mechanism under the "Energy Conservation and GHG Emissions Reduction in Chinese Township and Village Enterprises – Phase II" project number CPR/99/G31. The Project Management Office, the Chief Technical Advisor, and many other participants offered considerable guidance and help during the evaluation process, but any mistakes and omissions in this report should be responsibilities of the sub-contractor and its evaluation team.

The TVE Phase II project was launched in February 2001 for a planned four-year period and funded by a GEF grant and co-financing from GOC. UNDP is the international implementing agency, UNIDO is the international executing agency, and MOA on behalf of GOC is the domestic executing agency.

The TVE Phase II project aims to remove key market, policy, technological and financing barriers to the production, marketing and utilization of energy efficient technologies and products in the brick, cement, metal casting and coking sectors.

The RCF is designed to remove the financial barriers of the TVEs. It is funded by GEF with $1M grant and co-financed by MOA with $1M and ABC with $2M. A sub-contractor was selected by the project to design the RCF, and Hongyuan company was selected to manage the GEF $1M grant funding.

RCF was first designed as a fund, and then adjusted to a financing mechanism. The operation of the RCF was also adjusted accordingly.

The purpose of this evaluation is to review the design, adjustment, execution and finalization of the RCF, analyze its outcomes, summarize its impacts, test its effectiveness, find successful experience and lessons learned, and provide recommendations on further development in the post project period.

The evaluator's conclusion is that the design and adjustment of the RCF mechanism was in accordance with the public policy and financial regulation for the time being. The RCF mechanism seems to have been successfully implemented and managed, with funding sourced to support the pilot and replication projects well above the success criteria set in the Project Document. And the RCF mechanism seems to have important positive impacts on public policy, financial environment, commercial banks and other financial institutions, and TVEs.

The evaluator also finds problems with the RCF mechanism. The entrustment loan facility is currently managed in an inefficient mechanism, with only two pilot TVEs were financed. The reasons for this, the evaluation team believes, lie mainly on two aspects: binding with ABC commercial loans and lack of incentives in Hongyuan.

The evaluator also proposes two important recommendations as for the post project period.

The first question is the need for adjustment of Hongyuan company. Hongyuan has played an important and effective role in facilitating the implementation of the pilot and replication projects and managing the RCF mechanism during the project period. During the project period, Hongyuan is compensated by the project through granting some sub-contracts. And after the project is finished, it will have to find ways to secure funding or income from other sources to ensure its successful operations in the post project period. It is recommended that a plan should be initiated without delay by the project partners and Hongyuan's current shareholders and then be carried out immediately.

The second recommendation is about the RCF post project continuation. The evaluation team believes, for several important reasons, including the limited size of capital, the lack of incentives in Hongyuan, and the changes in financial environments for the TVE sector, the RCF mechanism should be adjusted in the post project period. The evaluator recommends that the entrustment loan facility can be maintained with major adjustments, and other financing vehicles such as ESCO can also be introduced into the operation of the RCF mechanism.

1. Project Background

China's township and village enterprises (TVE) are rural, collective economic organizations established at the township or village level. TVEs constitute a significant share of Chinese economic production and social welfare. TVEs currently provide more than half of the total output from the building materials (including brick), coking and metal casting sectors. However, TVEs also contribute significantly to local and global environmental problems. Emissions of Green House Gases (GHG) from industrial TVEs constitute a major share of China's overall GHG emissions. Their average relative energy consumption is 16% to 60% higher than currently available technologies and they produce low quality products that result in additional energy use downstream.

As Chinese government strengthened its regulation on energy efficiency and GHG emissions, Chinese TVEs faced several challenges in complying with the improved requirements and standards.

One major challenge was the lack of incentives to invest in EE projects. Most TVEs were suspicious about the economic outcome of the proposed EE projects. They were afraid that such investments would bring them improvement in energy efficiency and environment protection at the costs of economic losses.

Another major challenge was the barrier to get sufficient financing for their EE projects. Financial institutions, including commercial banks, were not very interested in financing the TVEs. In comparison to large state-owned enterprises, the TVE sector is characterized by high uncertainty, high risk, and high degree of information asymmetry. In addition, some TVEs could not provide acceptable collaterals as required by commercial banks, and more commercial banks were also not confident in the economic outcomes of the EE projects.

As a result, at that time, the TVE sector as a whole was lack of financial resources, and only few of them could get financial support from commercial banks and other financial institutions.

In November 2000, the GEF approved the second phase of the project "Energy Conservation and GHG Emissions Reduction in Chinese TVEs". Phase II of the project was supported with a GEF grant of US$ 7.992 million and GOC co-financing (in-kind and in-cash) of US$ 10.55 million. In February 2001, Phase II of the project was launched for a planned four-year implementation period.

The project objective is to remove key market, policy, technological, and financial barriers to the production, marketing and utilization of EE technologies and products in the selected sub-sectors. Specifically, the project objectives include: a) creating institutional mechanisms for barrier removal at the national, county and enterprise

level; b) establishing incentives and monitoring systems to strengthen existing regulatory programmes at the county level; c) building technical capacity for energy efficiency and product quality improvement in TVEs; d) creating access to commercial financing for TVE in the four sub-sectors; e) commercialize the financing of TVE energy conservation projects; and f) expanding the application of best practices for local regulatory reform to the national level.

Among others, RCF is designed to remove financial barriers faced by the TVEs in the four sectors. The RCF is intended as a dedicated financial instrument hosted within the Agricultural Bank of China (ABC) to catalyze TVE-based investments in energy conservation. According to the project document, initially the RCF will be jointly funded by GEF, ABC, and MOA.

2. Evaluation Purpose and Context

The purpose of this evaluation is to review the design, adjustment, execution and finalization of the RCF mechanism, analyze its outcomes, summarize its impacts, test its effectiveness, and find successful experiences and lessons learned. This evaluation is also aimed to give suggestions on further refinement and improvement of the RCF mechanism.

The key focuses of the evaluation are on the following aspects: (1) examining evidences that the RCF mechanism has achieved expected results; (2) adjustment of the RCF from a dedicated fund to a financing mechanism; (3) effects and impacts of the RCF mechanism on the financing circumstances in the TVEs of the four sub-sectors; (4) possible problems arisen from the operation of the RCF mechanism; and (5) issues that need to be addressed to sustain the future development of the RCF mechanism.

The detailed tasks of this evaluation include the following aspects.

- To review the design, more importantly, the adjustment of the RCF, to justify its relevance with the technical, market, financial and regulatory situations.
- To review the operation of the Hongyuan company and the ABC, to determine whether the codes, standards and procedures are well followed.
- To review the EE projects of the participating TVEs, to find their financial barriers before the project, and to see whether their barriers are removed after the execution of the project.
- Based on the above analysis, to find whether the execution of the RCF changes the financial situation faced by TVEs in the four industries. If positive impacts do exist, the background, reasons, mechanisms and effectiveness will be analyzed.

- To identify 2 to 3 best practices and to propose possible refinement and improvement in the future expansion of the RCF mechanism.

3. RCF Design Overview

The RCF was designed as a flexible financing mechanism rather than a traditional fund. The RCF mechanism includes several legal agreements and operational documents which define the relationships between the founding parties and guide the operating parties, the Hongyuan Company and the ABC, in their business operations of the RCF.

The UNDP, the UNIDO, the MOA and the ABC signed the MOU on the Establishment and Operation of the RCF at the end of August, 2003. The MOU defined the funding sources of the RCF and created three facilities for Chinese TVEs, including the entrustment loan facility, the commercial loan facility and the capacity building facility.

The MOA, the ABC headquarter and the Hongyuan Company signed another MOU on the management of the entrustment loan. This MOU defined the roles of the three parties in the business operation of the entrustment loan facility and set several basic principles in the operation. According to this MOU, the Hongyuan Company and various local branches of the ABC will sign entrustment agreements before the entrustment loans are extended.

Within the operation structure of the RCF, the ABC is responsible for making commercial loans to the TVEs and also extending entrustment loans according to the terms and conditions set by the Hongyuan Company. However, according to the commercial bank act of China and regulations at that time, the ABC as an agency and services provider could only deliver services of making, supervising and assisting drawing back the entrustment loan. The ABC would not assume any kind of loan risks. The ABC headquarter issued a Code of Practice in Operation of TVE Entrustment Loan Business which would guide the local branches of the ABC in their detailed businesses of extending the entrustment loans to Chinese TVEs.

The Hongyuan Company was selected to be responsible for screening and evaluating candidate borrowers and making decisions on terms and conditions of the entrustment loans. An Entrustment Loan Assessment and Management Criteria and Procedures was developed to guide the Hongyuan Company in its selection and assessment of the borrower TVEs and management of the entrustment loans.

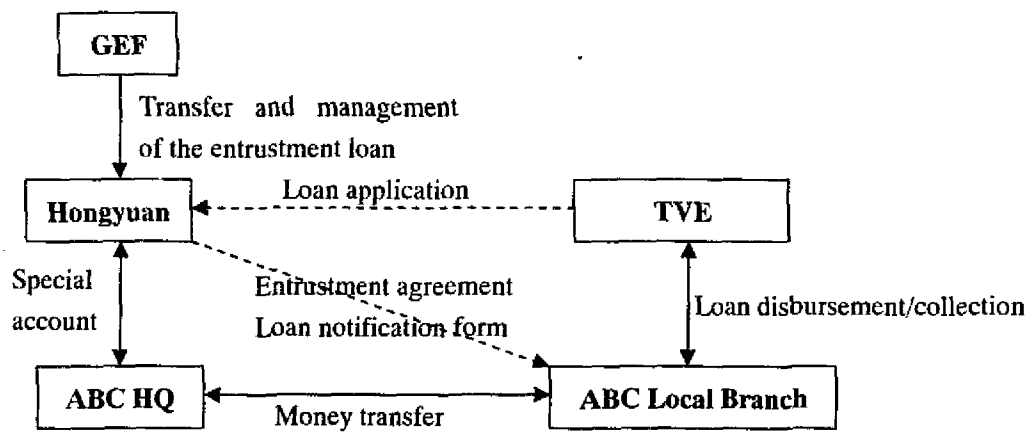
Any TVE that wants to apply the entrustment loan must meet several requirements. Among others, such requirements include (1) any single entrustment loan shall not exceed $ 200,000 dollars; (2) the applying TVE should have its basic account opened with local ABC branch; (3) the applying TVE needs to have commercial loans from

the ABC; and (4) the applying TVE must provide acceptable collaterals.

After Hongyuan received the entrustment loan applications, it needs to perform screening and due diligence on the applications. If Hongyuan is about to approve an entrustment loan application, it needs to sign an entrustment agreement with the corresponding ABC local branch before the loan is actually made. A template of such entrustment agreement was also developed to facilitate the operations and help Hongyuan to standardize its management of entrustment loans in different locations.

After the entrustment agreement is signed, for those applications that Hongyuan is about to approve, an entrustment loan notification form is needed to be submitted by Hongyuan to the ABC local branch, indicating the amounts, types of loans, duration, interest rates, grace period, collaterals and repayment schedules of the approved loans. The ABC local branch will disburse the entrustment loan according to this notification form.

The flow of funds and decision-making procedure of the entrustment loan facility can be summarized in the following chart (solid lines denote flow of funds, and dotted lines denote contractual arrangements).



4. Adjustments of the RCF

4.1 Adjustments Made to the RCF

The RCF was originally intended as a dedicated financial instrument hosted within the Agricultural Bank of China (ABC) to catalyze TVE-based investments in energy conservation. According to the project document, initially the RCF would be jointly funded by GEF, ABC, and MOA.

The project partners (UNDP, UNIDO, MOA, and ABC) signed a Memorandum of Understanding (MOU) in November 2001 to reflect the above concept.

Subsequent investigations by the project partners and experts have, however,

indicated that the RCF as originally conceived may not be feasible or desirable. Consequently, at the tri-party annual meeting of 2002, the project partners agreed that the RCF be designed as a flexible financial instrument for its intended purpose but not necessarily as an independent fund per se. The ABC further suggests that the modality of the RCF be such that it is funded by GEF and co-financed by ABC and MOA, and that the funds from different sources be administered in an integrated fashion but with separate accounts. The ABC also envisages that its co-financing be arranged through its local branches which will lend directly to the targeted, eligible borrowers.

The RCF design sub-contractors, FRC and VCChina, further defined the RCF as a "financing mechanism" which consisted of three parts, an entrustment loan facility ($1M from GEF), a commercial loan facility ($2M from ABC), and a capacity building facility ($1M from MOA).

Another adjustment is the hosting party of the RCF. Originally the RCF was designed to be hosted by the ABC. Under the new mechanism, capital from different sources is managed by different parties. The entrustment loan is managed by Hongyuan company, the commercial loan facility will be managed through the relevant local branches of the ABC, and the capacity building capital will be allocated through central and local agricultural authorities.

4.2 Necessities of Adjustments

(1) Strict financial regulations

During the 1990s, there had been many forms of funds in China. Among them are mutual funds (securities investment funds), industrial funds, and venture capital funds. These three kinds of funds are categorized as investment funds.

The investment funds developed very fast during the second half of the 1990s. Many of these funds had achieved sound performances. This explains why the RCF was first designed as a dedicated fund.

Chinese financial regulators and legislators planned to launch a new law on investment funds from 1999. A special team was formed to work out the draft legislation. Originally legislators wanted to include all three kinds of investment funds in one act. However, this attempt failed because of the east Asian financial crisis and the burst of the internet bubble which caused great loss for many industrial and venture capital fund investors. Finally, the NPC standing committee passed a securities investment fund act. Industrial funds and venture capital funds were not given a "legal identity" and thus faced strengthened regulations.

Since 2001, Chinese authority strengthened regulation on all kinds of funds. The China Securities Regulatory Commission Circular (2001) 6 strengthened supervision

of investment funds, and Circular (2001) 10 strengthened the requirements for setting up a fund management company. All four major state-owned commercial banks also tightened their commercial lending to investment fund management companies.

The fact was, during 2001 through 2003, no industrial funds and venture capital funds were approved to be registered as "funds" except approved by the State Council.

As the financial regulatory environment changed, the RCF would probably not be approved to be registered as a "fund". Therefore, an alternative design or definition of the RCF was needed.

(2) Managerial issues

Should the RCF be structured as a fund, a fund manager would be needed. According to the original Project Document, the RCF should be hosted by the ABC. However, according to the commercial banking regulations of China, ABC is currently prohibited from acting as a fund manager. If any other party was chosen to be the fund manager, ABC would not be able to invest into the fund unless approved by the State Council.

Therefore, it seems that the best way is to let funding from different sources be managed by different parties.

(3) Cost containment concerns

The initial capital budget of the RCF is only $4M, which is quite small for a fund. As the RCF is aimed to remove financial barriers of the pilot TVEs during the project period, it is obviously that it should not be structured as a totally commercial for-profit fund at least during the project period.

On the other hand, the Project Document requires that the RCF be a "revolving" fund. Therefore, the operation costs should be contained during the operation of the RCF.

The adjustment seems to be reasonable in that the entrustment loan is managed by Hongyuan without any charges for management fees. The commercial loan facility and the capacity building facility are also managed without any charges.

Based on the above considerations, the evaluation team believes that the adjustment from a dedicated fund to a flexible mechanism is a realistic and reasonable change which best suits the changes of the environment and interests of all parties.

5. Outcomes of the RCF

5.1 Achievements Made

The RCF was launched after several MOUs were signed and a sub-contract was conducted by Hongyuan company for transferring and management of the GEF $1M funding.

Since then, Hongyuan recruited a team of employees especially for the entrustment loan business, set up a series of standards and procedures for handling applications of entrustment loans, and notified all 9 pilot TVEs for the establishment of the TVE entrustment loan facility.

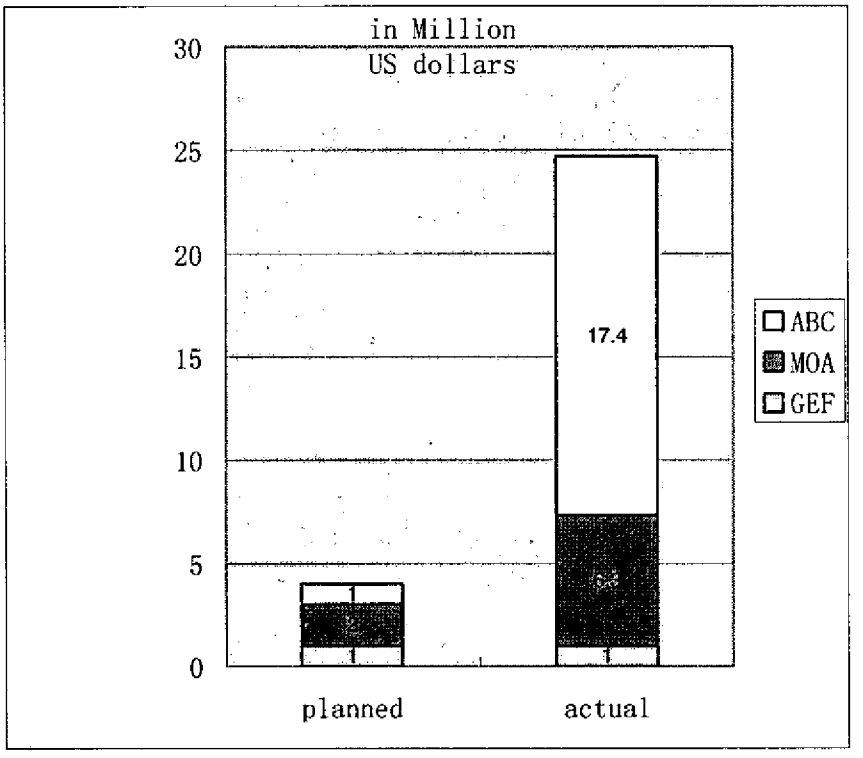
The ABC also issued a code of practice on operation of TVE entrustment loan facility, and trained its relevant staffs from both headquarter and branches.

During the project period, Hongyuan collected necessary materials from all 9 pilot TVEs. All of them applied for the TVE entrustment loan, two were financed by the entrustment loan facility with total funding of $400,000, and the others are still pending for evaluation and approval.

Regarding the commercial loan facility, besides assisting Hongyuan to extend the entrustment loans, the ABC also asked its concerned local branches to put more emphasis on supporting the pilot and replication TVEs identified by the Project. During the project period, the total commercial lending to 9 pilot TVEs reached a total of $17.4M, well above the expected $2M as planned.

Regarding the capacity building facility, the MOA provided capacity building supports to the pilot and replication TVEs through direct grants from MOA, grants through local TVE authorities, and government loans. During the project period, 9 pilot TVEs received a total of $6.3M from MOA and local TVE authorities, including $1.5M government loans. Besides, in order to better help project TVEs to build their capacities, the MOA and local TVE authorities did a lot of coordination work with other government authorities through PIC, LPIC and other mechanisms. As a result, all 9 pilot TVEs received various capacity building supports from other government authorities, including energy authorities, science and technology authorities, environment protection authorities, etc.

As a result, total investments for the 9 pilot projects have been increased to $49M, including more than $17M from the commercial loan facility. The following chart presents a comparison of the planned and actual financing of the RCF mechanism.



And for the part of capacity building facility, the sum of capacity building funding received by the pilot and replication TVEs were well above the committed $1M.

The RCF seems to have played an important role in supporting the financing of the pilot projects, in particular by achieving a high leverage impact in mobilizing other funds from other sources to finance the EE projects of the pilot TVEs.

5.2 Problems Identified

One of the successful criteria set in the Project Document is that "RCF and ABC will have arranged financial packages for eight pilot TVEs". All 9 pilot TVEs have successfully secured funding for their EE projects, so it seems this criterion has been met. However, only two pilot TVEs were supported by the entrustment loan facility, and the evaluation team believes the entrustment loan facility is currently managed in an inefficient mechanism.

The reasons for this, the evaluation team believes, lie mainly on two aspects: binding with ABC commercial loans and lack of incentives in Hongyuan.

According to the criteria and procedures of the entrustment loan, the disbursement of the entrustment loan is strictly bound with ABC commercial loans. That means a TVE must have secured an ABC commercial loan to be qualified as an applicant for the entrustment loan. This is reasonable at the inception of the RCF, considering asymmetric information about the credit risks associated with the TVEs, lack of

expertise in evaluation of Hongyuan and cost-saving reasons. However, this binding policy makes the entrustment loan also a commercially operated loan facility. Many small TVEs, especially those in the brick making sector, are not qualified to get a commercial loan from the ABC, because they are lack of acceptable collaterals. As a result, they are also not qualified for an entrustment loan to support their EE projects even if these projects are profitable themselves.

Hongyuan was chosen by the project to be the manager of the entrustment loan facility. According to the design of the RCF mechanism, Hongyuan can only charge a small sum of management fee from the borrowers. Hongyuan needs to use the fees to pay the ABC's service charge as well as its only costs associated with the management of the entrustment loans. Although the ABC has lowered its charge rate for the TVE entrustment loan service to 1% of the entrusted loans (the prevailing charge rate in Chinese banking industry is around 3%), Hongyuan still finds it is very difficult to cover the costs from the limited fee incomes. Hongyuan is a commercial company, and it can not earn any profit from the management of the entrustment loan, nor can it get any bonus from the successful collection of the entrustment loans. However, as a government sponsored company, Hongyuan is required to make the entrustment loan "revolving" which means Hongyuan will be asked to take responsibilities for losses from any possible non-performing loans. Therefore, Hongyuan will be lack of incentives in making the entrustment loans.

6. Impacts of the RCF

The operation of the RCF mechanism has very important impacts on various parties.

6.1 Public Policy and Financing Environment Improved for TVE Sector

In three continuous years starting from 2004, the number one circulars of the CCP central committee have all been focused on issues concerning agriculture, countryside and farmers. This revealed more importance of the agricultural business in the whole national business.

The circulars of the highest decision makers are followed by a series of new policies and regulations which aim to remove financial barriers faced by market participants in rural areas, mainly TVEs.

As from 2004, nearly all provinces and major municipal governments established SME authorities, with most of them being merged into original TVE authorities to provide better services to SMEs, especially those small and medium-sized TVEs.

Financial environments for the TVE sector are also improved a lot. On October 28, 2004, the People's Bank of China issued a new policy which allowed the credit unions to charge their TVE clients as high as 3.3 times of the reference interest rates in

extending commercial loans. This would give the financial institutions more incentives to finance the investments of the TVEs.

The China Banking Regulatory Commission (CBRC) issued its Circular 2005(54), asking financial institutions to re-allocate their asset structures and extend more loans to small businesses, including small TVEs. And later in October 2006, the CBRC further issued a guidance on due diligence on small businesses.

From the evaluator's point of view, the development of TVE Phase II project and the RCF mechanism is at the same direction of development of the macro environment, although its contribution might be very small from macro perspectives. On the other hand, the changed macro environment also helped the RCF to be functioning more smoothly and attract more funding for pilot and replication TVEs through the mechanism. And it is anticipated that in the post-project period, as the deepening of the reform of China's financial system, the macro financial environment will better facilitate the operation of the RCF mechanism.

6.2 Commercial Banks More Interested in TVE Financing

The ABC is involved in the whole process of the TVE Phase II project, especially the RCF mechanism, and thus has plenty of opportunities to understand the situations and financial barriers of the TVE sector.

During the project period, four officers from ABC HQ participated in the design and establishment of the RCF, about 30 staffs from ABC HQ, provincial and county level branches participated the training of the RCF, a code of practice was issued and disbursed to all relevant branches, and two entrustment loans and more commercial loans were extended to participating TVEs.

As a result, a common understanding has been reached in the ABC that EE projects are not only contributing social welfare but also bringing significant profits to investors, and TVEs and other types of SMEs can also be profitable clients. The ABC as a whole is now more interested in TVE businesses and has sourced more capital to this sector.

In March 2006, based on its rural business department, ABC set up new SME financing departments in its HQ and all provincial branch levels. The newly established department designed and provided many new financing products, such as express lending and auto revolving lending systems, to its small and medium-sized TVE clients. The ABC also launched a SME credit management system in April 2006 to collect and manage credit information of SMEs and TVEs. And later in mid 2006, ABC HQ declared it will be strategically focused on financing county-level businesses which are mainly composed of TVEs.

Many other commercial banks also established special departments to serve the financial needs of TVEs in rural areas. More importantly, in the year 2005, tens of rural credit unions were restructured as rural commercial banks to better serve the financial demands of TVEs and other market participants in rural areas.

6.3 More TVEs Achieved Better Understanding of EE Projects Benefits

Before the TVE Phase II project and the RCF were launched, many TVEs in the four sectors were not very sure about the profitability of investing in EE projects. They thought such investments only had social welfare, such as less GHG emissions and less pollutions. Now after the project helped 9 pilot finish their investments in EE projects, the demonstration effects are enormous. More and more TVEs begin to believe that such investments can also make large profit contributions.

The evaluation team visited several non-pilot non-replication TVEs in Nanjing and Xi'an which were also investing in such EE projects after witnessed the successes of the pilot TVEs. The increase of replication TVEs from 100 as planned to 118 also revealed the demonstration effects of the pilot TVEs. Discussions with the LPICs and local industrial organizations also reach the same conclusion.

6.4 Alternative Funding Vehicles Explored

At the local level, the RCF mechanism seems to have more direct and important impacts, and some alternative funding vehicles have been explored to support financing of the TVEs.

In Xinjin county, Sichuan province, where the pilot TVE Yongxing locates, the local government established a county level guarantee fund and financed, among others, Yongxing Brick Mill. It is reported that a lot of such SME guarantee funds have been or is being established at local levels.

A provincial energy fund was established by the local government of Shanxi. Pilot Xinggao Coking Group and Guangyuan Coking Company, together with many other TVEs, were financed by the fund.

The project is also actively exploring the possibility of introducing CDM mechanism into TVEs energy conservation and GHG reduction practices, and it has already developed communication and cooperation relationship with related international organizations and bilateral sources.

7. Evaluation Key Findings

The RCF mechanism seems to have played an important role in supporting the implementation of the pilot projects. The entrustment loan facility directly supported

two pilot projects, and over $10M commercial loans were successfully channeled through the RCF mechanism to support EE investments of the pilot TVEs. More importantly, the RCF seems to have had important positive impacts on public financial policies, the interests of commercial banks in funding EE projects of TVEs, and the willingness of TVEs to invest in the EE projects.

The evaluation team have conducted case studies on the two pilot TVEs that received entrustment loans and another replication brick TVE and conclude that the entrustment loan seems to be very effective in supporting comparatively large TVEs which can provide acceptable collaterals. However, for those small TVEs, especially those in the brick sector which have no credit record and acceptable collaterals, the entrustment loan facility is currently not able to give them direct financial support.

Therefore, it seems that the entrustment loan facility needs re-adjustments after the TVE Phase II project ends. During the project period, it seems to support too few pilot projects because of binding with ABC commercial loans and lack of incentives in Hongyuan company.

8. Conclusions and Recommendations

8.1 Design and Adjustments of the RCF

The evaluation team believes that the design and adjustments of the RCF mechanism was in accordance with the public policy and financial regulation for the time being.

8.2 Project Implementation and Management of the RCF

The RCF mechanism seems to have been successfully implemented and managed, with funding sourced to support the pilot and replication projects well above the success criteria set in the Project Document.

8.3 Impacts of the RCF

The RCF mechanism seems to have important positive impacts. The macro public policy and financial environment are becoming more favorable for TVEs, commercial banks are more interested in financing the EE projects, more TVEs are aware of the profitability of the EE project investments, and new financing channels are explored by the project.

8.4 Adjustments of Hongyuan Company

Hongyuan company, as a result of the adjustment of the original PTPMC, was founded by two departments of the MOA. During the project period, Hongyuan has played an important and effective role in facilitating the implementation of the pilot and replication projects and managing the RCF mechanism. Hongyuan is also

compensated for providing such services through project sub-contracts, capacity building and MOA co-financing.

Hongyuan will face great challenges after the TVE Phase II project ends in several months. As Hongyuan's income is now mainly from the project, it will have to find ways to secure funding or income from other sources to ensure its successful operations in the post project period.

As the time left for Hongyuan to make necessary adjustments is very limited, it is recommended that a plan should be initiated without delay by the project partners and Hongyuan's current shareholders and then be carried out immediately. A possible and realistic choice could be to restructure Hongyuan to a private company through management buy-out.

8.5 RCF Post Project Continuation

The RCF seems to have played an important role in supporting the financing of the pilot projects, in particular by achieving a high leverage impact in mobilizing other funds from other sources to finance the EE projects of the pilot TVEs.

After the TVE Phase II is ended, the RCF mechanism is still needed to help remove financial barriers of the TVE sector. As indicated in sections 6.1 and 6.4, the macro public policy and financing environment for the TVEs have changed and are now improved a lot, and some alternative financing channels are also explored and established. However, under current circumstances, the TVE sector is still facing financial barriers. The evaluation team believes that the financial barriers for those TVEs in cement making, foundry, and coking sectors with larger sizes and more advanced management have been improved a lot. But for those small TVEs in the brick making sector with less sizes, poor management, and lack of qualified collaterals, financial barriers have only been improved to a smaller extent.

The evaluation team further believes, for several important reasons, the RCF mechanism, especially the entrustment loan which was funded by the GEF $1M, should be adjusted in the post project period.

Firstly, the size of the entrustment loan facility is only $1M. To diversify risks, it was designed that any single entrustment loan should not exceed $200,000, or approximately RMB 1.6M yuan. Such an amount is quite small for most TVEs in cement and coking TVEs, with typical investment in EE projects in these TVEs often reaches more than $10M. On the other side, for those small TVEs in brick making sector, an entrustment loan of $200,000 is quite attractive, but they can not get the loan because they are lack of credit rating record and acceptable collaterals. Even if this problem can be resolved, the entrustment loan facility can only finance five projects at the same time at the level of $200,000 for each loan. During the project

period, it is useful because there are only 9 pilot projects. However, after the project ends, the capital base seems too limited for so many EE projects.

Secondly, as indicated in Section 5.2, as the manager of the entrustment loan facility, Hongyuan is lack of incentives. During the project period, the consequence of this problem can be eased because Hongyuan is receiving funding support from the project and the MOA which can be regarded as compensation for management of the entrustment loan facility. After the project ends, however, Hongyuan will be a fully commercial company and will not likely get funding from outside sources. In that case, it should be doubted whether Hongyuan can still manage the entrustment loan facility effectively.

Taking all the above factors into consideration, the evaluation team suggest that the entrustment loan facility should be adjusted for the post project period.

The entrustment loan facility can remain its form and usage as entrustment loans, but with major modifications in target TVEs, terms and conditions of lending, and incentive package for Hongyuan company. It is recommended that the entrustment loan facility can choose small TVEs like those in brick making and foundry sectors as its target TVEs so that more EE projects can be financed and greater diversification can be achieved because typical investment in such projects is much smaller as compared to that in cement and coking projects. The requirement of binding with an ABC commercial loan should be eliminated. The risks can be effectively managed as long as percentage of the entrustment loan to the total investment is kept within a certain limit, and the client can provide acceptable collaterals or guarantee. Furthermore, as a commercial company and manager of the entrustment loan facility, Hongyuan should be able to charge high interests in accordance with the associated risks and be paid a carried interest for those well performing loans.

At the same time, more financial vehicles can be introduced into the RCF mechanism. One possible choice is to introduce ESCO operation, with the GEF $1M funding be the capital base of ESCO investment. ESCO will be more flexible to help TVEs remove their financial barriers, because they are not required to provide collaterals. On the other hand, such an operation form will help Hongyuan secure more project sources. What's more, the expected return from an ESCO investment will be higher than that of an entrustment loan. As an ESCO investor, Hongyuan can share the higher return with the RCF.

A hybrid of ESCO operation and entrustment loan will also be helpful for sustainable development of the RCF mechanism..

Attachment 1

List of Abbreviations

ABC	Agricultural Bank of China
CTA	Chief Technical Advisor
EE	Energy Efficiency
GEF	Global Environment Facility
GHG	Greenhouse Gas
GOC	Government of China
LPIC	Local Policy Implementation Committee
MOA	Ministry of Agriculture
PIC	Policy Implementation Committee
PMO	Project Management Office
PTPMC	Production Technology and Product Marketing Consortium
RCF	Revolving Capital Fund
SME	Small and Medium-size Enterprise
TOR	Terms of Reference
TPR	Tripartite Project Review
TVEs	Township-Village Enterprises
UNIDO	United Nations Industry Development Organization
UNDP	United Nations Development Programme
VA	Voluntary Agreement

Attachment 2

Evaluation Methodology

In this evaluation, all the evaluation framework, criteria, principles and indicators are chosen in compliance with the monitoring and evaluation policies of GEF and UNDP.

Logical Framework Approach

According to GEF monitoring and evaluation policy, we adopted logical framework approach (LFA) as our evaluation framework.

The logical framework approach is an essential monitoring and evaluation project design instrument that facilitates results-oriented project implementation and sound monitoring and evaluation. This approach establishes the links between goals, objectives, outputs, and inputs through verifiable indicators and specifications of the assumptions that underlie these relationships. Testing of the logical framework against objectives and the external environment/circumstances must be a recurring exercise.

Identification of Project Contributions and Impacts

To better identify possible contributions and impacts of the project, the whole procedure, including design, adjustment, implementation and finalization are taken into consideration of the evaluator.

The evaluator studies different indicators before and after the project, and also try to evaluate differences with and without the project, so as to provide more scientific evaluation of the RCF mechanism.

Performance Indicators

Any contributions and impacts must be measured with a set of performance indicators. A set of sound performance indicators are of great importance for the success of the RCF evaluation.

In choosing performance indicators, the following standards are followed by the evaluator:

- **Specific:** The system captures the essence of the desired result by clearly and directly relating to achieving an objective and only that objective.
- **Measurable:** The monitoring system and indicators are unambiguously specified so that all parties agree on what it covers and there are practical ways to measure it.

- **Achievable and Attributable:** The system identifies what changes are anticipated as a result of the intervention and whether the result(s) are realistic. Attribution requires that changes in the targeted developmental issue can be linked to the intervention.
- **Relevant and Realistic:** The system establishes levels of performance that are likely to be achieved in a practical manner, and that reflect the expectations of stakeholders.
- **Time-bound, Timely, Trackable and Targeted:** The system allows progress to be tracked in a cost-effective manner at desired frequency for a set period, with clear identification of the particular stakeholder group to be impacted by the project or program.

Based on the project document, the annual PIC report, the TPR file and other reports and documents, we developed the RCF mechanism logical framework matrix. The performance indicators matrix are listed as Attachment 5.

Analysis and Information Collection

In determining the actual value of the indicators and analyzing the pros and cons of the project, the evaluator follows the following criteria:

- **Relevance:** The extent to which the activity is suited to local and national development priorities and organizational policies, including changes over time.
- **Effectiveness:** The extent to which an objective has been achieved or how likely it is to be achieved.
- **Efficiency:** The extent to which results have been delivered with the least costly resources possible. Also called cost-effectiveness or efficacy.
- **Results:** The positive and negative, and foreseen and unforeseen, changes to and effects produced by a development intervention. In GEF terms, results include direct project outputs, short- to medium term outcomes, and longer-term impact including global environmental benefits, replication effects and other, local effects.
- **Sustainability:** The likely ability of an intervention to continue to deliver benefits for an extended period of time after completion. Projects need to be environmentally as well as financially and socially sustainable.

In conducting this evaluation contract, various kinds of information are needed. We developed the following plan of data collection to facilitate this work.

Information Needed	Sources of Information	Methods of Collection
Baseline Information		
TVE's Energy consumption data	PMO/TVEs	Documents review Interview
TVE's attitude toward technology upgrades	PMO/TVEs	Documents review Interview
TVE's financing situation	PMO/TVEs/ABC	Documents review Interview
Institutional framework of TVE regulation	PMO/MOA	Documents review Interview
Information about design of RCF		
Role of PIC/LPIC	Sub-contractors of PIC/LPIC	Report review
Agreements between parties	Sub-contractors of PIC/LPIC and RCF	Documents review
Alternative structures of RCF	RCF sub-contractor	Interview
Adjustment of RCF design	RCF sub-contractor	Interview
Information about operation of RCF		
Bankable project proposals	HY	Documents review
Entrustment agreement between HY and ABC	RCF sub-contractor	Report review
Entrustment loan criteria and procedures	HY	Documents review
Entrustment loan statistics	HY	Documents review
Matching commercial loans	ABC	Interview Documents review
Loan repayment information	HY/ABC	Document review Interview
RCF promotion and publicization	HY	Field study
Profitability of HY company	HY	Financial statements analysis
Information about financing of pilot TVEs		
Additional financing through RCF	Pilot TVEs	Field study/questionnaire
Profitability of upgrade projects	Pilot TVEs	Field study/questionnaire Financial statements analysis
Energy savings	Pilot TVEs	Field study/questionnaire
Information Needed	**Sources of Information**	**Methods of Collection**

Product quality improvement	Pilot TVEs	Field study/questionnaire
Market of improved products	Pilot TVEs	Financial statement analysis
Available financing resources in different times	Pilot TVEs	Field study/questionnaire
Information about RCF's Impacts		
Awareness of non-pilot TVEs of benefits from technology upgrades	Non-pilot TVEs	Questionnaire
Number and amounts of investment in upgrades in non-pilot TVEs	Non-pilot TVEs	Questionnaire
ABC's awareness of bankable upgrades	ABC	Interview
Government's awareness of technology upgrades in TVEs	Government agencies	Phone interview
Total capital sourced to TVEs through RCF mechanism	TVEs and ABC	Questionnaire Interview
Other financial resources available for TVEs	TVEs	Questionnaire

Attachment 3

Meeting Minute with Hongyuan Company

Date: 22 July, 2006
Place: Office of Hongyuan Company
Participants:

Mr. Wang Hai, General manager of HY
Mr. Xiong Wei, Vice general manager of HY
Ms. Yu Huayun, Vice president and team leader, Beijing HuiWenHua
Mr. Li Bing, Consultant and team member, Beijing HuiWenHua

Ms. Yu Huayun introduced the RCF evaluation project and the project team. The RCF evaluation project was one of the three evaluation projects that aimed to systematically review the process and implementation of the TVE phase two project. Beijing HuiWenHua was chosen to conduct the RCF evaluation project. To better carry out this task, we would need cooperation from HY company and other relevant parties.

Mr. Wang Hai and Mr. Xiong Wei introduced HY company and its management of the entrustment loan.

Establishment of the RCF Mechanism

The RCF was originally designed as a fund. However, at that time, financial regulation in China was very strict and it was almost impossible for the RCF with only $4M to be structured as a fund. Therefore, the RCF was adjusted as a mechanism aiming to remove financial barriers faced by Chinese TVEs in the four sectors. During the project period, the RCF was designed to first help the pilot TVEs get financing for their technological upgrades, and then to show demonstration effects to the replication TVEs and other TVEs in these four sectors.

The current RCF mechanism was finalized in the year 2004. The GEF $1M would be used as an entrustment loan facility which was managed by HY company. The Agricultural Bank of China would help HY to make the loans, but it would not bear any risk associated with the loans. The ABC $2M would be used to lend to the TVEs as commercial loans, and the MOA $1M would be used for capacity building for the TVEs.

HY's Cpacity Building Regarding the Entrustment Loan Facility

In 2004, HY was chosen to manage the entrustment loan. With the help of a sub-contract titled "Transfer and management of the entrustment loan facility", HY

built its capacity from perspectives of organization structure, human resources and code of practices.

To better perform the role of entrustment loan manager, HY set up an entrustment loan management committee formed by people from the board, the management team, the business units, and outside experts. This committee was responsible for final decision of making entrustment loans.

HY also set up a new business unit specializing in the management of the entrustment loans. This unit was responsible for collecting loan applications, conducting due diligence, preparing loan assessment reports, and submitting a report to the committee for final decision. For those loan applications that were passed in the committee, the business unit was also responsible for later-stage management.

HY recruited several talented people to form the entrustment loan business unit. HY also invited financial experts from commercial banks and other financial institutions to train our staffs. The training package covered loan assessment, due diligence, collateral management, later-stage management, non-performing loan management, and related law and regulations.

HY signed a MOU with ABC and MOA, establishing the framework of business cooperation with ABC. For each entrustment loan case, HY would sign an agreement with the ABC local branch.

Achievements Made

Currently two entrustment loans were made to two pilot TVEs. The borrowers were Zhejiang Shenhe, a cement making company, and Dalian Jinmei, a metal casting company. Both loans were within $200,000 limit. Currently, both loans were in good condition, and the borrowers were paying interests according to a schedule specified in the loan agreement.

HY also received several other loan applications and was dealing with them. One or two of them might have opportunities to get the entrustment loan, and the others may have difficulties, mainly because they were lack of steady incomes and acceptable collaterals.

In addition, through the operation of the entrustment loan facility, more commercial banks and TVEs were aware of the profitability of taking technological upgrades. As a result, we could see more TVEs taking such upgrades now, and more TVEs could get financial lending from commercial banks to undertake such upgrades. This could be partly attributed to the RCF mechanism. HY was preparing to promote the RCF and especially the entrustment loan in the four sectors in the near future.

Problems and Concerns

There are several concerns about future development of the entrustment loan facility.

Firstly, HY was lack of incentives to manage the entrustment loan. HY was designed as a for-profits commercial company. However, in the current arrangements, HY could not benefit from the entrustment loan business. And also, HY could not compensate its staffs in the entrustment loan unit on a performance related basis. Actually, in the project period, HY got some compensation from the Project, this could be used or regarded as some kind of compensation for doing the entrustment loan business. But the problem was, how to deal with the situation after the project period which would be ended at the end of this year?

Secondly, the amount of available loans was too limited. Therefore, some TVEs were not so interested in getting the entrustment loan, just because the transaction costs were comparatively high. To get the entrustment loan for only $200,000, a full procedure was also needed, just like a commercial loan.

Thirdly, some TVEs, especially those in the brick sector, were not able to provide acceptable collaterals, although they were actually in need of financial support. HY was asked to keep the fund sustainable, so it need to ask the borrowers to provide sufficient collaterals. But on the other side, the RCF was designed to support the TVEs and help them remove financial barriers.

Attachment 4

Meeting Minute with Agricultural Bank of China

Date: 25 July, 2006
Place: ABC headquarter
Participants:

Mr. Xu Hao, Director of TVE lending department
Mr. Jin Junfeng, Project manager, ABC headquarter
Mr. Li Jian, ABC Zhejiang branch
Mr. Xiao Yun, ABC Dalian branch
Ms. Yu Huayun, Vice president and team leader, Beijing HuiWenHua
Mr. Li Bing, Consultant and team member, Beijing HuiWenHua

Ms. Yu Huayun introduced the RCF evaluation project and the project team. The RCF evaluation project was one of the three evaluation projects that aimed to systematically review the process and implementation of the TVE phase two project. Beijing HuiWenHua was chosen to conduct the RCF evaluation project. To better carry out this task, we would need cooperation from ABC and other relevant parties.

Participants from the ABC side introduced ABC's role in the functioning of the RCF and other information.

Role of ABC in the RCF Mechanism

The RCF was originally designed as a dedicated fund and then adjusted to a flexible financing mechanism through which each founding party make its own contributions to help Chinese TVEs to remove their financial barriers in taking technological upgrades.

As the only financial institution in the founding parties of the RCF, ABC provided a lot of useful suggestions in the design and establishment of the RCF. ABC shared with the RCF subcontractor its experiences in doing business with the TVEs and managing risks associated with the loans extended to the TVEs.

ABC committed $2M contribution to the RCF. Since it could not be sourced into a fund, it was designed that the ABC $2M would be used through the ABC commercial lending procedure, but ABC must make these loans to Chinese TVEs in the four sectors specified in the project documents.

ABC signed a MOU with MOA, UNDP and UNIDO in the establishment of the RCF mechanism and a MOU with MOA and HY company in the management of the entrustment loan facility.

According to the MOU signed by ABC, MOA and HY company, HY was the main responsible entity to manage the entrustment loan facility, and ABC would help HY to disburse the entrustment loans, sign loan agreements with the borrowing TVEs, and collect interests and principles on behalf of HY. All such business activities were conducted through ABC local branches. An entrustment agreement was needed to be signed between HY and ABC local branches.

Capacity Building in ABC

During the project period, ABC made great efforts to give financial supports to the pilot, replication and other TVEs in the four sectors. To better serve this objective, ABC also conducted capacity building on both headquarter and branch levels.

In the year 2003, ABC issued "Code of Practice in Operation of TVE Entrustment Loan Business" as an internal business guideline and asked all its branches to conform to this code of practice in dealing with TVE entrustment loan businesses. Loan procedures, criteria and other requirements were specified in this file.

ABC headquarter also designed a standard sample entrustment agreement to be signed between HY and ABC local branches. This standard agreement helped HY to facilitate its management of TVE entrustment loans in different places.

ABC headquarter organized several training sessions to provide trainings to its staffs, improving their capabilities to deal with RCF-related businesses. Now staffs from all provincial level branches and county level branches in the pilot counties received such trainings. The awareness and understanding of profitability and social welfare of TVEs' technological upgrades were improved.

Financing of TVEs

Since the launch of the RCF, ABC had successfully helped HY disburse a total of $400,000 entrustment loans to two pilot TVEs, Zhejiang Shenhe and Dalian Jinmei. Both projects seemed to be in good condition.

ABC also successfully granted commercial loans to all 9 pilot TVEs. The total finance (commercial loan, RCF entrustment loan, and MOA co-finance, not including equity finance) received by the pilot projects is $22.75M , well passed the target set for the project end.

Of all the 118 replication TVEs identified by the project, most of them were clients of ABC. The ABC branches would try to conduct statistics on their financing data.

Project Impacts

The project had important impacts on TVEs, ABC and even the Chinese financial industry.

Through the successful implementation of the 9 pilot TVEs, more TVEs were aware that such technological upgrades were actually profitable. As a result, we could see more investment in such upgrades in the pilot counties.

ABC also benefited a lot from the project. Through the successful operation of the 9 pilot TVEs, ABC was more confident in supporting Chinese TVEs to undertake such upgrading projects. Furthermore, ABC had adjusted its strategy to put more emphasis on supporting rural economy, including TVEs.

The whole Chinese financial industry now are more interested in financing SMEs, including TVEs which are actually SMEs in the rural areas. There might be many factors behind this change, however, the successful implementation of this project is surly one of the factors.

TVE Financing Outlook

ABC would commit more resources to support the economic development in rural areas. Supporting TVEs would be one important element in this strategy.

With the macro regulation situation more favorable for SMEs, ABC believed that Chinese TVEs would have more opportunities in finding financial resources to support their efforts in energy efficiency upgrades.

Attachment 5

Evaluation of the RCF: Performance Indicators Matrix

Project Objectives	Objectively Verifiable Indicators	Project Activity/Strategy	Project Target	Implementation Result
Development Objectives To improve energy efficiency and reduce GHG emissions in Chinese TVEs in the brick, cement, metal casting and coking industries through the implementation of the RCF project.	1. Increase in energy efficiency of TVEs	Implementation of 9 pilot projects and 118 replication projects.	10-20% energy efficiency improvements relative to pre-investment period will be observed.	Eight pilot TVEs that have finalized their EE projects have achieved annual energy savings of 168,000 tce.
	2. Reduction in GHG emissions in TVEs		Total GHG reduction from the pilot TVEs will add up to 85,000 tCO2 p.a.	Eight pilot TVEs that have finalized their EE projects have achieved annual GHG reduction of 420,000 t CO2.
Outcome 1 Institutional mechanisms for financial barrier removal created.	1. PIC constituted and operational.	Establishment and capacity building of PIC.	At least 50 individuals from GOC, local government and other stakeholders are trained.	1. PIC was established on Feb. 2001, statute devised and secretariat constituted. 2. Responsibilities: coordinating and providing consultation on major issues during project implementation; guiding the establishment and operation of the LPICs; guiding the

				establishment and operation of Hongyuan Co. 3. Operations: hold project meetings in a timely manner; provide training to LPIC members and local officials on policies and project implementation; evaluate and monitor LPIC and VA; evaluate the Entrustment Loan operations regarding policies.
	2. LPIC constituted and operational.	Establishment and capacity building of LPICs in pilot and pipeline counties.	Pilot TVE and counties have participated in constituting meetings, received relevant documentation and are committed to the project.	1. Established LPICs in eight pilot regions and developed statutes and Action Plans in line with local circumstances; 2. Designed a monitoring and evaluation system; 3. Carried out capacity building of LPICs: organized domestic workshops, study tours abroad and training sessions; more than 120 trainees involved; 4. Assisted Hongyuan Co. in organizing relevant EE training workshops; 5. Successfully promoted establishment of Xinjin county level guarantee fund; 6. Successfully promoted establishment of Shanxi provincial level energy fund.
	3. PTPMC constituted and operational.	PTPMC was adjusted to Hongyuan company.		1. Hongyuan was founded by two shareholders and funded by the project and MOA; 2. Business plan developed; 3. Conducted capacity building; 4. Hongyuan was chosen to be the manager of the

				entrustment loan facility.
	4. RCF constituted and operational. 4.1 RCF clearly defined. 4.2 Roles and relationships to other institutions defined. 4.3 Use of GEF/MOA/ABC funds defined. 4.4 Criteria and procedures for loans developed. 4.5 Training to staff of ABC and candidate borrowers provided. 4.6 Transfer and management of the entrustment loan facility assigned.	Adjustment of the RCF. Conduct of RCF sub-contract. Conduct of Transfer and management of the 1M ELF sub-contract. Providing of training.	At least 20 staff from TVE, ABC and other finance entities will have participated in financial training.	1. Sub-contract "Design and establishment of RCF" was implemented. 2. RCF Adjustments: **Reasons for Adjustments:** ➢ Strict financial regulations (to establish any fund was strictly controlled by the government); ➢ Managerial issues (the ABC is a commercial bank rather than a administrative bank, so it can not act as the fund manager, and its funding can only be disbursed through its branches); ➢ Cost containment concerns (the adjusted mechanism can have cost saving effects); ➢ Other possible uses of the GEF fund not realistic (guarantee mechanism was hard to develop because of limited capital size, and interest subsidy and capacity building can not meet the requirement of "revolving"). **Adjustments Made:** ➢ RCF is structured as a flexible financial mechanism; ➢ The GEF $1M funding is formed an entrustment loan facility managed by

				Hongyuan company; ➢ The ABC $2M funding is formed a commercial loan facility managed by ABC itself through its local branches; ➢ The MOA $1M funding is formed a capacity building facility managed through local TVE authorities. 3. MOU signed by UNDP, UNIDO, MOA and ABC on establishment of the RCF mechanism. 4. MOU signed by MOA, ABC and Hongyuan on management of the entrustment loan facility. 5. Sub-contract "Transfer and management of the 1M ELF" conducted by Hongyuan. 6. Capacity building conducted in Hongyuan. 7. Loan criteria and procedures developed for use of Hongyuan. 8. Code of practice in operation of ELF issued by ABC HQ. 9. Training provided to over 30 participants from ABC, Hongyuan, and TVEs.
Outcome 2 Financial Barriers removed by providing financing to pilot TVEs	1. Bankable project proposals at 9 pilot TVEs processed 1.1 Feasibility study and technological design completed.	Feasibility study and technology design provided by professional sub-contractors and funded by the project.	At least 8 loan applications will have been submitted to PIC, RCF and ABC.	1. A full set of files and documents of the ELF developed by Hongyuan. 2. Feasibility study and technology design completed by sub-contractors for the pilot TVEs. 3. All 9 pilot TVEs submitted loan applications

	1.2 Financing applications and forms completed.	Loan application forms provided by Hongyuan and ABC.		and other materials to Hongyuan.
	2. Financial closure and implementation of 9 pilot investments 2.1 Loan appraisal and approval procedures completed for entrustment loans. 2.2 Loan collateral procedures completed for ELFs. 2.3 Loan appraisal and approval procedures completed for commercial loans.	GEF funding managed by Hongyuan company through the Entrustment Loan Facility (ELF). ABC funding managed through its local branches. MOA funding managed through capacity building of pilot TVEs.	RCF and ABC will have arranged financial packages for eight pilot TVE.	1. Hongyuan conducted loan appraisal procedures for 5 pilot projects. 2. Zhejiang Shenhe and Dalian Jinmei were financed by the ELF with each of $200,000, three others are still pending for approval. 3. All 9 pilot projects succeeded getting bank loans under the ABC/RCF mechanism. 4. Total investments for the 9 pilot projects have been increased to $49M, including more than $10M from the commercial loan facility.
	3. Energy savings realized from pilot TVE projects 3.1 Energy efficiency improved. 3.2 GHG emissions reduced. 3.3 Profitability achieved from		15 to 20 percent energy savings compared to pre-investment period will be observed. TVE loans will perform satisfactorily and TVE operate	1. Realized energy savings are 168,000 tce and GHG emissions reductions are 420,000 t CO2 annually. 2. Both entrustment loans are in good condition, with Zhejiang Shenhe has paid by all its entrustment loan. 3. Pilot EE projects generated considerable profits for the TVEs. 4. Product quality of pilot EE projects improved a

	technology renovation investments.		profitably. Product quality will meet design specifications.	lot and generated considerable social and economic effects.
Outcome 3 Replication of best practices	1. RCF capital base enlarged or new financing vehicle accepted by more TVEs. 1.1 Publicize and promotion of RCF mechanism. 1.2 Replication of best practices in non-pilot TVEs. 1.3 More investments in technology renovation in TVEs in these four sectors.	Identification of replication TVEs. Feasibility study and technology assistance (if possible) provided by professional sub-contractors and funded by the project. Conduct of promotion of RCF and Hongyuan.	By end of year 2.5, the RCF capital base will comprise 4 mil USD in new equity or a new alternative funding vehicle for TVE energy conservation will exist. By project end, a measurable increase in funding to energy efficiency in TVEs. At least $10 million should be channeled to the RCF capital base or to alternative funding vehicles identified by the project.	1. The RCF mechanism has shown great positive impacts: ➢ Public policy are now more favorable for TVEs; ➢ Commercial banks have reached better understanding and are more interested in EE projects of the TVEs; ➢ The ABC set up a new SME financing department based on its rural business department to provide better financial services to small and medium-sized TVEs; ➢ The ABC launched a SME credit management system in April 2006; ➢ The ABC adjusted its strategy to be focused on serving county-level economy in which the TVE sector plays an important role; ➢ More rural commercial banks were set up to better satisfy financial demands of TVEs; ➢ More TVEs are aware of the profitability

			At least 100 new pipeline projects will have been identified. TVE will have a positive attitudes towards using business development services and commercial financing for technology and product upgrading and make regular use of it.	of EE projects and plan to invest into them. 2. A total of 118 replication projects were identified. Total co-financing requirements for the 118 replication projects will likely reach $100 million while GEF will contribute about $2 million. 3. Alternative funding vehicles explored by the project, including guarantee mechanism and energy funds at local levels, and introducing CDM mechanism to the TVE sector.
	2. Public policy and regulations more favorable for TVE financing of technology renovation investments.	Submission of policy suggestion report to relative government agencies.		Public policy is now more favorable for the TVE sector. ➢ The CCP number one Circulars have all been focused on development of agribusiness in past three continuous years; ➢ The PBOC released interest cap for extending loans to SMEs; ➢ The CBRC issued policies stimulating financial institutions to provide more loans and other financial services to SMEs.

Attachment 6

Financing EE Projects in Chinese TVEs:

A Case Study of Zhejiang Shenhe

1. Introduction

There are over 20 million TVEs in China, which are mainly collectively owned by towns and villages. The TVE sector plays an important role in China's economic and social development. The TVE sector accounts for one-third of China's total GDP, and it also accounts for about one half of the country's total manufacturing and industrial output. In addition, TVEs supply a lot of employment opportunities. In recent years, the TVE sector creates about 2 to 3 million jobs annually, contributing a lot to increasing incomes of peasants, restructuring rural economy, and developing agribusiness in China.

Chinese TVEs also caused serious environmental problems. The TVE sector accounts for a large portion of the total GHG emissions in China. The energy efficiency ratio of the TVE sector is 16 to 60 percent, lower than the average level which can be reached under the current technological circumstances. And the overall product quality of TVEs are comparatively lower than other companies, which also causes low energy efficiency.

In November 2001, based on experiences and lessons from the Phase I Project, GEF approved the Phase II of the project "Energy Conservation and GHG Emissions Reduction in Chinese TVEs". The Phase II project was funded by GEF with $7.992M and co-financed by GOC with $10.55M. The Phase II project was launched in February 2002 for a planned period of four years. The international implementation agency is UNDP, the international execution agency is UNIDO, and the domestic execution agency is MOA.

The TVE Phase II project aims to remove key market, policy, technological and financing barriers to the production, marketing and utilization of energy efficient technologies and products in the brick, cement, metal casting and coking sectors. During project implementation, 9 pilot TVEs and 118 replication TVEs are selected by the project and receive technical and financial assistance from the project to design and finalize their energy efficiency investments.

The financial barrier was one of the major challenges faced by Chinese TVEs. At the time of the project inception, most TVEs were characterized by high uncertainty, high risk, and high degree of information asymmetry, which made the commercial banks and other financial institutions not interested in providing financial support to them.

A "Revolving Capital Fund" (RCF) is designed to remove financial barriers of the TVEs in their investments in their EE projects. The RCF mechanism consists of an entrustment loan facility, a commercial loan facility and a capacity building facility. The entrustment loan facility is funded by the GEF $1M and managed by Hongyuan company, the commercial loan facility is funded by ABC $2M and managed through its local branches in the project areas, and the capacity building facility is funded by MOA $1M and managed through local GEF authorities.

Zhejiang Shenhe Cement Co. is one of the 9 pilot TVEs identified by the project. Shenhe was originally founded in 1975 and was restructured into a private company in April 1999. The company has its registered capital of RMB45.89M or $5.7M with its shareholders all being its management team members. The main business of Shenhe is production and sales of cement products. Before identified as a pilot TVE, its annual production was about 2M tons.

2. Technology Renovation and Energy Efficiency Management

The cement industry is a highly energy consuming industry, with costs of coal and electricity account for 60% of the total production costs. In 2003, many provinces, including Zhejiang, were affected by shortage of electricity due to fast economic development. Shenhe was seriously affected as well.

Therefore, the management team of Shenhe wanted to generate electricity from the waste heat. They hoped to save electricity costs, depend less on external electricity supply, and improve energy efficiency. At the very beginning, Shenhe planed to invest a auxiliary waste heat electricity generator. The auxiliary generator would use some coal as well as waste heat in power generation.

After Shenhe was selected as a pilot TVE of the project, TCDRI was chosen by the project to be the sub-contractor to provide technical assistance to Shenhe, including feasibility study and technical design.

According to TCDRI's technical design, Shenhe decided to invest a pure waste heat power plant which was more advanced, more environmental friendly, and more energy efficient. The capacity of the power plant was designed as 3 MW. The investment also included investments in some new equipment, including a condensing turbine, a generator, a kiln inlet waste heat boiler, a kiln outlet waste heat boiler, and a boiler water supply pump. According to sub-contractor's estimation, the total investments would be RMB 17 M yuan, or about $2M dollars, and the payback period would be 4.69 years.

Shenhe's EE project was approved by local government in March 2004. The company started the project in April 2004, and the power plant was put into use in March 2005.

All the electricity generated was used by the company itself.

3. Financing of the EE Project

After the project was started in April 2004, Shenhe found that the investment estimation made by TCDRI was lower than the actual needs which would be RMB 24.5M or $3M. And the company thus had a financing gap of about $1M.

In November 2004, Shenhe submitted its loan application to Hongyuan company and applied for an entrustment loan of $300,000.

Hongyuan conducted due diligence on Shenhe's loan application. Evaluations of Shenhe found that this company was in a sound financial status. By the end of 2004, Shenhe's asset-liability ratio was 53% which was quite normal in private companies. Historically the company borrowed $8.5 M from commercial banks, among which $6M was borrowed from ABC. By the end of 2004, the company had paid off all its loans from other financial institutions, and its balance of commercial loans from the ABC was about $4.3M. Besides, the company's credit rating in the previous three years remained the highest AAA rating, and the company was able to provide acceptable collaterals.

Through the due diligence process, Hongyuan also found some problems in Shenhe. The accounting firm provided reserved opinions in its auditing of Shenhe's financial statements, pointing out problems in fixed asset pricing, inventory pricing, and other items. Hongyuan also found that some major managers of Shenhe were relatives. Another problem with Shenhe was that the cement industry was a highly regulated sector, and its development could be affected by policy changes. As in 2004, the cement sector was affected by strict government regulations, and financial status of Shenhe was in a trend of turning bad.

Through an integrated evaluation, Hongyuan approved Shenhe's loan application in December 2004 and the ABC local branch disbursed $200,000 to Shenhe on December 31, 2004. Hongyuan charged no interests for the entrustment loan, but charged a small management fee which was 3% of the loan. Shenhe was asked to provide collaterals and pay back the loan within two years. Shenhe should pay back $36,585 before December 31, 2005, pay back another $36,585 before June 30, 2006, and pay back the rest before December 31, 2006.

In March 2006, Shenhe finalized its waste heat power plant and began to generate electricity for its own use. Within the total investments, the project provided some grants and technical assistance, Hongyuan provided $200,000 entrustment loans, and Shenhe successfully financed all the remaining investments by itself. No commercial loans were provided to directly support Shenhe's EE project.

4. Outcomes of the EE Project

The pure waste heat power plant of Shenhe took full use of the waste heat from its cement production lines, improved energy efficiency, reduced GHG emissions, and generated considerable economic profits for the company.

The waste heat power plant generates about 19M KWh annually which will be fully used by Shenhe itself. From this EE project, the annual energy savings are 8,020 tce, the annual reduction of GHG emissions are 19,993 tons, and the increase of profits are $762,000.

After its successful implementation of the pure waste heat power plant project based on its 2500 t/d cement line, in 2006, Shenhe decided to invest another pure waste heat power plant based on its 1000 t/d cement line.

The EE project of Zhejiang Shenhe made a great success, and achieved great demonstration effects.

(1) The EE project has positive impacts on local government policies. Before Shenhe's EE project, the prevailing technology in using waste heat in Zhejiang province was to invest in auxiliary waste heat power plant which involved using of additional coal. After evidenced Shenhe's successful experiment, the local government ceased approval of all auxiliary waste heat power plant projects, and asked all such firms to use the pure waste heat power plant technology.

(2) More TVEs followed Shenhe's practice in waste heat power generation. With the help of LPIC, a lot of TVEs visited Shenhe after its successful investment in pure waste heat power plant. With the apparent demonstration effects of Shenhe, more and more cement making TVEs invested in such EE projects. Since 2005, there are over 50 TVEs in the cement making sector invested in pure waste heat power plant projects in Zhejiang province.

(3) Commercial banks changed their attitudes. In the past, many commercial banks did not understand the EE projects. They thought investments in EE projects were just to conform to government regulation and could not generate economic profits. Shenhe's successful experiment changed their attitudes, and now commercial banks are playing an important role in financing such EE projects in other TVEs.

5. Lessons Learned

The following lessons can be learned from Shenhe's case.

(1) The importance of technology screening and selection.

In Shenhe's case, for the purpose of energy conservation and GHG emissions reduction, the company decided to use the waste heat from its cement production line for power generation. At that time, the prevailing technology in Zhejiang province was the auxiliary waste heat power generation which involved use of additional coal.

However, research conducted by TCDRI found that such technology actually increased costs of power generation and emissions of GHG. According to TCDRI's research, if Shenhe took the auxiliary waste heat power generation technology, the overall power generation costs would be almost equal to the market price of electricity, and thus can not bring economic welfare to the company. In that case, the huge amount of investment would give the company high cost pressure. TCDRI concluded that the auxiliary waste heat power generation technology was not economically feasible.

With the technology assistance from the TVE Phase II project, Zhejiang Shenhe finally decided to use the pure waste heat power generation technology which is more advanced, more economically feasible, more environment friendly, and more energy efficient. Shenhe's success revealed the great importance of technology selection. Should Shenhe adopted the auxiliary waste heat power generation technology, the company would achieve its energy saving and GHG emissions reduction objectives at the costs of great economic loss. In that case, we can imagine that Shenhe would probably not invest another waste heat power plant based on its 1000 t/d cement production line, nor would so many other TVEs. And the attitudes of commercial banks would remain as before that such EE projects are not bankable.

(2) Importance of Policy Driven

As the increase of population and economic development in China, it will be more and more important to find new resources or renewable resources and to improve efficiency of using current resources. As from the second half of the 1990s, both central and local governments issued a lot of policies and regulations to promote energy efficiency. In the cement making sector, such policies and regulations include higher product quality standards, limitation and forbidden of new shaft kiln lines, shut off of old small size shaft kiln lines, and promotion of new dry process lines.

In our case of Shenhe, from 1997, a series of new policies and regulations were issued in Zhejiang province to adjust the structure of its cement making industry. There were two important focuses in these policies and regulations.

The first focus was to restrict development of shaft kiln lines which were characterized of out-of-dated technology and low energy efficiency. Detailed measures were as follows. Firstly, to shut down the small cement making companies with out-of-dated shaft kiln technologies. For companies appeared in the lists to be shut down, using of their products were also forbidden. Secondly, to strengthen

pollution regulations, especially GHG emissions. Lastly, local government asked all cement making companies to re-apply for their licenses, and some companies would not be granted licenses again.

A second focus was to promote investments in the new dry process lines. Cement making companies that actively invested in new dry process lines, replaced their shaft kiln lines and took use of waste heat would be recognized by local government as resource efficient companies. Incentives and rewards were provided by local governments to the resource efficient companies in forms of interest subside, government grants, and preferential tax treatments.

The policy driven measures played an important role in stimulating TVEs to invest in EE projects. In 1999, new dry process lines only accounted for 1% in Zhejiang province. But this percentage increased to 36% in 2003 and 85% in 2005. Number of companies investing in using of waste heat also increased from less than 5 in 1999 to more than 50 in 2006.

(3) Roles of LPIC

The LPIC also played an important role in implementation of Shenhe's EE project.

Shenhe faced some problems in getting government approval for its EE project. The electricity authority worried about the safety of Shenhe's power plant project and postponed its approval procedure. And some other government agencies worried about the possibility that using of waste heat would decrease the product quality.

LPIC helped Shenhe a lot through effective coordination with different government agencies. For many times, LPIC coordinated meetings with local electricity, environment protection, economic committee, and TVE authorities. With the help of LPIC, Shenhe finished all government approval procedures, with the final government approval meeting only lasting for half an hour.

LPIC also played an important role in replication of Shenhe's successful model. With the coordination of LPIC, local government decided not to approve auxiliary waste heat power plant projects. LPIC also organized many TVEs to visit Shenhe. And with the help of PMO, LPIC succeeded in organizing training sessions to local TVEs. All these activities promoted the replication of EE projects in cement making TVEs.

(4) Importance of Financial Support

Zhejiang Shenhe is a TVE with strong capital base. Because of its experienced management team, for many years, its credit rating remains the highest AAA.

To some extent, the TVE Phase II project helped to remove financial barriers faced by

Shenhe in its EE project through entrustment loan, technical assistance and direct financial grant. On the other hand, although the EE project did not get direct commercial loan, since ABC provided commercial funding to its other projects, Shenhe was able to use more of its self-owned capital to invest in the EE project.

However, it is still apparent that there are problems in Shenhe's financing for its EE project. On the one hand, the $200,000 entrustment loan only accounted for less than 10% of the total investment and thus had limited contribution. On the other hand, although Shenhe is an AAA rating company and was financially sound at that time, it still did not get direct commercial financing for its EE project investment. For those TVEs with not very strong capital base and high credit rating, at that time, it would be more difficult for them to get financing for their EE projects, and many of them would have failed in such investments. The good thing is after Shenhe succeeded in its EE project, commercial banks changed their attitudes toward such investments, and many other TVEs succeeded getting financing from commercial banks.

We can see from Shenhe's case the importance of financial support to such EE projects. For the RCF mechanism, since its capital base is very limited, it would be more important to attract more capital from other sources to invest in EE projects than its direct investment. And for the commercial banks, it is key for them to change their attitudes toward the EE projects.

(5) Promotion and Improvement of Willingness of TVEs to Invest EE Projects

TVEs are for-profit market entities. From the institutional perspective, we can not expect TVEs to invest EE projects just to assume their social responsibilities. It is more important to provide incentives to this kind of EE projects through systematically design of institutions. Only those bankable EE projects can be sustainable.

We should promote and improve willingness of TVEs to invest EE projects from various aspects. Firstly, governments should issue policies and regulations to restrict and even forbid using of highly energy consuming technologies and force companies to take use of more advanced EE technologies. Secondly, government can provide economic incentives in forms of interest subsidy, grants, and preferential tax treatments to TVEs which invest in EE projects. In addition, from the case of Zhejiang Shenhe, we've learned that it is helpful to promote successful models to attract more TVEs investing in EE projects.

Attachment 7

Financing EE Projects in Chinese TVEs:

A Case Study of Dalian Jinmei

1. Introduction

There are over 20 million TVEs in China, which are mainly collectively owned by towns and villages. The TVE sector plays an important role in China's economic and social development. The TVE sector accounts for one-third of China's total GDP, and it also accounts for about one half of the country's total manufacturing and industrial output. In addition, TVEs supply a lot of employment opportunities. In recent years, the TVE sector creates about 2 to 3 million jobs annually, contributing a lot to increasing incomes of peasants, restructuring rural economy, and developing agribusiness in China.

Chinese TVEs also caused serious environmental problems. The TVE sector accounts for a large portion of the total GHG emissions in China. The energy efficiency ratio of the TVE sector is 16 to 60 percent, lower than the average level which can be reached under the current technological circumstances. And the overall product quality of TVEs are comparatively lower than other companies, which also causes low energy efficiency.

In November 2001, based on experiences and lessons from the Phase I Project, GEF approved the Phase II of the project "Energy Conservation and GHG Emissions Reduction in Chinese TVEs". The Phase II project was funded by GEF with $7.992M and co-financed by GOC with $10.55M. The Phase II project was launched in February 2002 for a planned period of four years. The international implementation agency is UNDP, the international execution agency is UNIDO, and the domestic execution agency is MOA.

The TVE Phase II project aims to remove key market, policy, technological and financing barriers to the production, marketing and utilization of energy efficient technologies and products in the brick, cement, metal casting and coking sectors. During project implementation, 9 pilot TVEs and 118 replication TVEs are selected by the project and receive technical and financial assistance from the project to design and finalize their energy efficiency investments.

The financial barrier was one of the major challenges faced by Chinese TVEs. At the time of the project inception, most TVEs were characterized by high uncertainty, high risk, and high degree of information asymmetry, which made the commercial banks and other financial institutions not interested in providing financial support to them.

A "Revolving Capital Fund" (RCF) is designed to remove financial barriers of the TVEs in their investments in their EE projects. The RCF mechanism consists of an entrustment loan facility, a commercial loan facility and a capacity building facility. The entrustment loan facility is funded by the GEF $1M and managed by Hongyuan company, the commercial loan facility is funded by ABC $2M and managed through its local branches in the project areas, and the capacity building facility is funded by MOA $1M and managed through local GEF authorities.

Dalian Jinmei is one of the 9 pilot TVEs identified by the TVE Phase II project. The company is located at Shenli Village, Huajia Town, Dalian. It was founded in 1996 as a collective TVE with its registered capital of $360,000. The main business of the company is production and sales of cast pipe products.

Dalian Jinmei was selected by the project to be a pilot TVE in the metal casting sector.

By the year 2005, the company's total assets reached $4.2M. The company had five project lines and its products were sold to more than 40 countries all over the world. Jinmei was named by Liaoning provincial government as a "Top Export Company".

Jinmei has over 300 employees among with 176 are technicians and 8 are senior engineers. Jinmei passed the ISO 9001 certificate in 1998, and passed Norway DNV certificate, UK LR certificate, and China CCS certificate in 2004.

2. Technology Renovation and Energy Efficiency Management

Since the year 2000, China's foundry industry faced some new challenges. The major challenges were,

(1) The entry of foreign foundry companies brought intense competition stress to local companies. Compared to the local foundry companies, foreign companies had more capital, more advanced technologies, better management, and thus higher production efficiency. As a result, many local foundry firms were acquired by foreign competitors, and the others were forced to adapt themselves to the new situation.

(2) Higher prices of raw materials were another big challenge. After the year 2000, the average prices of major raw materials of the foundry industry, pig iron and coke, increased by 160%. Since the price increase of the products was less than that of the raw materials, and market demands were affected by the price increase, the foundry sector was affected as well.

With the above background, Jinmei recognized the importance of an EE project. The TVE Phase II project helped Jinmei to implement its EE projects. Main technology

renovations included:

(1) Technology renovation of the molding process. Before the renovation, the applied molding process was done by hands with a piece of stickling board which led to a poor accurate of sand moulds. As a result, the overweight rate of castings was as high as over 15% thus leading to 450 tons of casting overweight annually. It was proposed to replace the process with fiberglass epoxy patterning process in the production of those common pipe fittings sizing from ø 80 mm – 1,600 mm thereby effectively lowering overweight rate and improving the mould accurate.

(2) Technology renovation of the melting process. The previously adopted melting process was to use cold blast cupolas with low energy efficiency. Due to the poor quality and low temperature of molten iron, it could not meet the requirement for casting nodular cast iron pipe fittings, and also led to cinder inclusion and cold shut in castings which are the main causes of a high reject rate, as high as 15%. It was planned to replace the process with a duplex melting system consisting of a cupola and an electric furnace, i.e. to have the iron melted in the cupola to a temperature of 1350℃ firstly, and then turn into an electric furnace till the temperature reaches to 1500℃ (tapping temperature).

(3) Recovery of used foundry sand. With a used sand crushing – screening - washing (to remove water glass coating from the sand) - drying (natural airing) - collecting and stacking (by a front loader) process, the new sand consumption could be reduced.

(4) Construction of a coke store. A coke store covering an area of 100 m^2 was planned to be constructed to protect coke from weathering.

In addition to the above mentioned technology renovations, Jinmei also conducted reform of energy efficiency management, improving its management efficiency from various aspects.

The EE project of Jinmei was started in October 2004 and finalized in September 2005.

3. Financing of the EE Project

The EE project of Dalian Jinmei involved purchase and installation of a new coke storage and several other equipments. The overall investment was about $650,000.

The main financial indicators by the end of 2004 were as follows: total asset $3.9M, asset-liability ratio 44%, gross margin 3%, current ratio 1.11, and quick ratio 0.83.

Jinmei had its basic account opened with the local ABC branch, and had outstanding commercial loans from the ABC. By the end of 2004, balance of commercial loans

was $10,000. And its credit rating was AAA.

In January 2005, Jinmei submitted its application to Hongyan company and applied for entrustment loan of $200,000.

Hongyuan conducted due diligence on Jinmei's application. During its evaluation, Hongyuan mainly considered the following factors.

(1) Jinmei was in a good condition at that time with major financial indicators improved from the previous year.

(2) Jinmei had a high credit rating and low asset-liability ratio, and it succeeded in paying back commercial loans from the ABC according to the pre-defined schedule.

(3) Jinmei was granted preferential policies of the nation's restructuring north-east traditional industrial area from 2004. And in 2005, the company's EE project was supported by Dalian and Jinzhou local governments.

(4) Jinmei was able to provide acceptable collaterals.

(5) Jinmei's profitability was affected by the price increase of raw materials. In 2004, its gross margin was only 3%. In addition, the company was lack of liquidity. Both its current ratio and quick ratio were lower than the industrial average levels. This was mainly because Jinmei used a lot of cash to purchase equipments in the previous year.

Finally, Hongyuan concluded that although the size of Jinmei was limited, and it was facing some challenges at that time, the company had a bright outlook and could meet all the requirements and standards of the entrustment loan facility and thus was eligible for an entrustment loan.

In May 2005, Hongyuan made an entrustment loan of $200,000 to Jinmei through ABC Jinzhou branch. The main terms of conditions include a tenure of two years and management fee rate of 2%. Jinmei was asked to provide collaterals with its self-owned houses. It was also asked to repay $80,000 within 12 months, and repay the rest within 24 months.

The finalized investment of Jinmei's EE project was $650,000. The TVE Phase II project provided $60,000 grant and $200,000 entrustment loan, local governments of Dalian and Jinzhou provided some subsidy, and Jinmei managed to finance the rest of the project by itself without any commercial loans.

4. Outcomes of the EE Project

The EE project of Jinmei succeeded both in social and economic welfare.

The implementation of the EE project improved Jinmei's energy efficiency and reduced its GHG emissions. It was anticipated that the annual energy savings would reach 152 tce and the annual GHG emissions reduction would be 381 tons.

At the same time, the EE project also brought considerable economic benefits to Jinmei. The implementation of the project helped Jinmei to save about 152 tons of coals annually. Based on the unit price of $220 per ton, this would save costs of about $33,000 annually. In addition, the EE project also lowered the overweight rate and reduced consumption of labor force. After the technology renovation, the needed labor force in sand processing was reduced by 80% while production capacity was increased by 3 to 4 times.

Jinmei's EE project also had important demonstration effects.

Local policies were improved. After the implementation of Jinmei's EE project, based on its experiences, local governments of Dalian and Jinzhou clarified its policy of supporting EE projects in foundry TVEs. Local governments would provide interest subsidy and preferential tax treatment for TVEs which invested in technology renovation aiming to improve energy efficiency and reduce GHG emissions.

And more TVEs were influenced by Jinmei's successful experiment. After Jinmei's successful implementation of its EE project, a lot of foundry TVEs followed and invested in such EE projects, and 8 of them were selected by the TVE Phase II project as replication TVEs.

5. Lessons Learned

The following lessons can be learned from Jinmei's case.

(1) Roles of LPIC

The LPIC of Jinzhou was constituted with representatives from local TVE, environment protection, economic committee, and science and technology authorities. During the approval process of Jinmei's EE project, members of LPIC had several meetings, discussed barriers of Jinmei and provided a lot of support to the company.

LPIC also played an important role in the replication of the successful experience of Jinmei. LPIC helped the local government to clarify its policies of supporting such EE projects. In addition, in selecting replication TVEs, LPIC did a lot of work to promote Jinmei's case, and finally succeeded in selecting 8 TVEs as replication TVEs as well as attracting more non-pilot non-replication TVEs to invest in such EE projects.

(2) Importance of Financing

The average size of foundry TVEs is smaller compared to cement TVEs. Many foundry TVEs found it difficult to get financial support from commercial banks because of lack of acceptable collaterals.

Jinmei could be in the upper quartile among foundry companies in Dalian area. During 2004 and 2005, many foundry TVEs suffered losses because of sudden increase of raw materials, but Jinmei successfully realized 3% gross margin.

Financial support from the TVE Phase II project including RCF entrustment loan helped Jinmei a lot in remove its financial barriers. Grants and entrustment loan accounted for 41% of the total investment in Jinmei's EE project. Jinmei did not get direct support from commercial banks, but the main reason was mainly with its unwillingness to apply for a commercial loan.

However, for may other foundry TVEs which had poorer financial status than Jinmei, since they had poor credit rating, it might be very difficult for them to overcome their financial barriers.

The good news is, when the TVE Phase II project is coming to its end, a lot of new policies and regulations are issued to help TVEs remove their financial barriers. Now for most TVEs in the foundry sector, the major financial barriers are not lack of financing sources, but lack of scientific management, including transparency and credibility of their financial statements.

(3) Promotion and Improvement of Willingness of TVEs to Invest EE Projects

TVEs are for-profit market entities. From the institutional perspective, we can not expect TVEs to invest EE projects just to assume their social responsibilities. It is more important to provide incentives to this kind of EE projects through systematically design of institutions. Only those bankable EE projects can be sustainable.

We should promote and improve willingness of TVEs to invest EE projects from various aspects. Firstly, governments should issue policies and regulations to restrict and even forbid using of highly energy consuming technologies and force companies to take use of more advanced EE technologies. Secondly, government can provide economic incentives in forms of interest subsidy, grants, and preferential tax treatments to TVEs which invest in EE projects.

In Jinmei's case, its willingness to invest EE project was actually affected by many factors, including intense competition from international market players, increase of raw material prices, and strengthening of environment protection by local governments. From the very beginning, Jinmei aimed to achieve both social and

economic benefits from its EE project. After its objectives were reached with the help of the TVE Phase II project, Jinmei invested a lot more in advanced technologies. In 2005, the companies invested over $3.5M to establish another product line which could produce more than 3000 tons high quality products annually.

(4) Importance of Policy Driven

In Jinmei's case, policy driven played a role in inspiring the company to invest in EE projects with strengthening environment protection regulations and subsidies and preferential tax treatments.

There are about 20,000 foundry companies in China with the average annual output of about 1,000 tons. This sector is characterized by large number of small-sized TVEs with low energy efficiency. This makes the foundry sector a high-input but low-output industry. Just in 2004, this industry consumed 3 M tons of coke, 10 M tons of pig irons, and 10 M tons of new sands. The unit energy consumption is about 2 times higher than the developed economies.

On the other hand, the figures here also imply that the Chinese foundry industry has a huge potential in energy savings. However, to realize the potentials, it is not enough only to simply ask the companies to invest in EE projects. More importantly, the government needs to adjust the structure of the industry and provide incentives to companies to invest in EE projects. The implementation of the TVE Phase II project promoted policy improvement in some local areas, however, when viewed from the macro perspective, we still have a lot to do.

Attachment 8

Financing EE Projects in Chinese TVEs:

A Case Study of Xianyang Zhouling

1. Introduction

There are over 20 million TVEs in China, which are mainly collectively owned by towns and villages. The TVE sector plays an important role in China's economic and social development. The TVE sector accounts for one-third of China's total GDP, and it also accounts for about one half of the country's total manufacturing and industrial output. In addition, TVEs supply a lot of employment opportunities. In recent years, the TVE sector creates about 2 to 3 million jobs annually, contributing a lot to increasing incomes of peasants, restructuring rural economy, and developing agribusiness in China.

Chinese TVEs also caused serious environmental problems. The TVE sector accounts for a large portion of the total GHG emissions in China. The energy efficiency ratio of the TVE sector is 16 to 60 percent, lower than the average level which can be reached under the current technological circumstances. And the overall product quality of TVEs are comparatively lower than other companies, which also causes low energy efficiency.

In November 2001, based on experiences and lessons from the Phase I Project, GEF approved the Phase II of the project "Energy Conservation and GHG Emissions Reduction in Chinese TVEs". The Phase II project was funded by GEF with $7.992M and co-financed by GOC with $10.55M. The Phase II project was launched in February 2002 for a planned period of four years. The international implementation agency is UNDP, the international execution agency is UNIDO, and the domestic execution agency is MOA.

The TVE Phase II project aims to remove key market, policy, technological and financing barriers to the production, marketing and utilization of energy efficient technologies and products in the brick, cement, metal casting and coking sectors. During project implementation, 9 pilot TVEs and 118 replication TVEs are selected by the project and receive technical and financial assistance from the project to design and finalize their energy efficiency investments.

The financial barrier was one of the major challenges faced by Chinese TVEs. At the time of the project inception, most TVEs were characterized by high uncertainty, high risk, and high degree of information asymmetry, which made the commercial banks and other financial institutions not interested in providing financial support to them.

A "Revolving Capital Fund" (RCF) is designed to remove financial barriers of the TVEs in their investments in their EE projects. The RCF mechanism consists of an entrustment loan facility, a commercial loan facility and a capacity building facility. The entrustment loan facility is funded by the GEF $1M and managed by Hongyuan company, the commercial loan facility is funded by ABC $2M and managed through its local branches in the project areas, and the capacity building facility is funded by MOA $1M and managed through local GEF authorities.

Zhouling Hollow Brick Plant is one of the replication TVEs identified by the TVE Phase II project. The plant is located in Xianyang, Shaanxi Province. The plant has an area of more than 100 mu, and more than 200 employees, including 11 technicians. Zhouling is the largest hollow brick producer in Xianyang area.

2. Technology Renovation and Energy Efficiency Management

Zhouling was founded in 1976. Its main problems were with its high consumption of coal and electricity and low energy efficiency.

The TVE Phase II project invited Xi'an Kaisheng as a sub-contractor to provide technical assistance services to 14 replication brick-making TVEs, including Zhouling. The services provided included feasibility studies, project proposals, technology and engineers design, and capacity building in TVEs.

The objective for Zhouling to implement the EE project was to take use of advanced technologies and produce new building material products which can meet environmental standards. The main technology renovations included:

(1) Technology renovation to the kilns. This included rebuilding a new 30-chamber annular kiln and repairing a 34-chamber annular kiln.

(2) Technology renovation to other equipments and processes. This included adding two MH-2/100-type high-vacuum pumps, two sets of vertical mud column cutter and cutter, and reconstructing the extruder auger. And the power supply equipment was also included in the plan.

(3) Capacity building. This included trainings to managers and employees, and establishing an energy savings management system.

The implementation of the EE project was started in March 2005 and finished in August 2005.

3. Financing of the EE Project

The total investment for Zhouling's EE project was $80,000. The TVE Phase II project provided grants of $8,400, and the rest was financed by the entrepreneur himself.

After the EE project was finalized, the plant had fixed assets of $460,000 and 205 employees.

4. Outcomes of the EE Project

Zhouling succeeded in its investment in the EE project.

With regard to energy saving and GHG emissions reduction, the plant achieved the following outcomes.

(1) The once-successful ratio in the production process was increased from 84% to 92%.

(2) The renovation on mud column cutter saved electricity consumption by 17% to 30%.

(3) The renovation on kilns, including a newly built 30-chamber annular kiln and a repaired 34-chamber annular kiln, would save coal consumptions by 1,920 tce annually.

(4) The new MH-2/100 high vacuum pumps decreased consumptions of electricity, and the annual cost saving could reach $2,920.

(5) After installing electric power compensators, annual electricity cost savings would be over $5,000.

It was calculated that the annual energy consumption of the plant would decrease from 6,241 tce to 5,206 tce, or 17%, and GHG emissions would decrease 2,582 tons, or 16.6%.

At the same time, Zhouling also gained considerable economic benefits. It was estimated that annul economic benefits from this investment would be $90,000.

It was calculated that the payback periods of this EE investment was only 0.86 year, while the IRR would be as high as 77.76%.

Zhouling also attracted a lot of attention from other brick making plants after it finalized its EE project. Within several months, the plant received many brick producers to visit its EE project. The most faraway visitor was from Kirghizia.

5. Lessons Learned

The following lessons can be learned from Zhouling's case.

(1) Roles of pilot TVEs

The TVE Phase II project selected Liucun Hollow Brick Plant which was located in Xi'an area as a pilot TVE in the brick making sector. The project provided project proposal, feasibility study, financial grants, and capacity building to Liucun. Liucun finished its EE project in June 2005 with the total investment of about $450,000 in three continuous years.

With its finalize of the EE project, Liucun became the largest and most advanced brick making plant in Xi'an area with an annual production capacity of 50 M standard bricks. At the same time, Liucun's hollow brick product was named as national high quality product in 2005 due to its quality improvement in the EE project.

It was just under the influences of Liucun's demonstration effects that many brick making TVEs, including Zhouling, started to invest in EE projects.

(2) Importance of Policy Driven

In the past, for a long time, solid clay bricks dominated Chinese brick market. However, solid clay bricks were high resource consumption, low quality and low energy efficient products. As from 1990s, almost all provinces issued strict policies and regulations to restrict or even abandon production and use of solid clay brick products.

Shaanxi province and Xi'an City also issued some policies to restrict production and use of solid clay bricks. Establishing of new solid clay brick making plants or production lines were abandoned, use of solid clay bricks was restricted, and preferential tax treatments could not be enjoyed by solid clay brick producers.

As a matter of fact, the strengthening of public policies and government regulations promoted investments in EE projects in the brick making sector.

(3) Roles of Industrial Association and LPIC

In Xianyang, the local industrial association together with the LPIC played an important role in implementation and promotion of EE projects in brick making plants.

The LPIC in Xianyang constituted of representatives from economic committee, TVE authority, and building material reform office. LPIC provided incentives to local brick

making industrial association which helped a lot to develop the brick making industry in Xianyang area.

The local brick making industrial association had done a lot to help its member TVEs, including training, organizing visits to pilot TVEs, monitoring production process, etc.

(4) Importance of Capacity Building and Financial Support

Chinese brick making TVEs are mostly small sized enterprises with low fixed asset values which usually can not provide acceptable collaterals and thus are often refused by commercial banks to provide financial services.

As a result, most brick making TVEs do not have commercial loans. And commercial banks and other financial institutions are generally not interested in projects of brick making TVEs.

However, what can be anticipated is that as the adjustment of the structure of the industry and economic development, brick making TVEs will become larger in size and more efficient in energy consumption in the future. Removal of financial barriers will be a key to this process.

Currently, Chinese government issues a lot of new regulations to help SMEs remove their financial barriers. However, for most brick making TVEs, they still have a long way to get financial supports from commercial banks.

The gaps mainly lie in the management of the brick making TVEs. In China, most managers in brick making TVEs are peasants who are lack of modern management expertise. Managers in the brick making sector are lack of basic financial knowledge. Most brick making TVEs do not have a booking system and financial statements. In addition, many of the managers are unwilling to borrow from others because of traditional thoughts.

Therefore, in the future, capacity building in brick making TVEs should be an important measure to help them remove financial barriers.

Attachment 9

Review Mission Report

1. Documents Reviewed

Documents and reports reviewed include:

- Project document of the TVE phase II project;
- TOR of sub-contract "design and establishment of the RCF";
- Report of sub-contract "Design and establishment of the RCF";
- Hongyuan business plan;
- Report of sub-contract "Establishment of PTPMC";
- Report of sub-contract "Revision of PTPMC business plan & marketing campaign";
- Reports of sub-contracts "Feasibility study and design of pilot projects";
- Report of sub-contract "Establishment and capacity building of PIC";
- Report of sub-contract "Establishment and capacity building of LPIC";
- Report of sub-contract "Coking replication project";
- Report of sub-contract "Foundry replication project";
- Report of sub-contract "Cement replication project";
- Report of sub-contract "Brick making replication project";
- PIR reports of various years;
- TPR reports of various years;
- Mid-term project evaluation report.

2. Meetings Held

Time	Location	Topic	People Met
2006-03-13	PMO	Project Preparation	Wang Xiwu, PIC Senior Officer Wang Guiling, deputy PMO director Xu Litong, CTA
2006-03-16	Beijing Henan Massion	Evaluation projects coordination	Representatives from pilot TVEs Representatives of various sub-contractors Representatives from LPICs MOA staffs Wen Gang, Mid-term evaluator
2006-03-23	PMO	Briefing	Wang Xiwu, PIC Senior Officer Wang Guiling, deputy PMO director Xu Litong, CTA
2006-04-04	Nanjing Moling Foundry	Pilot demo in metal casting sector	Liang Xinbao, general manager of Moling Mr. Tu, CTO of Moling

2006-04-04	Nanjing Jiali	Replication demo in metal casting sector	CEO and staffs of Jiali Foundry Company
2006-04-04	Nanjing Yuhua	Demo of non-pilot non-replication TVE	CEO and staffs of Yuhua Foundry Company
2006-04-05	Nanjing	LPIC in Nanjing	LPIC members in Jiangning, Nanjing General secretary, local foundry industrial association Representatives from pilot and replication TVEs PMO staffs
2006-04-05	Nanjing	Feasibility studies of EE projects	Mr. Li, general manager of Kaisheng Mr. Wang, CTO of Kaisheng PMO staffs
2006-04-06	Zhejiang Shenhe	Pilot demo in cement sector	Mr. Wei, president of Shenhe Mr. Shen, general manager of Shenhe
2006-04-06	Zhejiang Tongxiang	LPIC in Zhejiang	Local TVE authority LPIC members in Tongxiang
2006-04-17	Liucun Brick	Pilot demo in brick sector	Mr. Lin, general manager of Liucun
2006-04-17	Xi'an	Replication demo in brick sector	Xi'an Shenwei Building Materials
2006-04-17	Xi'an	Non-pilot, non-replication in brick sector	Xi'an Shijiadao Hollow Brick Plant
2006-04-18	Xi'an	LPIC in Xi'an	LPIC members in Xi'an General secretary, local brick industrial association PMO staffs
2006-04-19	Xianyang	LPIC in Xianyang	LPIC members in Xianyang PMO staffs
2006-04-19	Xianyang	Replication demo in brick sector	Xianyang Zhouling New Building Materials Company
2006-07-22	Hongyuan Office	Review of Hongyuan	Wanghai, general manager of HY Xiongwei, vice general manager of HY Hu Bo, ELF manager

2006-07-25	ABC HQ	Review of ABC	Xu Hao, Director of TVE lending department Jin Junfeng, Project manager, ABC headquarter Two staffs from local branches
2006-09-27	PMO	Progress review	Wang Xiwu, PIC Senior Officer Wang Guiling, deputy PMO director Xu Litong, CTA
2006-11-09	PMO	Mid-term review	Wang Guiling, deputy PMO director Xu Litong, CTA

3. Site Visiting

Time	TVE Visited	Location
2006-04-04	Nanjing Moling Foundry	Nanjing
2006-04-04	Nanjing Jiali Foundry	Nanjing
2006-04-04	Nanjing Yuhua Foundry	Nanjing
2006-04-06	Zhejiang Shenhe	Zhejiang
2006-04-17	Xi'an Liucun Brick	Xi'an
2006-04-17	Xi'an Shenwei Building Materials	Xi'an
2006-04-17	Xi'an Shijiadao Hollow Brick Plant	Xi'an
2006-04-19	Xianyang Zhouling New Building Materials	Xianyang