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UNIDO Project No.: EG/CPR/99/G31
P.O. No.: 16000939

Final Report

To

United Nations Industrial Development Organization (UNIDO)

Contract Title

Replication of Regulatory Reform Strengthening Strategy in Countries/Regions for the Establishment and Capacity Building of Local Policy Implementation Committees (LPICs)-Phase III

Project Title

Energy Conservation and Greenhouse Gas Emissions Reduction in Chinese Township & Village Enterprises-Phase II

Submitted by

MOA Township Enterprise Development Center (TEDC)

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1. Background

To promote the utilization of energy saving technologies in the TVEs in the cement, foundry, brick making and coking sub-sectors of China, assist related enterprises in overcoming the technology, market, policy and financing barriers in this process to reduce GHG emission, the Global Environmental Facility (GEF) supported the project of Energy Conservation and Greenhouse Gas Emissions Reduction in Chinese Township and Village Enterprises—Phase II. The purpose of the subcontract, Replication of Regulatory Reform Strengthening Strategy in Countries/Regions for the Establishment and Capacity Building of Local Policy Implementation Committees-Phase III, is to assist 11 replication areas selected in the LPIC building on the basis of summary of experiences of Phase I and Phase II.

This is the final report on Replication of Regulatory Reform Strengthening Strategy in Countries/Regions for the Establishment and Capacity Building of Local Policy Implementation Committees-Phase III submitted to the United Nations Industrial Development Organization (UNIDO) by MOA Township Enterprise Development Center (TEDC) in association with MOA Center for Development of Energy & Environmental Protection Technology (EEPTDC) (hereinafter referred to as "subcontractors").

This report is a summary of the activities carried out from July 4, 2005 to October 24, 2006. Here is one point to say that though the subcontract was officially signed in October 2005, the implementation started in July 2005 under the suggestion and requirement of PMO and PIC.

2. Activities Conducted

The activities conducted by subcontractors include:

2.1 Prepare for the replication of LPICs in Phase III

Time: July 4, 2005—July 10, 2005

Task members: Cao Guangming, Liu Xin, Cao Fengzhong, Zhou Hong, Tian Yishui, Meng Zhaoli, Yang Xin, Wang Defu, Pang Jun

Outputs: Industrial Survey Plan

The subcontractors collected information on the status of four industries and replication areas by network and libraries. To collect rules, regulations and industrial standard related to environmental protection and energy conservation, the subcontractor visited National Development and Reform Commission (NDRC), Ministry of Agriculture (MOA), State Environmental Protection Administration (SEPA) and related industrial associations. A workshop was organized on July 7, 2005 with Mr. Xu Litong, PMO, PIC Secretariat and Hongyuan Company to analyze barriers and problems up against the subcontract implementation and debrief ideas and suggestions on capacity building of LPICs- Phase III. The industrial survey plan was finalized in this workshop (see Annex 1).

2.2 Industrial Surveys in 11 Replication Regions

Time: July 11, 2005—August 9, 2006

Task members: Liu Xin, Cao Guangming, Cao Fengzhong, Zhou Hong, Pang Jun, Ruan Fujin, Wang Defu, Yang Xin

According to the industrial survey plan, during July 11, 2005—August 9, 2006, the subcontractors conducted industrial surveys in foundry industry in Jinnan District of

Tianjin City, Jinzhou District of Dalian City, Nanjing City, Jinzhong City and Linfen City of Shanxi Province; brick making industry in Shuangliu County of Chengdu City, Xi'an City and Xianyang City of Shaanxi Province and Liaoning Province; cement industry in Zhejiang Province and Guangdong Province by workshops, visits to administrations, field visits and questionnaires. The purpose of the surveys is to collect information on local industrial development status, level of technical equipments, energy consumption and pollution discharge, TVEs' property right reform, local laws, regulations and policies related to energy conservation and environment protection.

During the surveys, the experts group, representatives of PMO and PIC introduced the building of 4 LPIC in Phase II and knew the willingness and barriers of local government to develop LPIC. The LPICs' membership, framework and functions were confirmed under the guidance of SC experts and representatives from PMO and PIC Secretariat based on the obtained information, which made it clear to develop LPIC's establishment and Statute & Action Plan.

2.3 Drafting and Revising Survey Reports, Statutes, Action Plans

Time: July 11, 2005—August 20, 2006

Task members: Liu Xin, Cao Guangming, Cao Fengzhong, Zhou Hong, Pang Jun, Ruan Fujin, Wang Defu, Yang Xin

Outputs: Survey Reports, Statutes and Action Plans for 11 replication areas

Based on the obtained information, the subcontractor drafted 11 survey reports (draft), assisted LPICs in Jinnan District of Tianjin City, Jinzhou District of Dalian City, Shuangliu County of Chengdu City, Xi'an City and Xianyang City of Shaanxi Province, Jinzhong City and Linfen City of Shanxi Province, Liaoning Province, Guangdong Province, Nanjing City of Jiangsu Province and Zhejiang Province in writing Statutes (draft) and Action Plans (draft).

The subcontractors held three workshops in PMO (Beijing) respectively on August 22, 2005, November 15, 2005 and July 17, 2006 to discuss the draft survey reports, Statutes and Action Plans with PMO, PIC and Mr. Xu Litong and then revised the reports according to comments.

The above-mentioned reports were sent to LPICs to solicit their comments and suggestions, and amended in accordance with the feedbacks (See Annex 2-12).

2.4 Training and Submission of Training Report

Time: September 11, 2005-April 19, 2006

Task members: Liu Xin, Cao Guangming, Yang Xin, Wang Defu, Pang Jun

Outputs: Training Report

Based on the obtained information in industrial survey, the subcontractors communicated with LPICs in replication areas, demonstration enterprises and LPIC in Phase I and Phase II to develop the evaluation on training demands and formulated draft training plan. The subcontractors held a workshop on August 25 to discuss the draft training plan with PMO, PIC and Mr. Xu Litong and then revised the plan according to comments.

From August 29 to September 8, the subcontractors prepared for the training according to the training plan, including inviting trainers, organizing experts to compile training materials, choosing training location, and notifying trainees.

The subcontractors conducted training in Hangzhou, Zhejiang Province on Sep 11,

2005. There were 41 trainees and the training was conducted through lectures, discussions and field visits.

The training contents include: national energy conservation and environmental policies, international energy conservation policies and mechanisms, advanced management and experience in promotion of energy conservation and GHG emission reduction of developed countries, as well as the objective, target, strategy, plan, the role of LPIC and pilot enterprises in the project and progress. The objective, target, strategy and plan of project were discussed.

The training has five characteristics: First, it is the incorporation of training and field visit; trainees were organized to visit demonstration enterprise to know the outcome of energy conservation. Secondly, it is an interactive training and it took longer time for communication and discussion among the participants for the participants could know each other better and finish future work more effectively. Thirdly, it included the discussion on the available mechanism for LPIC Establishment and VA Dissemination in Replication Region. Fourthly, the trainees are from different organizations. Local officers of 11 replication areas to establish LPIC and some replication enterprises took part in the training. Fifthly, the training had contents with various topics. Not only the experiences of successful LPIC were shared, but also the trend of resource saving society and development of circular economy of China was reflected in the training.

According to the contract, the subcontractors summarized this training systematically and submitted the Training Report in April 2006. The Report included the training materials, training minutes and list of participants (See Annex 13).

Note:

(1) This training was conducted with the support and direct instruction of PMO and secretary of PIC. To prevent repeating organizing similar activities in short term, promote the efficiency of training, avoid the Chinese Spring Festival Vacation in January 2006, the former planed training period, and ensure the general progress of the project, the training was conducted in advance in September 2005. The training plan and related materials will be submitted with this interim report.

(2) For there are many data in the lecture of "International and Domestic New Trend for Energy Development" by Mr. Dai Yande, deputy director of Energy Research Institute of NDRC, he refused to open the material. This material is not attached.

2.5 Draft Interim Report

Time: December 11—25, 2005

Task members: Cao Guangming, Liu Xin

Outputs: Interim report

The subcontractors drafted the interim report according to the activities conducted and solicit comments and suggestions of PMO, PIC and Mr. Xu Litong, amended in accordance with the feedbacks and finalized the interim report and submitted to UNIDO.

2.6 Evaluation of the Action Plan and VAs in Phase II and Summarization of the Experience in Phase II

Time: December 26,2005—March 10, 2006

Task members: Cao Guangming, Cao Fengzhong, Zhou Hong, Tian Yishui, Meng Zhaoli, Ruan Fujin

Outputs:

Monitoring and Assessment Report on the implementation of Action Plans of the four LPICs established in Phase II, and Summary Report of Phase II.

As required in the contract, the subcontractors held a meeting for the expert team on Nov 9, 2005. Ms. Wang Guiling, Deputy Director of the PMO, and Mr. Wang Xiwu, Senior Administrator of the PIC Secretariat were specially invited. It was decided at the meeting to speed up a document, and dispatch it under the name of the PMO to ask LPICs to carefully draft their *LPIC Annual Report* and *Annual VA Monitoring Report of Demonstration TVEs*. The subcontractor sent the above-mentioned document to four LPICs and conducted coordination with LPICs for several times, and got their *LPIC Annual Report* and *Annual VA Monitoring Report of Demonstration TVEs* on Feb 13, 2006. The subcontractor assisted Hongyuan Co. in conducting a comprehensive review on the operation of the four LIPCs established in Phase II and their implementation of VA and developed the draft evaluation report.

To summarize the activities and experiences of the subcontract of Phase II, the subcontractor held the Summary Workshop for Establishment and Capacity Building of LPICs-Phase II on Feb. 20, 2006. The activities in Phase II and the evaluation reports were analyzed and discussed deeply, and the evaluation reports were finalized. The experiences were concluded and the summary report and modification of Action Plan and VA were finalized in the workshop. According to the results of the workshop, the subcontractor finished the Summary Report on achievements and experiences of LPIC in Phase II (See Annex 14).

Note:

These three outputs should have been submitted in November 2005. However, for the members of LPICs were summarizing their work in 2005, to get more exact information and data, the subcontractors and PMO thought it was a better plan to integrate the monitoring and evaluation of Action Plan and VA in Phase II with the work summarization of LPICs. PMO dispatched the Notice for the Monitoring and Evaluation on the Action Plan and VA, and got their *LPIC Annual Report* and *Annual VA Monitoring Report of Demonstration TVEs* on Feb 13, 2006. Therefore, the subcontractors submitted the Summary Report in March, 2006.

2.7 Devise the Separate VAs Templates for the Four Sub-sectors

Time: December 2005—July 2006

Task members: Tian Yishui, Meng Zhaoli

Outputs: VAs templates for the four sub-sectors

Activities:

The subcontractors studied the energy conservation status of the four sub-sectors through data collection and industrial field survey. In May 2006, the subcontractor separately drafted the VA templates for the four sub-sectors and solicited comments and suggestions from PIC and PMO. The templates were revised according to the comments (See Annex 15). The subcontractors also assisted in the popularization of VAs system. The list for enterprises which signed VA is in Annex 16.

2.8 Revise the Existing Monitoring and Evaluation System for LPIC Action Plans and VAs

Time: April 2006—July 2006

Task members: Liu Xin, Tian Yishui, Cao Fengzhong, Meng Zhaoli

Outputs: Revised Monitoring and Evaluation System

Activities:

As required by the contract, the subcontractors held a workshop on May 9, 2006. Ms. Wang Guiling, Deputy Director of the PMO, and Mr. Wang Xiwu, Senior Administrator of the PIC Secretariat were specially invited. The participants discussed the problems of existing Monitoring and Evaluation System identified during practical implementation and put forward some comments on revision. The subcontractors revised existing Monitoring and Evaluation System for Action Plan (See Annex 17).

2.9 Summarization of Experiences in Phase III and Draft Final Report

Time: June 5, 2006—October 24, 2006

Task members: Cao Guangming, Liu Xin

Outputs: Draft final report, Report on Experiences on Establishment of LPIC

The subcontractors summarized the experiences and problems in Phase III based on the activities conducted. The experiences in Phase I and Phase II were also integrated in the Report on Experiences on Establishment of LPIC.

3. Summarization of Experiences on Establishment of LPIC

3.1 Progress of Establishment of LPIC

3.1.1 Background of Establishment

The Policy Implementation Committee is established and hosted by MOA in September 2001, consisting representatives of seven concerned government agencies, including the Ministry of Finance (MOF), National Development and Reform Commission (NDRC) (former the State Development Planning Commission and the State Economic and Trade Commission), the Ministry of Science and Technology (MOST), State Environmental Protection Administration (SEPA), and Agriculture Bank of China (ABC). The establishment of LPIC is under the guidance of PMO and PMO.

LPICs, set up by local governments in regions where pilot and replication TVEs are, are the counterparts of the PIC at local level. They have the following functions:

- Disseminate and promote the Voluntary Agreement System; Assist in developing and implementing incentive policies for energy efficiency
- Developing new financing sources
- Provide assistance in the selection of replication TVEs
- Assist in establishing industrial self-discipline associations
- Devise project replication plan, provide guidance and coordination for TVE's energy conservation and GHG emissions

3.1.2 Progress

The subcontractors assisted local concerned agencies in establishment of LPIC in Phase III. Four LPICs have been established in Phase I in Xinjin county of Sichuan Province, Lalian City of Liaoning Province, Tieshan District, Huangshi City of Hubei Province, and Jiangning District, Nanjing City of Jiangsu Province from July 2003 to June 2004. Four more LPICs have been established in Phase II in Tongxiang City of Zhejiang Province, Yingde City of Guangdong Province, Baqiao District, Xi'an city of Shaanxi Province and Shanxi Province from June 2004 to March 2005. The subcontractors assisted local concerned agencies in establishment of 11 LPICs in

Phase III under the guidance of PIC and PMO. The 11 replication regions include: Jinnan District of Tianjin City, Jinzhou District of Dalian City, Shuangliu County of Chengdu City, Xi'an City and Xianyang City of Shaanxi Province, Jinzhong City and Linfen City of Shanxi Province, Nanjing City of Jiangsu Province, Liaoning Province, Guangdong Province and Zhejiang Province. By September 2006, LPICs in 8 demonstration regions and 11 replication regions have been finished. More information is shown in Table 1 and Table 2.

Table 1 Summary of Establishment of the 8 LPICs in Demonstration Regions

	Setup of LPIC						Progress in the Demonstration TVEs			
	Demonstration Areas	**Establishment Date**	**Member**	**Survey Report**	**Action Plan**	**M&E Report**	**Demonstration TVE**	**VA Signing**	**Energy Saving (tce/a)**	**CO_2 Emission Reduction (t/a)**
Phase I	**Xinjin County of Sichuan**	March 25,2002	Government Office, Information Office, Small & Medium Enterprises Bureau, Environmental Protection Bureau, Land & Resources Administration, Construction & Planning Bureau	Finished	Finished	Finished	**Yongxing Shale Brick Factory of Xinjin County**	Finished	1,943.06	4,844.06
	Dalian of Liaoning	Sep 8,2003	TVEs Bureau, Science & Technology Bureau, Environmental Protection Bureau, Finance Office	Finished	Finished	Finished	**Jinmei Pipe Casting Ltd of Lvshun**	Finished	152.94	381.27
	Tieshan district of Huanhshi of Hubei	Sep 10,2003	Government Office, Planning Bureau, Statistics and Pricing Bureau, Economic Development Bureau, Science & Technology Bureau, Environmental Protection Bureau, Finance Bureau, Agriculture Bureau, Forestry and Water Resources Bureau, Agriculture and Industry Relation Office, Luzhangshan Street Committee, Agriculture Bank of Tieshan Branch	Finished	Finished	Finished	**Lufeng Cement Ltd.**	Finished	8,720.54	21,740.29
	Jiangning district of Nanjing of Jiangsu	Aug 22,2002	Government Office, Finance Bureau, Science & Technology Bureau, Environmental Protection Bureau, Agricultural Bank, Planning and Economic Development Bureau, Government of Moling Township, Moling Casting Factory (Headquarter)	Finished	Finished	Finished	**Moling Casting Factory**	Finished	3,068.20	7,649.02

	Setup of LPIC						Progress in the Demonstration TVEs			
	Demonstration Areas	Establishment Date	Member	Survey Report	Action Plan	M&E Report	Demonstration TVE	VA Signing	Energy Saving (tce/a)	CO_2 Emission Reduction (t/a)
Phase II	Tongxiang of Zhejiang	Oct 8, 2004	Economy and Trade Bureau, Finance and Local Taxation Bureau, Science & Technology Bureau, EPB, National Taxation Bureau, People's Bank of Tongxiang Branch, Heshan Township Government, Shenhe Cement Ltd	Finished	Finished	Finished	Shenhe Cement Ltd	Finished	8,020.02	19,993.91
	Yingde City of Guangdong	Jan 13, 2005	Government Office, Economic & Trade Bureau, SME Bureau, EPB, Land Resource Bureau	Finished	Finished	Finished	Baojiang Cement Material Ltd	Finished	11,865.53	29,580.76
	Baqiao District of Xi'an of Shaanxi	June 14, 2004	Government Office, Economy & Trade Bureau, Science & Technology Bureau, EPB of Baqiao Brach, Construction Bureau, Administration of Land and Resources, Construction Material Quality Testing Station, Agriculture Bank of Baqiao Branch	Finished	Finished	Finished	Liucun Brick Factory	Finished	1,298.11	3,236.18
	Shanxi Province	Feb. 28, 2005	Shanxi SME Bureau, Shanxi Economic Committee, Shanxi Science and Technology Bureau, Shanxi Finance Department, Shanxi Development and Reform Committee	Finished	Finished	Finished	Gangyuan Coking Company of Taiyuan	Finished	41,364.00	103,120.45
							Xinggao Coking Company of Shanxu	Finished	91,920.00	229,156.56

Table 2 Summary of Establishment of the 11 LPICs in Replication Regions

	Setup of LPIC						Replication TVEs	
	Replication Areas	**Establishment Date**	**Member**	**Survey Report**	**Action Plan**	**M&E Report**	**No. of Replication TVEs**	**Industry**
Phase III	**Jinnan District of Tianjin City**	May 23,2006	Office of District Government, Industrial Economic Commission, Development and Planning Committee, Environmental Protection Bureau and Science, Technology Committee of Jinnan District	Finished	Finished	Finished	7	Foundry
	Jinzhou District of Dalian City	June 13, 2006	District Government, Economic Development Bureau, Environmental Protection Bureau, Science and Technology Bureau of Jinzhou District	Finished	Finished	Finished	8	Foundry
	Shuangliu County of Chengdu City	May 10, 2005	Office of County Government (County Office for Promotion), SME Bureau, Construction Bureau (Office of Wall Materials Reform), Land Resource Bureau, Science and Technology Bureau, Fiscal Bureau, Industrial and Business Bureau, Price Bureau, Environmental Protection Bureau, Power Supply Bureau, National Tax Bureau, Quality Supervision Bureau, Safety Supervision Bureau	Finished	Finished	Finished	5	Brick Making
	Xi'an City of Shaanxi Province	August 17, 2006	Xi'an Wall Materials Research and Design Institute, Xi'an Economic Committee, Office of Leading Group for Energy Saving Construction and Wall Materials Reform in Xi'an (hereinafter referred to Office of Wall Materials Reform), Xi'an Technical Supervision Bureau, Xi'an Environmental Protection Bureau, Xi'an Quality Supervision and Test of Wall Materials Product Station	Finished	Finished	Finished	15	Brick Making
	Xianyang City of Shaanxi Province	March 15, 2006	Xianyang Leading Group of Rectification of Brick Production Order, comprised of twelve parties including Economic Committee, TVE Bureau, Technology Supervision Bureau, Land Resource Bureau Environmental Protection Bureau, Planning Bureau, Industry and Commerce Bureau, Agricultural Bureau, Power Supply Bureau, Police Station, Supervisory Bureau for Work Safety and Association of Wall Materials Industry	Finished	Finished	Finished	14	Brick Making

	Jinzhong City of Shanxi Province	April 26, 2005	LPIC of Shanxi Province is the guidance organization of Jinzhong LPIC; Office of Jinzhong Municipal Government is the coordinator of LPIC; Jinzhong Private Economic Development Bureau is the member of LPIC; Foundry industrial associations in the counties of Jinzhong are executive of LPIC for detailed work.	Finished	Finished	Finished	5	Foundry, coking
	Linfen City of Shanxi Province	May 8, 2005	Linfen SME Bureau, Financial Bureau, Environmental Protection Bureau, Foundry Industrial Association, Shanxi Institute of Technology, Shanxi Houma Tangrong Auto-parts Co. Ltd, Shanxi Huaxiang Tongchuang Foundry Co. Ltd	Finished	Finished	Finished	5	Foundry, coking
	Nanjing City of Jiangsu Province	April 4, 2006	Nanjing Suburb SME Bureau, Nanjing Foundry Association, Jiangsu Metallurgy Design and Research Academy, Lishui County SME Bureau, Jiangning District SME Bureau, Liuhe District SME Bureau, Yuhuatai District Development and Reform Bureau	Finished	Finished	Finished	6	Foundry
	Liaoning Province	March 26, 2006	Liaoning Wall Materials Reform Office, Liaoning Provincial EPB, Liaoning Provincial Wall Materials Industrial Association, Shenyang Municipal Wall Materials Reform Office, Dalian Municipal Wall Materials Reform Office, Anshan Municipal Wall Materials Reform Office, Shenyang Municipal Wall Materials Reform Office, Fushun Municipal Wall Materials Reform Office, Benxi Municipal Wall Materials Reform Office, Dandong Municipal Wall Materials Reform Office, Jinzhou Municipal Wall Materials Reform Office, Yingkou Municipal Wall Materials Reform Office, Fuxin Municipal Wall Materials Reform Office, Liaoyang Municipal Wall Materials Reform Office, Tieling Municipal Wall Materials Reform Office, Chaoyang Municipal Wall Materials Reform Office, Panjin Municipal Wall Materials Reform Office, Huludao Municipal Wall Materials Reform Office	Finished	Finished	Finished	16	Brick making
	Guangdong Province	June 23, 2006	Guangdong Cement Industrial Association, Resource Comprehensive Use Section of Provincial Economic and Trade Committee, Industry Section of Development and ~~Reform Committee, Provincial Design Academy of~~ Architectural Material, Environmental Protection Industrial Association, Material College of South China University of Technology, Guangdong Yuede Management Consulting	Finished	Finished	Finished	3	Cement

			Co. Ltd.					
	Zhejiang Province	Sep 18, 2006	Provincial SME Bureau, Provincial Science and Technology Department, Provincial environmental Protection Bureau, Provincial Financial Department, Provincial Economic and Trade Committee, Test Center of SME Bureau	Finished	Finished	Finished	6	Cement

3.2 Effect of LPIC

According to the project objective and LPIC's function, we will analyze the effect of LPIC in the four fields of market, policy, technology and financing.

3.1.1 Market

1. LPICs help TVEs with energy-saving technical renovation to reduce cost and enhance competence in the market.

TVEs usually worry about the increase of cost for the adoption of new technology and the following price increase and competence decrease before the energy-saving technical renovation. LPICs disseminated the outcomes and benefits of demonstration TVEs and helped TVEs to enjoy the policies. It eliminated the TVEs' worry. After adoption of energy saving technology, TVEs enhance their efficiency of energy and resource consumption and reduced the cost for energy saving product. They have more price advantages, larger market share rate and more profit.

For example, 2 demonstration TVEs and 60 replication TVEs in brick making industry finished their technical renovation by adoption of energy saving measures on the basis of local natural conditions and economic status with the help of LPICs. The main products are perforated bricks and hollow bricks. It reduces the unqualified rate, enhances the quality of product, and decreases the energy cost and production cost. Furthermore, it enhances the local marketing competition of perforated bricks and hollow bricks.

2. LPICs coordinate the supply of raw materials and market admission to broaden the market.

Some LPICs coordinated the producing area of raw materials and potential market to broaden market for TVEs. For example, LPIC of Tongxiang City of Zhejiang Province, a demonstration region, found that the local raw materials for cement production were so absent that the TVEs had to buy in other regions. The LPIC facilitated access to limestone supply for the demonstration TVE through Jiaxing Cement Association to build stable supply source. Furthermore, it coordinated with Shanghai Cement Associations to cancel the licensing system for marketing cement into Shanghai market thereby creating a fine environment for cement marketing.

LPIC of another demonstration region, Dalian City, analyzed the foundry market information and export market, and invited companies engaged in foreign trade, Japanese and Korean businessmen and Dalian's foundry enterprises to conduct trade fair for order allotment, which would broaden the market.

3. LPICs standardize the market

Some TVEs charged predatory pricing in some areas for there were so many enterprises producing a few kinds of products. For the members of LPICs usually include many administrations of the industry and industrial association, it is very helpful for different agencies to cooperate with each other to beat the unfair competition.

For example, Shuangliu County of Chengdu City set up the Association of New Materials Industry during the process of establishment of LPIC. Its members are composed of over fifty enterprises in Shuangliu. Furthermore, the leaders of over 10 administrations, like City Construction Bureau, Land Resource Bureau, Quality Supervision Bureau, were invited to be the advisories. After its establishment, the Association conducted price rectification for shale brick in sale and prevented unfair competition under the guidance of government.

3.2.2 Policy

LPICs help TVEs overcome policy obstacles to adoption of energy saving technology through policy making and policy implementation.

1. Policy making

For LPICs communicate with demonstration TVEs and replication TVEs closely, they know the industrial status, feature and problems deeply and can put forward reasonable suggestions on policy making.

For example, in Shanxi province, there used to be two different development ideas for coking industry. One supports coking production with large-scale mechanical coking ovens, which is integrated utilization oriented. The other one supports heat recovery technology, which is clean and environment friendly. In selecting demonstration technologies for phase II subcontract, LPIC consulted with PMO, PIC and CTA and agreed that the heat recovery technology would be adopted and demonstration enterprises would be selected on the basis of this technology. The decision was discussed and passed by the tripartite meeting. In the process of implementation, this new technology had inevitably met the problem of low market and policy recognition. With this technology being adopted, the emission of benzopyrene has almost been reduced to zero and the emission of CO_2 and SO_2 is notably lower than that from large-scale mechanical coking ovens. A standard on heat recovery oven's waste gas emission has been planned in Shanxi province. This standard is much stricter than that for large-scale mechanical coking ovens. LPIC of Shanxi province proposed to provincial government that different standards for different production processes are quite unfavorable to the extension of the heat recovery technology. The provincial government has attached great importance to the proposal. Due to the demonstration project's success, the "Clean Type" coking oven plus the waste heat power generation technology has designated as a key national technical renovation project, and ranked key promotion technology in coking sub-sector by Shanxi Provincial Government.

EE Tri-arch Hoffman Kiln Technology is successfully in use of the brick making TVEs. This practice also helps to generate the national standard of JC982-2005. Furthermore, LPIC of Liaoning Province drafted a list for new technology to disseminate in brick making industry on the base of *Eleventh Five-Year Plan for Wall Materials Industry in Liaoning Province*, which will become the base of brick making TVEs to adopt new technology for technical renovation and enhancement of competence. The LPIC is still compiling *Technical Regulation for Construction in use of Perforated Concrete Bricks in Liaoning Province* and *Local Standard for Autoclaved Fly Ash Bricks in Liaoning Province*. The objective is to promote the development, production and use of new wall materials with the feature of soil saving, energy saving, small weight, high intensity, and heat insulation.

2. Policy implementation

LPICs played important role like guidance and coordination in the project implementation, which ensured the government support for the technical renovation in TVEs. The outputs of this project are helpful for the local officers to implement national and local macro polices, and enhancement of the TVEs' enthusiasm to implement environmental protection polices.

For example, in the brick making industry, the Ministry of Construction, MOA, Ministry of Land Resource and former State Construction Materials Bureau selected 160 medium and large cities in June 2000. Solid bricks had been forbidden used in construction of houses in these cities before June 2003. NDRC made adjustment on the number of the cities from 160 to 170 in June 2001.

On May 21, 2003, Chengdu Municipal government issued Provisional Measures on Prohibiting Production and Use of Solid Clay Brick in Chengdu. It said, since June 1, 2003, the production and use of solid clay brick should be prohibited. Within Chengdu's administrative region, no project shall be passed for newly building, rebuilding or expanding solid clay brick production lines. Those enterprises that get soil from arable shall be closed and the production of those that get soil from non-arable land shall be stopped by December 31, 2005. Shuangliu SME Bureau, the dependent organization of LPIC in Shuangliu, took effective measures and made a schedule for production restricted and close and began close, stop, combine and transfer the TVEs producing clay bricks from January 2000. After four year, all TVEs producing clay bricks in the county had been closed or transferred by May 2004.

3.2.3 Technology

It is difficult for TVEs to obtain technical information, anticipate the effect of some technology when they adopt energy saving technology. LPICs have advantages in helping TVEs conduct energy conservation and GHG emission reduction and remove the technical obstacles.

1. Increase technical information source

TVEs in some areas have difficulty in access to advanced technical information on energy conservation due to local economic development, location and industrial status. After finding out the problem, LPICs organized visits, technical trainings, technical communication and other activities to help TVEs to obtain technical information needed, which was helpful for the adoption of energy saving technology.

LPIC in Shuangliu County of Chengdu City, Xi'an City, and other LPICs have organized local TVEs to visit demonstration TVEs. Technical trainings held by LPIC in Jinnan District of Tianjin City, Jinzhou District of Dalian City, Linfen City of Shanxi Province provided local replication TVEs with information on national and international trend of industrial technology, and status of main technologies. TVEs benefited from the trainings.

2. Accelerate energy-saving technical diffusion

LPICs organized the dissemination of outputs of technical renovation and field visit in the demonstration TVEs. On one hand, replication TVEs have realized the importance of energy conservation and GHG emission reduction; on the other hand, the TVEs excluded in this project learned experiences of demonstration TVEs and adopted all energy saving technology. It promotes the energy-saving technical diffusion.

The successful construction and operation of the first waste heat power generation plant ever applied on a 5-stage pre-heater NDP cement line in China have promoted the issue of an incentive policy by Zhejiang government to encourage the application of waste heat power generation technology onto NDP cement lines, i.e. to connect to the grids free of charge, simplify the approving procedures, etc. Besides, the technology has been brought into the national development program (National mid-long term program for energy conservation) by NDRC. It is decided under the program that the technology will be replicated at about 30 NDP cement lines.

Currently, 9 demonstration TVEs and 118 replication TVEs have achieved energy conservation 439,947 tce/a and a total CO_2 emissions reduction 1,096,788 t/a. Replication TVEs have achieved energy conservation 314,110 tce/a and a total CO_2 emissions reduction 783,075 t/a.

3. Dissemination of VA

This project takes lead in introducing VA into TVEs, thereby making the raising of

energy efficiency in TVEs changed from passively relying on an administrative obligation to a social obligation. It is not merely an innovation of governmental management, but raises TVE's awareness to involve in environmental protection.

Besides all demonstration TVEs have signed VA, LPICs assisted the subcontractors in dissemination of separate VAs templates for the four sub-sectors. Among 118 replication TVEs, 21 TVEs have signed VA with LPIC.

3.2.4 Financing

For there is much risk in the energy saving technical renovation and it needs more investment in the beginning, moreover, it is difficult to get loans from banks, TVEs will invest very cautiously.

For example, LPIC of Xinjin County of Chengdu City signed a 50 million Medium and Small Enterprise Loan agreement with Sichuan subsidiary of State Development Bank. LPIC recommended Yongxing Shale Brick Factory as demonstration enterprise to Chengdu Finance Bureau. LPIC's efforts helped to provide 500,000 Yuan financial support for demonstration enterprise's energy efficiency and GHG emission reduction technical reform.

According to the Temporary Regulations on Encouragement and Support for Industrial Enterprises' Development in Jinzhou District, the district government will provide a special fund of 10 million Yuan to support the important enterprises to develop technical renovation as loan discount of fixed assets investment or subsidy. If the replication TVE finish the technical renovation and pass the test, LPIC will implement the preferential policy, which is the District Government will provide the TVEs with the supporting fund equal to the GEF investment. The purpose is to promote more TVEs to conduct energy conservation and emission reduction voluntarily.

Another example is that Jinnan District is in implementation of the following policies: *Executive Measures for Loan Discount for Technology Upgrading Projects in Industrial Enterprises in Jinnan District* and *Detailed Rules for the Implementation of Policies on Tax-exemption for imported equipments and Income Tax-deductible for Domestic Equipments Enjoyed by Industrial Technology Upgrading Projects in Jinnan District*. First, the technology upgrading projects with over one million Yuan invested in fixed assets and the technical level achieving the advanced level in the industry will enjoy the tax credit polices. Secondly, for the technology upgrading projects with over 500 thousand Yuan invested in fixed assets, if it uses imported equipments listed in List of Encouraged Industry, Products and Technologies by Country at Present, the value-added tax and customs in importing will be exempted; if it purchases domestic equipment, 40% of the invest on equipment purchase will be exempted from the new income tax increased than the previous year the longest tax credit period is five years.

3.3 Experiences of Establishment of LPIC

3.3.1 Necessary of Establishment of LPIC

After the surveys conducted in 8 demonstration regions and 11 replication regions on energy conservation and environmental protection, it is found that it's very hard for single agency to solve the problems existing in market, policy, technology and financing for adoption energy saving technology. It is a good try to establish LPIC, a special coordination agency, which consists of members from different administrations that have different functions. The operation of LPIC has created an effective mechanism for different administrations to play their advantages. It also integrated the functions of different government administrations, which helps to strengthen law enforcement force, to change the policy environment that does not fit into market mechanism and to promote local government to adopt energy conservation policies

and measures. The incentive policies shall increase TVEs' self-discipline awareness, promote them to implement environment protection and energy conservation laws and regulations and technical standards, and reach the target of GHG emission reduction. LPIC is constituted by technical professionals, government officials and financial staff. All these members have offered their advice on how to help TVEs improve their energy efficiency and on how to formulate Action Plan. LPIC has also contributed a lot to environment protection and energy conservation cause by signing Energy Efficiency Voluntary Agreements with TVEs.

The background of LPIC's establishment is close related to Chinese political system and institution, so its function has different feature in different phases. At the beginning of LPIC' establishment, for there are many institutional obstacles and inconsistency in polices, LPIC played important role in policy coordination. However, for the reform in political system and economic development, policies consist with each other more and more and there are less institutional obstacles. Therefore, LPIC will lose the conditions its function needs.

3.3.2 *Wild dissemination*

In the process of project implementation, it is the first time for many government officials and entrepreneurs to come into contact with the concept of international project as well as LPIC and Voluntary Agreement. It proves to be the biggest obstacle to the smooth implementation of the project. PMO and PIC have actively publicized the concept of LPIC and Voluntary Agreement on many occasions such as PIC annual meeting and other activities conducted by other subcontractors. They have also spent a lot of time and energy on communicating with demonstration TVEs and local governments. In order to guarantee the quality of LPIC construction, PMO and PIC officials have participated in the surveys conducted by LPIC subcontractors. These activities make the members of LPICs understand the importance and particularity of project and complete tasks actively.

3.3.3 Sufficient surveys

Before organizing a LPIC, surveys should be conducted to find all kinds of obstacles for adoption of energy saving technology in TVEs and problems in the industrial development. According to the results, a practical Action Plan is to be formulated and to disseminate Energy Efficiency Voluntary Agreement among TVEs. For these four industries are all smaller industries relatively in all regions, local governments may not understand the industrial status entirely. Therefore, it is necessary to conduct surveys deeply and sufficiently to get first-hand materials during the surveys, which are crucial to future work.

3.3.4 Cooperation with NGO

The role of NGOs such as industrial associations and research institutes have advantages of information, publicity, technologies, human resources, working network and influences. LPICs should cooperate with NGOs to take advantage of their effect to support for energy conservation and GHG emission reduction.

3.3.5 Diversify the setup of LPICs

1. Reasons

(1) Diversity of membership

First, for the institutional reform of local government agencies and adjustment in functional arrangement, original TVE Bureaus in some areas were canceled or combined into related agencies, like SME Bureau and Economic Development Bureau. Therefore, these agencies still have the function of administration of TVEs.

Secondly, for the industrial scale is different in different areas, it is quite different for the administrative agencies' attention paid to the industry and the level they knew on the industrial development. So there is difference on the selection of members of LPICs.

Thirdly, governments in different areas attached different importance to LPIC. Some are very active for the LPIC's tasks, but others may be not interested in them. It influences the selection of members of LPICs.

Fourthly, as original working model in some regions fit for the project requirement and has similar working mechanism, original resources and outcomes to work will be used. It is convenient for the establishment of LPIC.

(2) Diversity of regions LPIC established in

Industrial policy restructuring and the application of new technologies and new equipments have exerted considerable impact on the leading industries in some regions. It has not only changed local leading industry's technical equipment structure but also brought new opportunities for its development and for energy conservation and pollution reduction. LPIC at county level is quite limited to play an effective role. LPIC at municipal level or even at provincial level shall be a more effective coordination mechanism. The vision of LPIC integrated into municipal and provincial industrial restructuring and economic development is a breakthrough and a new trial for the regional concept of LPIC. It helps to promote energy conservation and GHG emission reduction among municipal and provincial leading industries. Therefore, the percentage of LPICs at municipal and provincial level is increased during the project implementation. In the 11 replication regions in Phase III, there are three at provincial level and 5 at city level.

2. Diversity of membership

There are two models for establishment of LPIC, one is mainly dependent on government agencies and the other is mainly dependent on industrial association.

In the demonstration phase, all LPICs were established by the first model. It is still the main model used in replication phase. The feature of this model is "coordination", and its advantages are as following:

- Convenient for policy coordination
- Helpful to provide suggestions and reference for policy making
- Helpful for the sustainability of LPIC mechanism because of the policies' effect on industrial development

Its disadvantages include:

- Communication with TVEs are not close enough
- It is hard to ensure the information sharing among different agencies

The second model is used in replication phase. The reason is that LPICs in demonstration regions are just responsible for technical renovation in only on TVE, but LPICs in replication regions will replicate technical renovation in many TVEs. The feature of this model is "consultation". Its advantages include:

- Service for TVEs and close relationship with TVEs
- Financial support for daily operation
- Stronger technical support for TVEs

- Helpful for TVEs to increase technical information sources

Its disadvantages are:

- Difficult to influence government agencies
- Difficult to realize the function of policy coordination

Therefore, establishment of LPICs should select the best membership and working model on the basis of the status and level of industrial development, management model, implementation of polices and so on.

4. Annexes

Annex 1 Industrial Survey Plan

Annex 2.1 Survey Report on Foundry Industry in Jinnan District in Tianjin City

Annex 2.2 Statute of LPIC in Jinnan District in Tianjin City

Annex 2.3 Action Plan of LPIC in Jinnan District in Tianjin City

Annex 3.1 Survey Report on Foundry Industry in Jinzhou District in Dalian City

Annex 3.2 Statute of LPIC in Jinzhou District in Dalian City

Annex 3.3 Action Plan of LPIC in Jinzhou District in Dalian City

Annex 4.1 Survey Report on Brick Making Industry in Shuangliu County in Chengdu City

Annex 4.2 Statute of LPIC in Shuangliu County in Chengdu City

Annex 4.3 Action Plan of LPIC in Shuangliu County in Chengdu City

Annex 5.1 Survey Report on Brick Making Industry in Xi'an City in Shaanxi Province

Annex 5.2 Statute of LPIC in Xi'an City in Shaanxi Province

Annex 5.3 Action Plan of LPIC in Xi'an City in Shaanxi Province

Annex 6.1 Survey Report on Brick Making Industry in Xianyang City in Shaanxi Province

Annex 6.2 Statute of LPIC in Xianyang City in Shaanxi Province

Annex 6.3 Action Plan of LPIC in Xianyang City in Shaanxi Province

Annex 7.1 Survey Report on Foundry Industry in Nanjing City in Jiangsu Province

Annex 7.2 Statute of LPIC in Nanjing City in Jiangsu Province

Annex 7.3 Action Plan of LPIC in Nanjing City in Jiangsu Province

Annex 8.1 Survey Report on Brick Making Industry in Liaoning Province

Annex 8.2 Statute of LPIC in Liaoning Province

Annex 8.3 Action Plan of LPIC in Liaoning Province

Annex 9.1 Survey Report on Cement Industry in Zhejiang Province

Annex 9.2 Statute of LPIC in Zhejiang Province

Annex 9.3 Action Plan of LPIC in Zhejiang Province

Annex 10.1 Survey Report on Foundry Industry in Jinzhong City in Shanxi Province

Annex 10.2 Statute of LPIC in Jinzhong City in Shanxi Province

Annex 10.3 Action Plan of LPIC in Jinzhong City in Shanxi Province

Annex 11.1 Survey Report on Foundry Industry in Linfen City in Shanxi Province

Annex 11.2 Statute of LPIC in Linfen City in Shanxi Province

Annex 11.3 Action Plan of LPIC in Linfen City in Shanxi Province

Annex 12.1 Survey Report on Cement Industry in Guangdong Province

Annex 12.2 Statute of LPIC in Guangdong Province

Annex 12.3 Action Plan of LPIC in Guangdong Province

Annex 13.1 Training Plan

Annex 13.2 Training Materials

Annex 13.3 Training Minutes

Annex 13.4 List of Participants of the Training

Annex 14 Summary Report for Establishment and Capacity Building of LPIC in Phase II

Annex 15.1 Template of VA for Brick Making Industry

Annex 15.2 Template of VA for Foundry Industry

Annex 15.3 Template of VA for Cement Industry

Annex 15.4 Template of VA for Coking Industry

Annex 16 List of Replication TVEs which Signed VA

Annex 17 Specification for the Revision of Monitoring and Evaluation System

Annex 1

Industrial Survey Plan

Replication areas	Time	Participants	Agencies to be surveyed	Contents of survey
Jinnan District in Tianjin City	July 11-15,2005	Liu Xin, Pang Jun	Industrial Economic Committee, Environmental Protection Bureau, Committee for Science and Technology, Development Planning Committee, replication enterprises	Local foundry industrial development status, level of technical equipments, energy consumption and pollution discharge, TVEs' property right reform, local laws, regulations and policies related to energy conservation and environment protection, mechanism for local TVEs obtaining advanced technologies and the obstacles for local TVEs' adopting advanced energy saving technologies.
Jinzhou District in Dalian City	July 18-22,2005	Zhou Hong, Yang Xin	Economic Development Bureau, Environmental Protection Bureau, Science and Technology Bureau, replication enterprises	Local foundry industrial development status, level of technical equipments, energy consumption and pollution discharge, TVEs' property right reform, local laws, regulations and policies related to energy conservation and environment protection, mechanism for local TVEs obtaining advanced technologies and the obstacles for local TVEs' adopting advanced energy saving technologies.
Shuangliu County in Chengdu City	Aug10-16, 2005	Liu Xin, Pang Jun	Office of Country Government, SME Bureau, Construction Bureau, Science and Technology Bureau, Environmental Protection Bureau, Quality Supervision Bureau, industrial association, replication enterprises	Local brick making industrial development status, level of technical equipments, energy consumption and pollution discharge, TVEs' property right reform, local laws, regulations and policies related to energy conservation and environment protection, mechanism for local TVEs obtaining advanced technologies and the obstacles for local TVEs' adopting advanced energy saving technologies.
Xi'an City in Shanxi Province	Nov 5-9,2005	Zhou Hong, Ruan Fujin	Xi'an Wall Materials Research and Design Institute, Industrial Management Office of Xi'an Economic Committee, Office of Wall Materials Reform, Technical Supervision Bureau, Environmental Protection Bureau, replication enterprises	Local brick making industrial development status, level of technical equipments, energy consumption and pollution discharge, TVEs' property right reform, local laws, regulations and policies related to energy conservation and environment protection, mechanism for local TVEs obtaining advanced technologies and the obstacles for local TVEs' adopting advanced energy saving technologies.
Xianyang City in Shanxi Province	Oct 31-Nov 4, 2005	Zhou Hong, Ruan Fujin	Xianyang Leading Group for Brick Making Industry Rectification, Economic and Trade Bureau, Office of Wall Materials Reform, TVE Bureau, Technology Supervision Bureau, Land Resource Bureau and Environmental Bureau, replication enterprises	Local brick making industrial development status, level of technical equipments, energy consumption and pollution discharge, TVEs' property right reform, local laws, regulations and policies related to energy conservation and environment protection, mechanism for local TVEs obtaining advanced technologies and the obstacles for local TVEs' adopting advanced energy saving technologies.

Annex 2.1

Field Survey Report on Energy Conservation & GHG Emissions Reduction in Foundry Industry in Jinnan District, Tianjin City

According to the framework and requirement of UNDP/GEF Energy Conservation & GHG Emissions Reduction in Chinese TVES – Phase II consisting of three phase, a study tour group, led by Ms. Wang Guiling, PMO deputy director, consisting of subcontractor experts and technical industrials, went to Jinnan District, Tianjin city and conducted a five-day tour from July 11 to 15, 2005. Workshops, field study and questionnaire answering had been held in order to remove the market, policy, technology and financing obstacles that have been identified in the process of producing, marketing and applying energy efficiency technology in Jinnan district's foundry industry. Another object of the tour is to direct the establishment of LPIC in the district and promote its capacity building. In order to guarantee the quality and effectiveness of the tour, Mr. Wang Xiwu, Senior Adviser of the PIC Secretariat, and Mr. Xu Iitong, UNIDO Senior Project Management Expert, were invited to participate in the tour. Findings and results are as the following.

1. General Status of Foundry in Jinnan District

Jinnan District is one of the four districts surrounding the urban area of Tianjin. It is located in southeast in Tianjin and south of downriver of Hai River. It covers 420.75 square kilometers and has the population of 420 thousand. It has 8 towns and a division in urban area. Jinnan District is named as the Gold Triangle of Tianjin for its developed economy, prosperous society, rich product and pleasant weather. Jinnan District is not only a beautiful and rich land, but also a developing export-oriented industry base.

The total output value of Jinnan District was 10.03 billion Yuan in 2004, increased by 18% than the pervious year. It has over 20 kinds of industries, like machinery, chemical, light industry, textile, building materials, clothing, foundry, metal product, electronic instrument, environmental protection equipments and so on.

1.1 Status of Foundry Industry

(1) Industrial scale

There were 162 foundry enterprisers in Jinnan District in 2004, accounting for 5.5% of that of total TVEs; the total production value was 2,740 million Yuan, accounting for 18.7% of that of total TVEs; there were 18 thousand employees (see Table 1). So the foundry industry is an important part of TVEs in Jinnan District

Table 1 Basic Data of Foundry Industry in Jinnan District

	Unit	Foundry		TVEs		The foundry industry accounts for the TVEs in 2004(%)
		2003	2004	2003	2004	
Number of enterprises		156	162	2,886	2,943	5.5
Total output value	million	2,260	2,740	11,700	14,600	18.7
Business revenue	million	2,140	2,600	11,000	13,900	18.7
Initial fixed capital	million	560	680	5,100	6,400	10.6
Staff employed	person	12,000	16,000	93,000	117,000	13.6
Total profit payments and tax turnover	million	187	200	930	1150	17.39

(2) Energy consumption

As an industry with high output value, foundry industry is energy-intensive in Jinnan District. The major energy-use equipment is cupola. The energy consumption of the foundry industry was 149.9 thousand tce and the CO2 emission was 373,580 tons in 2004. Therefore, the adoption of energy efficiency and GHG emission reduction technologies shall contribute to local environment quality improvement.

Table 2 Energy Consumption and CO_2 Emission of Foundry Industry in Jinnan District

	unit	2003	2004
Output	Thousand tons	324	405
Energy consumption Per Unit	Tce per ton	0.40	0.37
Total energy consumption	Thousand Tce	129.6	149.9
CO_2 emission	Thousand tons	323.1	373.58

(3) Ownership Reform

At the beginning of reform, most foundry enterprises were collective enterprises in Jinnan District. The ownership reform in foundry industry of Jinnan District started in1998. The reform optimized resources distribution, facilitated the access to financing market, perfected the mechanism of enterprise's legal person management and internal management, greatly mobilized the initiative of enterprise's owners and employees thereby increased the enterprises' vitality. So far, there are 68 companies limited, 56 stock cooperation enterprises and 35 private enterprises among the 162 foundry enterprises (see Table 3).

Table 3 Ownership Reform in Foundry Industry of Jinnan District

	Total No. of enterprises	Enterprises to conduct ownership reform	Enterprises with ownership reform finished		
			Private enterprises	Stock cooperation system enterprise	Company Limited
Number	162	3	35	56	7
Percentage	100%	2%	21.6%	34.5%	41.9%

1.2 Main Problems in the Industrial Development

(1) The professional level should be enhanced, the technical information sources are limited and the educational level of staff is low.

Among the 240 production lines in 162 foundry enterprises, 142 were designed by professional designing institute, 86 are designed by the TVEs themselves and 12 were designed by domestic enterprises (see Table 4). The proportion of production lines designed by professional institute to total is less than 2/3. The professional level should be enhanced.

Table 4 Statistics on Production Line Designed in Foundry Industry

	Number of Product line	Types of Production Lines				
		Specialized designing	Independently designing	Domestic designing	Energy calculation	
					Done	To be done
Number	240	142	86	12	60	180
Percentage	100%	59.2%	35.8%	5%	25%	75%

Table 5 shows that the main technical information sources of foundry industry in Jinnan District include associations, domestic enterprises, friends and government. As the most timely and advanced way to get information, internet is hardly used as technical information source. Therefore, the relatively lagged measures for obtaining technical information in foundry industry restrict the development of enterprises and enhancement of technical level.

Table 5 Technical Information Sources of Foundry Enterprises in Jinnan District

Sources	Number of enterprises	Percentage %
Network	2	1.5
Associations	55	33.7
Colleges, universities and scientific institutes	14	8.3
Domestic enterprise	42	26
Foreign countries	1	0.9
Government agencies	20	12.5
Friends	28	17.1
Total	162	100

It can be learnt from Table 6 that staff with middle and high school education level represent 94.95% of total number of staff. Only 5.15% of employees have got primary professional title. In general, the low educational level of workers is not good for energy efficiency technology adoption and application.

Table 6 Statistics of the Staff in Foundry Industry

	Number	Percentage (%)
Total number of staff employed	18,000	100
High professional title	180	1
Medium professional title	240	1.3
Preliminary professional title	340	1.8
College and junior college	190	1.05
Junior or senior high school	17,050	94.95

(2) Financing sources are too limited and government demonstration fund and informal financing are not developed.

Foundry enterprises in Jinnan District were built in quite different period. The earliest was built in at the beginning of 1950s, and the latest was built in recent years. Nevertheless, the source of investment for technical upgrading is very similar, including self-fund and bank loan. The self-fund is from the accumulation of enterprises' development. For the national financial reform, in the process of applying for bank loan, the key problem the foundry enterprises faced with was the provision of mortgage. The reason is some the foundry enterprises built earlier were collective enterprises and have no property right over the land, so the land cannot be mortgaged. In recent years, with the ownership reform finished, foundry enterprises got Permit for Land Use. Besides this, Jinnan District Government provided preferential policies for the foundry enterprises, the difficulties for enterprises to get loan are alleviated.

Table 7 Capital Sources for Technical Upgrading in Foundry Industry in Jinnan District

	Total investment	Self-funding	Bank loan	Government demonstration fund	Informal financing
Investment on technology upgrading (million)	318	242.634	68.37	4.134	2.862
Percentage%	100%	76.3%	21.5%	1.3%	0.9%

From Table 7 we can see that the percentage of government demonstration fund and the informal financing are both nearly zero. This reflects that Jinnan District government should strengthen financial support for technology upgrading in foundry industry. At the same time, the TVEs should seek more financial support. Informal financing will be an effective measure in the future development of enterprises.

(3) Most castings are the medium or low grade product, the exportation price is low, and it is difficult to resist the fluctuation of market.

The main products of foundry in Jinnan District are special equipment, metal fittings and valves. The products are sold to north of China and northeast of China. Some products are exported to more than 30 countries and regions like USA, Canada, UK, Malaysia and Hong Kong. For the low level of product quality and production process, the exploration price is quite low. It is harmful for enterprises to improve the technical level. For the limited types of products and the high comparability, it is difficult for enterprises to resist the fluctuation of market.

2. LPIC Building in Jinnan District

Based the above mentioned status of foundry industry in Jinnan District, to promote the reform of TVEs, enhance energy efficiency, reduce GHG emission, and strengthen the energy saving technology upgrading of foundry enterprises, LPIC in Jinan District will be built relying on the Industrial Economic Commission. LPIC will be responsible for helping foundry industry utilize energy saving technology with high efficiency and over come the barriers to the utilization. The member parties include Industrial Economic Commission, Development and Reform Commission, Environmental Protection Bureau and Science and Technology Commission in Jinnan District. The Executive District Chief of Jinnan District will act as Director of LPIC, the leaders of Industrial Economic Commission of Jinnan District will act as the Deputy Director. The office of LPIC is located in the Industrial Economic Commission of Jinnan District.

Industrial Economic Commission of Jinnan District is the macro supervision departments of TVEs in Jinan District and has the responsibilities of instruction, coordination, supervision and service. It is familiar with the status of TVEs in Jinnan District, especially the foundry enterprises. LPIC's tasks may be included in its responsibilities. So it will ensure the general understanding of foundry industry in Jinnan District to establish LPIC relying on Industrial Economic Commission. It is helpful for the development of foundry industry and further energy conservation and emission reduction.

3. Policies Related to Foundry Industry in Jinnan District

Tianjin Municipal Government pays importance to development of circular economy and has developed rich practices. In Jan 2004, "to build up idea on circular economy" was put forward at the 14th Municipal People Representative Conference. The revised

Managing Measures on Supervision and Test of Energy Conservation was issued in June 2006. The Measure requires testing and assessing integrated energy consumption and energy consumption per unit product according to the national and municipal standard on limitation of energy consumption. It creates good environment for popularization of energy saving technology.

Tianjin and Jinnan District developed special policies for foundry industry:

3.1 Policy on Reduction and Drawback of Value-added Tax for Foundry Enterprises

According to Notice on Reduction and Drawback of Value-added Tax for Castings and Forgings of MOF and National Administration of Taxation (FR No.2002-141), the value-added tax applied on castings and forgings produced for commercial purpose and sold by foundry enterprises to be used for machine production will be levied in accordance with the relevant regulation first and returned by 35% of the actual tax paid. The returned value-added tax will be used for the research and development of casting and forge products specially. Under the guidance of Jinnan District Government, the foundry enterprises in Jinnan District are applying actively to get more financial support for development of enterprises.

3.2 Financial Support for TVEs of Jinnan District Government

Implementing *Measures for Loan Discount for Technology Upgrading Projects in Industrial Enterprises in Jinnan District* and *Detailed Rules for the Implementation of Policies on Tax-exemption for imported equipments and Income Tax-deductible for Domestic Equipments Enjoyed by Industrial Technology Upgrading Projects in Jinnan District* are implemented in Jinnan District. First, the technology upgrading projects with over one million Yuan invested in fixed assets and the technical level achieving the advanced level in the industry will enjoy the tax credit polices. Secondly, for the technology upgrading projects with over 500 thousand Yuan invested in fixed assets, if it uses imported equipments listed in List of Encouraged Industry, Products and Technologies by Country at Present, the value-added tax and customs in importing will be exempted; if it purchases domestic equipment, 40% of the invest on equipment purchase will be exempted from the new income tax increased than the previous year the longest tax credit period is five years.

3. 3 Environmental Protection Policy

According to Notice on Air Pollution Control issued by Tianjin Municipal Government on January 20, 1999, clean fuels should be used for all kilns and the coal burned equipments to be built are forbidden. The desulphurization and dust collection should be conducted and high quality coal with low sulphur content (percent of sulphur is less than 0.5% and the percent of ash is less than 10%)

On January 20, 2004, Tianjin Finance Bureau associated with Environmental Protection Bureau issued the "Temporary Measures on Levying, Use and Management on Special Fund for Environmental Protection in Tianjin". The Measures required that Special Fund for Environmental Protection should be used by Environmental Bureau as subsidy and interests of loans for the pollution prevention and control projects. More support should be provided for foundry and other industries caused severe pollution to assist them in popularization and utilization of new technology and production process on pollution prevention.

Rules on Comprehensive Treatment and Disposal for Enterprises/Projects with severe pollution and high fatalness in Jinnan District is in implementation to conduct comprehensive treatment and disposal for enterprises/projects with severe pollution and high fatalness. The specific measures include: first, the small enterprises with

hazard and pollution will not be built; secondly, enterprises/projects with severe pollution and high fatalness will be treated comprehensively, a set of enterprises/projects with severe pollution and high risk in safety will be closed on chemical engineering, oil defining, foundry, plating and spray-paint. Second, there is the existing heavy pollution high danger enterprise carries on the comprehensive program, closes some big enterprise project with seriously pollution, the security have danger.

4. Brief Introduction of Replication Enterprises

After the assessment of products, production scale and process, management level and the enthusiasm on energy saving technology upgrading, this project selected 7 enterprises in Jinnan District for the replication project. The average annual output value of 7 enterprises is over 8 million Yuan and their production processes are representative to some degree. Furthermore, these enterprises have strong willing to develop technology upgrading on energy conservation and emission reduction he basic information of replication enterprises are shown in Table 8.

5. Recommendations on LPIC

(1) Strengthen dissemination; improve the awareness on energy conservation, reduction of energy consumption and environmental protection

Integrate "the blue sky program" developed by Tianjin Municipal Government, strengthen dissemination and improve the awareness of foundry TVEs on resource conservation, reduction of energy consumption and environmental protection.

(2) Help the enterprises to strive for the preferential policy

LPIC should create good policy environment for the enterprises, such as provide enterprises with preferential tax policy, specially the tax of export-oriented type enterprises which focus on environmental protection and energy conservation. As to financial support, the financial department will strive for setting up a special fund to support the foundry industry, especially enterprises with good achievement on energy conservation and emission reduction.

(3) Expand the technical information sources and conduct technical training

LPIC should expand the technical information sources by visit, lectures of experts and other effective measures. LPIC should conduct training on technology and energy efficiency management for technicians in foundry enterprises on the basis of the technical level of the industry. This will enhance the capacity of enterprises to obtain, discriminate and adopt technical information on energy conservation, improve the technical level, reduce percentage of unqualified products and energy consumption and save production cost.

(4) Expanding financing sources

LPIC should help enterprises establish many financing sources and realize the multi-subject of investment. LPIC will provide foundry industry with key support by Loan Assurance System for SMEs, informal financing and foreign capitals. Furthermore, LPIC will commend the loan request of enterprises to PIC and help enterprises strive for rolling fund.

Table 8 Basic information on Replication Enterprises

No.	Enterprise	Main Products	Annual Output (ton/year)	Main Equipments		Intent on Technology Upgrading
				Name	Specification	
1	Tianjin Bohai Valve Manufacture Co.Ltd	Valve	8,000	cupola	3-ton, 5-ton, 0.5-ton	Carry on the technology upgrading on the 5-ton cupola from current cold wind cupola to the hot-blast stove which has national patent as highly energy saving products.
2	Tianjin Dazhan Valve Factory	Valve series product	8,000	cupola	5-ton	Carry on the technology upgrading on the cupola from current cold wind cupola to the hot-blast stove to reduce consumption on coke and increase the temperature of iron melt.
3	Tianjin Kaiyuan the Third Valve Co.Ltd	Valve series product	9,000	cupola	5-ton, 2 sets	In view of the fact that the sale market of company product is larger and larger, the production cannot satisfy the market demand, 5-ton cupola should be added. Now is in implementation. To improve the product quality, reduce the coke consumption, the added cupola will be hot-blast stove.
4	Tianjin Xinhai Paper-making Machine Co.Ltd	Paper making machine, cast iron vat for drying and spare parts	3,000	cupola	5-ton, 2 sets	After moving to the new factory site, an 8-ton cupola with the dust removal equipment will be added.
5	Tianjin Jinnan Huiyuan Metal Goods Factory	Well ring, well lid, valve	4,000	cupola	5-ton, 3 sets	To reduce energy consumption, enhance the percentage of qualified product and reduce pollutant emission, a hot-blast stove will be added. The surplus heat will be used to enhance the molten rate of iron melt.
6	Tianjin Juyuan Foundry Co.Ltd	Boiler fitting	3,000	cupola	3-ton, 1 set	Purchase the highly effective hot blast cupola; build a workshop, a laboratory and a new roller for throwing pellet.
7	Tianjin Jinnan Baitangkou Foundry Factory	Well lid, Well boult	3,001	cupola	3-ton, 2 sets	Carry on the technology upgrading on the current cold wind cupola to the hot-blast stove to reduce coke consumption.

Annex 2.2

Statute of Policy Implementation Committee, Jinnan District

General Provisions

Clause 1 Jinnan District Policy Implementation Committee (hereinafter referred to as LPIC) is an institution led by the Jinnan District Government, which is established to help foundry TVEs in the district to remove policy barriers in applying energy saving technologies.

Clause 2 The objective of the LPIC is to establish effective coordination mechanism, disseminate energy efficient technology and introduce high efficient management system at TVEs to produce high quality and energy efficient product thereby reducing energy consumption and GHG emissions and promoting the sustainable development of foundry TVEs in Jinnan District.

Organization of LPIC

Clause 3 The membership of the LPIC is comprised of five parties including Office of District Government, Industrial Economic Commission, Development and Planning Committee, Environmental Protection Bureau and Science and Technology Committee of Jinnan District.

Clause 4 The LPIC shall have 9 delegates (including one director and two deputy directors) composed of director, deputy director and head of divisions of Industrial Economic Commission, deputy director of Development and Planning Committee, deputy director of Environmental Protection Bureau and deputy director of Science and Technology Commission of Jinnan District.

Clause 5 LPIC delegates, to be nominated by the local government, shall serve a term of three years. If any member organization wishes to delegate its membership to a delegate from within the same office as the actual member a written application of such delegation should be submitted to the municipal government for approval.

Clause 6 The LPIC will instate one director and two deputy directors. The executive deputy director of the District Government shall be Director of LPIC, and the director and deputy director of the Industrial Economic Commission shall be Deputy Director of LPIC. The Deputy Director can act as Director in his absence. In addition to the normal duties and obligations of a member of LPIC, the Director (or acting Director) chairs meetings of LPIC, signs Minutes and formal correspondence of LPIC.

Clause 7 Under the LPIC, an office is established to be in charge of handling routine matters, conduct the activities required in the PIC's documentation and conference summary and communications with the PIC and the project management office of the UNDP/GEF Chinese TVEs Project. The Office is established within the Security & technology Division of Industrial Economic Committee. The address is Dajian Street, Xianshuigu, Jinnan District, Tianjin.

Clause 8 The office staff includes the members of Security & technology Division of Industrial Economic Committee, the deputy director of the Industrial Economic Commission will act as Office Director.

Functions of LPIC

Clause 9 Main responsibilities of the LPIC are, under the guidance and with the coordination of the national PIC and the national project management office, to facilitate to remove policy, market, technology and financing barriers encountered by the local foundry TVEs to policy enforcement. *Detail responsibilities include the following..*

1. Develop and implement action plan aimed at promoting regulatory reform related to the monitoring of energy efficiency at foundry TVEs, and facilitation of the transform of the project implementation into a market-oriented mechanism.
2. Push forward TVEs to sign the VA with local government authorities.
3. Provide TVEs with domestic and international information on advanced technology and policies on energy conservation and emission reduction.
4. Promote the enforcement of national and local policies, regulations and standards related to energy efficiency, technical renovation and environmental protection in foundry industry in Jinnan District.
5. Establish incentive mechanism to promote energy efficient technologies, and have best practices in energy conservation and emissions reduction replicated throughout the district.
6. Recommend to the national PIC rewards to organization(s) or individual(s) with remarkable performance

Clause 10 Responsibilities of member parties are:

1. Industrial Economic Commission will be responsible for organizing and coordination with different agencies.
2. Development and Planning Committee will be responsible for examination, approval, record and check of new-built and rebuilt projects in foundry industry in accordance with related policies.
3. Science and Technology Committee will be responsible for popularization of new technology, new products and new production process.
4. Environmental Protection Bureau will instruct foundry industry on energy saving and environmental protection policies and pollution indicators.

Governance and working procedures

Clause 11 LPIC will operate by means of meetings, once half a year. The Director, or the Deputy Director in his absence will chair the meetings. A meeting will be considered duly valid if more than 50% of its members are present.

Clause 12 The LPIC Director may call interim meetings as per the request of PIC, and the PMO.

Clause 13 Minutes of meetings and progress reports will be submitted to the national PIC on a regular basis.

Supplementary Articles

Clause 14 This statute will become effective after it is discussed and approved by all LPIC members. LPIC reserves the right for the explanation of this statute.

Annex 2.3

Action Plan of the LPLC in Jinnan District

1. Project Background

The project of "UNDP/GEF Energy Conservation & GHG Emission Reduction in Chinese TVEs" has been funded by GEF. The aim of the project is to help Chinese TVEs that engaged in brick-making, cement, casting and coking to adopt energy efficiency technologies and to reduce GHG emission.

During the project's first phase, there are all kinds of obstacles to the adoption of energy efficiency technologies have been identified and evaluated and strategies to remove the obstacles have been formulated. During the second phase, it has been proposed to establish top-down PLC both at central and local level. The LPLC shall be the new mechanism to remove the policy obstacle and to promote energy efficiency in Chinese TVEs by adopting a market transformation approach. During the third phase, 11 replication areas will be selected to develop LPIC building and overcome the market, policy, technology and financing barriers to the adoption of energy efficiency technologies on the base of experiences in Phase I and II.

In order to realize the objectives set for the project's third phase, to create a sound environment for the replication enterprises and the foundry industry that these enterprises belong to, to promote the implementation of policies, laws and statutes, to establish a mechanism favorable for enterprises to adopt energy efficiency and GHG emission reduction and to extend the experiences accumulated by the demonstration enterprises, the LPIC in Jinnan District has formulated the action plan.

2. Major Obstacles to Jinnan TVEs' Adopting Energy Saving Technologies

(1) The professional level should be enhanced, the technical information sources are limited and the educational level of staff is low.

(2) Financing sources are too limited and government demonstration fund and informal financing are not developed.

(3) Most castings are the medium or low grade product, the exportation price is low, and it is difficult to resist the fluctuation of market.

3. Objective

3.1 Short-term objective (2005-2008)

(1) The government signs Energy Efficiency Voluntary Agreement with replication enterprises.

(2) The replication enterprises conduct energy saving technology upgrading and to realize the objective of decreasing unit product's energy consumption by 15% (with the data of 2004 as baseline).

(3) To establish an effective mechanism for foundry industry's sustainable energy efficiency and GHG emission reduction.

3.2 Medium and long term objectives (2009-2010)

(1) In 2010, compared with the data of 2004 (baseline), the ultimate objective of decreasing unit product's energy consumption by 20% will be realized.

(2) To extend the Energy Efficiency Voluntary Agreement in foundry industry and to establish enterprises' self-improving mechanism to promote energy efficiency by adopting a market transformation approach.

(3) To extend the Energy Efficiency Voluntary Agreement to the heat treatment and the forging industry.

4. *Implementing Plan*

4.1 Government signs EE Voluntary Agreement with promoted enterprises.

Time: July 2005-December 2008

Objective: Government signs Energy Efficiency Voluntary Agreement with replication enterprises; technical upgrading shall be finished before June 30, 2008, and unit product's energy consumption be decreased by 15% compared with the data of 2004(baseline). By December 31, 2010 unit product's energy consumption will be decreased by 20%.

Tasks:

(1) Consult with enterprises and formulate energy saving technology upgrading plans that are to be assessed;

(2) Identify barriers to the implementation of the plan;

(3) LPIC consults with local government and formulates incentive policy;

(4) Work out Energy Efficiency Voluntary Agreement together with replication enterprises;

(5) Provide technical and financial support;

(6) Sign Energy Efficiency Voluntary Agreement;

(7) According to the stipulations of Energy Efficiency Voluntary Agreement, the implementing progress of the tasks is to be supervised by the third party that has been confirmed by the parties involved in Energy Efficiency Voluntary Agreement;

(8) Summarize the experiences accumulated by replication enterprises and get ready for popularizing the experiences in foundry industry in Jinnan District.

4.2 Establish Association of Foundry TVEs in Jinnan District

Time: October 2005-June 2006

Objective: Directed by Industrial Economic Committee, Association of Foundry TVEs in Jinnan District shall be established. The mission of the association is to provide service for general benefit of the foundry industry by organizing the foundry TVEs to find measures and cooperate together to achieve industrial self-discipline.

Tasks:

(1) Conduct surveys on foundry TVEs;

(2) Set up the leading group of the association;

(3) Formulate statutes for Association of Foundry TVEs in Jinnan District;

(4) Organizing the setup meeting in June 2006, providing opportunity for member enterprises to exchange their experience;

(5) Put forward development plan for foundry industry in December 2006.

4.3 Develop Capacity Building of Technicians and Managers in Foundry Industry

Objective: Strengthen the capacity of foundry TVEs in soliciting and identifying

information on energy efficiency and new technology thereby raising their technical level, lowering the reject rate and product cost and reducing energy consumption.

Tasks:

(1) 3-5 technicians are selected from different local foundry enterprises to attend the training.

Time: Every August from 2005 to 2008

Contents:

a. The development trend of foundry industry;

b. The practical technologies of foundry industry;

c. Laws, statutes and technical standards related to foundry industry;

d. Practical operation on imports and exports.

(2) Organize enterprises to visit enterprises with high technical level to learn advanced experiences.

Time: January 2008-January 2010

4.4 Strengthen the implementation of preferential policies

Time: January 2006-December 2009

Objective: Promote enterprises to develop energy conservation and emission reduction voluntarily.

Tasks:

Implement the following polices for qualified enterprises: Measures for Loan Discount for Technology Upgrading Projects in Industrial Enterprises in Jinnan District and Detailed Rules for the Implementation of Policies on Tax-exemption for imported equipments and Income Tax-deductible for Domestic Equipments Enjoyed by Industrial Technology Upgrading Projects in Jinnan District

4.5 Assist those enterprises that sign Energy Efficiency Voluntary Agreement in applying for SME Credibility Guarantee fund

Time: July 2007-December 2009

Objective: With the influence of GEF project, try to win SME Credibility Guarantee Fund for those enterprises that sign Energy Efficiency Voluntary Agreement. Extend Energy Efficiency Voluntary Agreement mechanism to the foundry industry in the district.

Tasks:

(1) In October 2007, introduce Energy Efficiency Voluntary Agreement to 10 institutions engaged in small and medium scale enterprises' credibility guarantee and recommend to them the enterprises that sign Energy Efficiency Voluntary Agreement;

(2) In October 2007, organize the enterprises that signed Energy Efficiency Voluntary Agreement and those enterprises that are willing to conduct technical upgrading to approach the 10 institutions engaged in small and medium scale enterprises' credibility guarantee. Focus on the movement trend of the credibility guarantee fund.

(3) From January 2008 to August 2008, assist the credibility guarantee institutions in conducting survey on the replication enterprises and those enterprises that are willing

to conduct technical upgrading;

(4) From September 2008 to December 2009, assist the small and medium scale enterprise credit guarantee institution to determine qualified enterprises.

4.6 Strengthen the dissemination and extension

Time: December 2009-December 2010

Objective: Disseminate energy conservation and emission reduction, extend Energy Efficiency Voluntary Agreement and realize the target of energy conservation and emission reduction

Tasks:

(1) Print pamphlets on energy efficiency and distribute them to enterprises in foundry, heat treatment and forging industry.

(2) Strengthen dissemination on energy conservation and emission reduction by local broadcast, TV, newspaper and other media, introduce the energy conservation and emission reduction and Energy Efficiency Voluntary Agreement to public;

(3) Organize on-the-spot meeting to introduce the experiences of those enterprises that sign Energy Efficiency Voluntary Agreement;

(4) Organize workshops to discuss the possibility and obstacles to implementing Energy Efficiency Voluntary Agreement in enterprises.

5. Follow-up and Report of the Action Plan

According to local realities, LPIC formulates report on the previous year's work every January and works out *Annual Working Plan of LPIC of Jinnan District*. The report is to be submitted to national PIC secretariat before January 31. The secretariat is to collect all the submitted reports and reports to MOA's GEF office. All the reports are to be evaluated by the office and each action plan shall be revised according to the evaluation results.

Annex 3.1

Field Survey Report on Energy Conservation & GHG Emissions Reduction in Foundry Industry in Jinzhou District, Dalian City

According to the framework and requirement of UNDP/GEF Energy Conservation & GHG Emissions Reduction in Chinese TVES – Phase II consisting of three phase, a study tour group, led by Ms. Wang Guiling, PMO deputy director, consisting of subcontractor experts and technical professionals, went to Jinzhou district, Dalian city and conducted a five-day tour from July 18 to 22, 2005. Workshops with District Government, Economic Development Bureau, Environmental Protection Bureau, Science and Technology Committee in Jinzhou District, field study and questionnaire answering for replication enterprises had been held in order to remove the market, policy, technical and financial obstacles that have been identified in the process of producing, marketing and applying energy efficiency technology in Jinzhou district's foundry industry. Another object of the tour is to direct the establishment of LPIC in the district and promote its capacity building. In order to guarantee the quality and effectiveness of the tour, Mr. Wang Xiwu, Senior Adviser of the PIC Secretariat, and Xu litong, UNIDO Senior Project Management Expert, was invited to participate in the tour. Findings and results are as the following.

1. General Status of Foundry in Jinzhou District

Jinzhou District is located in central new urban district in planning in Dalian. It covers 1,054 square kilometers, and is biggest administrative district in Dalian with total population of 490 thousand. Jinzhou District is the functional extension of main urban area of Dalian. It will be the region for industrial central development of "Big Dalian" in the future. In 2003, the revenue of product sale was 9.07 billion Yuan, which increased by 24.6% than previous year.

1.1 Status of Foundry Industry

There were 27 foundry large-scale enterprises (with revenue of product sale over 5 million) in Jinzhou District by the end of 2004. The fixed asset was 350 million Yuan, the total output value was 1 billion Yuan, the tax paid was 60 million Yuan, and the number of staff employed was 5,000 (see Table 1).

Table 1 Basic Economic Data of Foundry TVEs in Jinzhou District

Total output value (million Yuan)	Business revenue (million Yuan)	Revenue from export (million Yuan)	Profits (million Yuan)	Tax paid (million Yuan)	Initial fixed capital (million Yuan)	Staff employed (person)
1,000	900	700	100	60	350	5,000

(1) Energy consumption

The energy consumption of the foundry industry was 129 thousand tce in Jinzhou District in 2004, the energy consumption per unit was 0.341 tce per ton. The energy cost occupied 25% to 30% of total cost in foundry industry. Therefore, the adoption of energy efficiency and GHG emission reduction technologies shall contribute to local environment quality improvement.

Table 2 Energy Consumption of Foundry Industry in Jinzhou District

	Unit	2003	2004
Output	Thousand tons	65	129
Energy consumption per Unit	Tce per ton	0.631	0.341
Total energy consumption	Thousand tce	41	44
Electricity	Million tons	10.93	21.95
Coke	Thousand tons	24	37
CO2 emission	Thousand tons	102.2	106.9

(2) Ownership Reform

Ownership of foundry TVEs in Dalian has been reformed in accordance with the principle of "Cleared ownership, specified responsibility, to have enterprises' management come-away from the direct governmental interference, and scientific management" since 1998. By now, a total of 27 foundry TVEs have been reformed into 21 private enterprises and 6 joint-stock enterprises (see Table 3).

Table 3 Ownership Reform in Foundry Industry of Jinzhou District

	Total No. of enterprises	Enterprises to conduct ownership reform	Enterprises with ownership reform finished	
			Private enterprises	Joint-stock enterprises
Number	27	0	21	6
Percentage	100%	0	78%	22%

(3) Technical level

Table 4 Technical Information Sources of Foundry Enterprises in Jinzhou District

Sources	Number of enterprises	Percentage %
Network	2	7.4
Associations	5	18.5
Colleges, universities and scientific institutes	5	18.5
Domestic enterprise	4	14.9
Foreign countries	6	22.2
Government agencies	0	0
Friends	5	18.5
Total	27	100

Table 4 shows that the main technical information sources of foundry industry in Jinzhou District include foreign countries, scientific institutes, association and friends. So many technical information sources ensure the foundry enterprises to get information on energy saving technology in time and further adoption of the technologies.

It can be learnt from Table 5 that 17% of employees have got primary professional title. It reflects that the employees of foundry industry in Jinzhou District have high educational and professional level and it is helpful to develop energy saving

technology.

Table 6 Statistics of the Staff in Foundry Industry in Jinzhou District

	Number	Percentage (%)
Total number of staff employed	4,446	100
High professional title	89	2
Medium professional title	534	12
Preliminary professional title	222	5
Junior or senior high school	3,379	76
Others	222	5

(4) Market

Dalian is the most developed industrial region in the Northeast China. The gather of many big-sized manufacturing industries, e.g. Dalian Locomotive Plant, Dalian Heavy Machinery Works, Dalian Starter Works and Dalian Dockyard, etc. has formed an approximately 500,000-700,000 tons of market demands for casting.

In the meantime, Dalian, as a key harbor in the Northeast China, is close to Japan and Korea. This geographic advantage attracted many foundries from Japan and Korea to transfer their preliminary casting production, a kind of labor-intensive production, into Dalian where industry is comparably under developing. To a harbor city, the advantage for ocean shipping of such hulking cargos as metal castings is obvious. Traders from Japan and Korea come to Dalian to look for local foundries. They provide local foundry TVEs with latest technology free of charge to help them to produce qualified products. According to the statistics that castings exported to Japan and Korea reaches 400,000 tons every year.

However, for the castings produced by the TVEs are of low and middle grade with low export prices. In addition, due to lack of accordant standards and price coordination system for casting export, TVEs have to fight for foreign orders through out-of-order competitions with each other thus severely disturbed the market order and causing the price of their export depreciated. This, to some extent, ruined the business reputations and hurt the willingness of the TVEs in particular in updating their production process and equipment thereby raising the energy efficiency in their production.

(5) Financial source

Foundry industry in Jinzhou District formed late, most enterprises were built after the Chinese economy reform, therefore in the initial period of building, the main financial sources were bank loan and government demonstration fund.

With the development of Chinese market economy, at present, the capital for technology upgrading are from self-funding and bank loan. The percentage of informal financing is very low (see Table 6).

Table 6 Capital Source for Technical Upgrading in Foundry Industry in Jinzhou District

	Total investment	Self-funding	Bank loan	Government demonstration fund	Informal financing
Investment on technology upgrading (million)	105.84	84.78	18.42	1.69	0.95
Percentage%	100	80.1	17.4	1.6	0.9

2. LPIC Building in Jinzhou District

In order to further strengthen the supervision on safe production, product quality, energy consumption and environmental protection for foundry enterprises, promote the standardized management and technology upgrading in enterprises, advance enterprise's standardized management and the technological transformations, LPIC in Jinzhou District will be built relying on the Economic Development Bureau in Jinzhou District to promote the development of activities on energy conservation and emission reduction.

The member parties of LPIC include Office of District Government, Economic Development Bureau, Environmental Protection Bureau and Science and Technology Bureau in Jinzhou District. The Deputy District Chief of Jinzhou District in charge of industry will act as Director of LPIC, the Director of Economic Development Bureau in Jinzhou District will act as the Deputy Director of LPIC. The office of LPIC is located in the Economic Development Bureau of Jinzhou District.

Because the TVE Bureau was incorporated into Economic Development Bureau in Jinzhou District, the latter conducts the responsibilities former TVE Bureau had, such as: organize implementation of local regulations, laws and policies related to TVEs' development; protect the legal benefit of TVEs and conduct planning, instruction, supervision, coordination and service for TVEs; direct technology progress, renovation and upgrading. Therefore, Economic Development Bureau, as the main administration of foundry industry in Jinzhou District, will play its active role.

3. Policies Related to Foundry Industry in Jinzhou District

In recent years, Dalian has eliminated many enterprises with high energy consumption and low efficiency. Some large-scale enterprises conducted technology and products upgrading in the transformation process. It is necessary for Jinzhou District, as the region for industrial central development, to develop energy saving technology upgrading. Therefore, Dalian Municipal Government and Jinzhou District Government issued a series of policies for development of energy saving technology upgrading in the foundry industry.

3.1 Policy on Reduction and Drawback of Value-added Tax for Foundry Enterprises

According to Notice on Reduction and Drawback of Value-added Tax for Castings and Forgings of MOF and National Administration of Taxation (FR No.2002-141), the value-added tax applied on castings and forgings produced for commercial purpose and sold by foundry enterprises to be used for machine production will be levied in accordance with the relevant regulation first and returned by 35% of the actual tax paid. The returned value-added tax will be used for the research and development of casting and forge products specially. Up to now, there are 4 foundry TVEs listed in the 144 enterprises enjoying the preferential policies.

3.2 Funds for Support of the Development of TVEs in Dalian

In July 2003, Dalian Finance Bureau and TVE Bureau jointly issued a decree to arrange from the governmental budget RMB1.5 million each year to support technical renovation of the key TVEs within the period of 2003-2005. It is mainly used for one year interest subsidy to the development of production capacity and technical renovation in TVEs.

Annual turnover, annual export value (foreign currency earned), employment and taxation as well are described in the documentation. The application to the fund is scheduled by every June 30.

Every year Dalian offers 30 million Yuan to Jinzhou District for TVEs' development, at the same time Jinzhou District government invests 10 million Yuan on encouraging TVEs to export and fetching in foreign capital every year. Another fund of 10 million Yuan offered by District government is for the loan discount of SMEs.

3.3. Environmental Protection Polices

Jinzhou District, as a strong district in heavy industry in Dalian, responds and implements the environmental plan and program actively. Now it is implementing a program entitled "Blue Sky, clean sea and green landscape".

In order to control the air pollution in Dalian, the local government request that all foundries in Dalian must install dust collection devices in their production for reducing the air pollutant. Environmental Protection Bureau levies pollutant discharge fee in the foundry industry. The currently rate for SO_2 discharge is RMB0.60/kg.

After the "The Promotion Law for Cleaner Production", Dalian Environmental Protection Bureau scheduled that 60% of key industrial enterprises in Dalian should meet the requirement of clean production within the Tenth-Five Year period, established a fund dedicated to the pilot of clean production, and provided RMB100,000 to the selected pilot enterprise as the start capital free of charge.

4. Brief Introduction of Replication Enterprises

After the assessment of products, production scale and process, management level and the enthusiasm on energy saving technology upgrading, this project selected 8 enterprises in Jinzhou District for the replication project. The average annual output value of 8 enterprises is over 10 million Yuan and their production processes are representative to some degree. Furthermore, these enterprises have strong willing to develop technology upgrading on energy conservation and emission reduction he basic information of replication enterprises are shown in Table 7.

Table 7 Basic information on Replication Enterprises

No.	Enterprise	Main Products	Annual Output (ton/year)	Main Equipments		Intent on Technology Upgrading
				Name	Specification	
1	Dalian Jinzhou Tianyuan Foundry Machine Factory	Seats and refated product of electric machine	3,000	Cupola	5-ton, 2 sets	1. Increase the capacity of mixing grit machine in dust removal to control the dust into environment. 2. Upgrade the dust removal and control equipments of cupola to reduce the pollution of effect to the environment 3. Upgrade the machines in cleaning and polishing procedure for dust removal
2	Dalian Jinzhou Yuanjie Special Steel Foundry Factory	Special alloy steel casting	2,000	Medium-frequency furnace	GW3-1200-5 , 2 sets	Upgrade the melting equipments
3	Dalian Fengming Alloy Cast Steel Co. Ltd.		1,800	Medium-frequency furnace	GW3-1200-5 , 2 sets	Replace the old electric stove with intermediate frequency with new electric stove (3t) which is environmental friendly and high energy efficiency..
4	Dalian Jinzhou Maolong Industry Co. Ltd.	Valve, water pump, hardware of mining equipment	3,120	Cupola	3.5-ton, 1 set	Upgrade the melting equipments
5	Dalian Yuandong Exact Foundry Co. Ltd.	Exac casting	800	Medium-frequency furnace		Upgrade the equipments for wax mould manufacture
6	Dalian Qianbao Cast Iron Co. Ltd.	Auto parts	5,000	Electric furnace	US Bile 2.5-ton	Add a production line, a smelting stove with capacity of 2 tons, rebuilding thorough cleaning department, the machining equipment.
7	Dalian Jinze Special Casting Co. Ltd.		2,460	Medium-frequency furnace	1-ton, 1set 0.5-ton, 1 set 0.15-ton, 1 set	1. Upgrade the cleaning room for 3.5*3.5*1.5 throwing pellet for dust removal 2. Upgrade dust cleaner in production line for resin sand.
8	Dalian Xinchong Foundry Co. Ltd.	Auto parts and other casting	30,000	Cupola	7-ton, 2 sets	1. Install dust cleaner in automatic casting line to reduce the dust emission 2. Install dust control equipments in cleaning grits to reduce the dust emission 3. Purchase a van for transportation of iron melts with heat preservation to reduce energy loss and ensure the temperature of iron melt.

5. Recommendations on LPIC

(1) Improve the awareness on energy conservation, reduction of energy consumption and environmental protection

Integrate "the Big Dalian", "Green Dalian" and "Tourism City" projects developed by Dalian Municipal Government, strengthen management on environmental protection and energy conservation in foundry TVEs in Jinzhou District, provide service and instruction and improve the awareness of foundry TVEs on resource conservation, reduction of energy consumption and environmental protection.

(2) Conduct technical training and help enterprises develop capacity building

LPIC should invite experts from local and abroad to deliver trainings thus building up the capacity of foundry TVEs in soliciting and identifying information on energy efficiency and new technology thereby raising their technical level, lowering the reject rate and product cost and reducing energy consumption. LPIC may organize enterprises to visit enterprises with high technical level to learn advanced experiences.

(4) Expanding financing sources

LPIC should help enterprises establish many financing sources and realize the multi-subject of investment. LPIC will provide foundry industry with key support by Funds for Support of the Development of TVEs in Dalian, informal financing and foreign capitals. Furthermore, LPIC will commend the loan request of enterprises to PIC and help enterprises strive for rolling fund.

(4) Formulate related polices for the canonical market

Formulate the related policies to ensure the canonical operation of market to control the unfair competition and disorder of the market and forbid the activity of diminishing in price designedly.

Annex 3.2

Statute of Policy Implementation Committee, Jinzhou District

General Provisions

Clause 1 Jinzhou Policy Implementation Committee (hereinafter referred to as LPIC) is an institution led by the Jinzhou district government, which is established to help foundry TVEs in the district to remove policy barriers in applying energy saving technologies.

Clause 2 The objective of the LPIC is to establish effective coordination mechanism, disseminate energy efficient technology and introduce high efficient management system at TVEs to produce high quality and energy efficient product thereby reducing energy consumption and GHG emissions and promoting the sustainable development of foundry TVEs in Jinzhou.

Organization of LPIC

Clause 3 The membership of the LPIC is comprised of four parties including District Government, Economic Development Bureau, Environmental Protection Bureau and Science and Technology Bureau of Jinzhou District.

Clause 4 The LPIC shall have 4 delegates composed of directors of District Government, Economic Development Bureau, Environmental Protection Bureau and Science and Technology Bureau of Jinzhou District.

Clause 5 LPIC delegates, to be nominated by the local government, shall serve a term of three years. If any member organization wishes to delegate its membership to a delegate from within the same office as the actual member a written application of such delegation should be submitted to the district government for approval.

Clause 6 The LPIC will instate one director and three deputy directors. The deputy director of the District Government in charge of industry shall be Director of LPIC, and Deputy Directors of LPIC include the director of the Jinzhou Economic Development Bureau, director of Environmental Protection Bureau and director of Science and Technology Bureau. The Deputy Director can act as Director in his absence. In addition to the normal duties and obligations of a member of LPIC, the Director (or acting Director) chairs meetings of LPIC, signs Minutes and formal correspondence of LPIC.

Clause 7 Under the LPIC, an office is established to be in charge of handling routine matters, conduct the activities required in the PIC's documentation and conference summary and communications with the PIC and the project management office of the UNDP/GEF Chinese TVEs Project. The office is located in the Economic Development Bureau.

Clause 8 The head of Economy Running Division of Economic Development Bureau will act as Office Director.

Functions of LPIC

Clause 9 Main responsibilities of the LPIC are, under the guidance and with the

coordination of the national PIC and the national project management office, to facilitate to remove policy, market, technology and financing barriers encountered by the local foundry TVEs to policy enforcement. Detail responsibilities include the following.

1. Develop and implement action plan aimed at promoting regulatory reform related to the monitoring of energy efficiency at foundry TVEs, and facilitation of the transform of the project implementation into a market-oriented mechanism.
2. Provide TVEs with domestic and international information on advanced technology and policies on energy conservation and emission reduction.
3. Promote the enforcement of national and local policies, regulations and standards related to energy efficiency, technical renovation and environmental protection within foundry industry in Jinzhou.
4. Establish incentive mechanism to promote energy efficient technologies.

Clause 10 Responsibilities of member parties are:

1. District Government shall be responsible for strengthening the support of other government agencies, organizing the united action of LPIC in Jinzhou district, and bring the LPIC's tasks into the work plan of the government.
2. Economic Development Bureau shall be responsible for coordination and be responsible for national PIC. It is the macro administration of TVEs and has the responsibilities on instruction, coordination, supervision and service.
3. Science and Technology Bureau will be responsible for formulating the TVE's science and technology plan, and instructing the TVE's technology upgrading and popularization of science and technology in Jinzhou District.
4. Environmental Protection Bureau will be responsible for supervision on law enforcement the environmental protection, putting forward the specific requirement for the technology upgrading and pollutant discharge and making the replication enterprises' discharge meet related standard.

Governance and working procedures

Clause 11 LPIC will operate by means of meetings, once half a year. The Director, or the Deputy Director in his absence will chair the meetings. A meeting will be considered duly valid if more than 50% of its members are present.

Clause 12 The LPIC Director may call interim meetings as per the request of PIC, and the PMO.

Clause 13 Minutes of meetings and progress reports will be submitted to the national PIC on a regular basis.

Supplementary Articles

Clause 14 This statute will become effective after it is discussed and approved by all LPIC members. LPIC reserves the right for the explanation of this statute.

Annex 3.3

Action Plan of the LPLC in Jinzhou District

1. Project background

The project of "UNDP/GEF Energy Conservation & GHG Emission Reduction in Chinese TVEs" has been funded by GEF. The aim of the project is to help Chinese TVEs that engaged in brick-making, cement, casting and coking to adopt energy efficiency technologies and to reduce GHG emission.

During the project's first phase, there are all kinds of obstacles to the adoption of energy efficiency technologies have been identified and evaluated and strategies to remove the obstacles have been formulated. During the second phase, it has been proposed to establish top-down PLC both at central and local level. The LPLC shall be the new mechanism to remove the policy obstacle and to promote energy efficiency in Chinese TVEs by adopting a market transformation approach. During the third phase, 11 replication areas will be selected to develop LPIC building and overcome the market, policy, technology and financing barriers to the adoption of energy efficiency technologies on the base of experiences in Phase I and II.

In order to realize the objectives set for the project's third phase, to create a sound environment for the replication enterprises and the foundry industry that these enterprises belong to, to promote the implementation of policies, laws and statutes, to establish a mechanism favorable for enterprises to adopt energy efficiency and GHG emission reduction and to extend the experiences accumulated by the demonstration enterprises, the LPIC in Jinzhou District has formulated the action plan.

2. Major Obstacles to Jinzhou TVEs' Adopting Energy Saving Technologies

(1) The market demand is huge but the disordered competition is quite damaging and price self-discipline is absent.

(2) The capacity of foundry TVEs in soliciting and identifying information on energy efficiency and new technology should be strengthened.

(3) The financing sources are too limited, and the ability to use informal financing is weak.

3. Objective

3.1 Short-term objective (2005-2008)

(1) The government signs Energy Efficiency Voluntary Agreement with replication enterprises.

(2) The replication enterprises conduct energy saving technology upgrading and to realize the objective of decreasing unit product's energy consumption by 15% (with the data of 2004 as baseline).

(3) To establish an effective mechanism for foundry industry's sustainable energy efficiency and GHG emission reduction.

3.2 Medium and long term objectives (2009-2010)

(1) In 2010, compared with the data of 2004 (baseline), the ultimate objective of decreasing unit product's energy consumption by 20% will be realized.

(2) To extend the Energy Efficiency Voluntary Agreement in foundry industry and to establish enterprises' self-improving mechanism to promote energy efficiency by adopting a market transformation approach.

4. Implementing Plan

4.1 Government signs EE Voluntary Agreement with promoted enterprises.

Time: July 2005-December 2008

Objective: Government signs Energy Efficiency Voluntary Agreement with replication enterprises; technical upgrading shall be finished before December 31, 2008, and unit product's energy consumption be decreased by 15% compared with the data of 2004(baseline). By December 31, 2010 unit product's energy consumption will be decreased by 20%.

Tasks:

(1) Consult with enterprises and formulate energy saving technology upgrading plans that are to be assessed;

(2) LPIC consults with local government and formulates incentive policy;

(3) Work out Energy Efficiency Voluntary Agreement together with replication enterprises;

(4) Provide technical and financial support;

(5) Sign Energy Efficiency Voluntary Agreement;

(6) According to the stipulations of Energy Efficiency Voluntary Agreement, the implementing progress of the tasks is to be supervised by the third party that has been confirmed by the parties involved in Energy Efficiency Voluntary Agreement;

(7) Summarize the experiences accumulated by replication enterprises and get ready for popularizing the experiences in foundry industry in Jinzhou District.

4.2 Popularize Energy Efficiency Voluntary Agreement

Time: 2009-2010

Objective: LPLC further popularizes Energy Efficiency Voluntary Agreement in foundry industry in Jinzhou District.

Tasks:

(1) Conduct training for foundry industry in Jinzhou District and publicize GEF project;

(2) Conduct survey of foundry TVEs in Jinzhou District;

(3) Collect information of TVEs that are willing to conduct energy efficiency technical upgrading;

(4) Sign the Energy Efficiency Voluntary Agreement with willing enterprises.

4.3 Develop Capacity Building of Technicians and Managers in Foundry Industry

Objective: Strengthen the capacity of foundry TVEs in soliciting and identifying information on energy efficiency and new technology thereby raising their technical level, lowering the reject rate and product cost and reducing energy consumption.

Tasks:

(1) 3-5 technicians are selected from different local foundry enterprises to attend the training.

Time: Every September from 2005 to 2008

Contents:

a. The development trend of foundry industry;

b. The practical technologies of foundry industry;

c. Laws, statutes and technical standards related to foundry industry;

d. Practical operation on imports and exports.

(2) Organize enterprises to visit enterprises with high technical level to learn advanced experiences.

Time: January 2008-January 2010

4.4 Organize trade fairs for order allotment

Time: March 2008

Objective: Open up external market for Jinzhou District's foundry enterprises and determine lowest protection price for foundry products according to market conditions.

Tasks:

(1) Learn foundry product's market information from companies engaged in foreign trade;

(2) Contact with Japanese and South Korean companies that specialize in foundry. Introduce the technical advantages of foundry industry in Jinzhou District to them. This is helpful to know more about the export market;

(3) Learn the foreign trade orders placed by foundry industry in Jinzhou District;

(4) Invite companies engaged in foreign trade, Japanese and Korean businessmen and foundry enterprises in Jinzhou District to conduct trade fair for order allotment;

(5) Try to regularize the trade fairs for order allotment.

4.5 Implement Supporting Fund for Industrial Enterprises for qualified replication TVE

Time: July 2006-December 2008

Objective: Encourage replication TVEs to complete technical renovation, and drive other TVEs to conduct energy conservation and emission reduction voluntarily.

Tasks:

According to the Temporary Regulations on Encouragement and Support for Industrial Enterprises' Development in Jinzhou District, the district government will provide a special fund of 10 million Yuan to support the important enterprises to develop technical renovation as loan discount of fixed assets investment or subsidy. If the replication TVE finish the technical renovation and pass the test, LPIC will implement the preferential policy, which is the District Government will provide the TVEs with the supporting fund equal to the GEF investment. The purpose is to promote more TVEs to conduct energy conservation and emission reduction voluntarily.

4.6 Apply for loan for cleaner production's extension of the TVEs which signed VA

Time: July 2008-December 2010

Objective: Encourage TVEs to conduct energy conservation and emission reduction

voluntarily.

Tasks:

According to the requirement of "tenth-five plan", 60% of the industries should realize cleaner production by the end of "tenth-five"; Loan for Cleaner Production's extension shall be used to encourage the enterprises that sign EE Voluntary Agreement to develop the cleaner production audit for energy conservation and GHG reduction. Preferential policy such as accelerating the depreciation of the equipment listed in government's cleaner production catalogue.

4.7 Conduct on-the-spot meeting to introduce the experiences of those enterprises that sign Energy Efficiency Voluntary Agreement and to promote its extension and publicity

Time: December 2009

Objective: Extend Energy Efficiency Voluntary Agreement

Tasks:

(1) Print pamphlets on energy saving technology and distribute them to enterprises engaged in foundry and deep processing of agricultural and sideline products.

(2) Organize on-the-spot meeting to introduce the experiences of those enterprises that sign Energy Efficiency Voluntary Agreement

5. Follow-up and report of the action plan

According to local realities, LPIC formulates report on the previous year's work every January and works out *Annual Working Plan of LPIC of Jinzhou District*. The report is to be submitted to national PIC secretariat before January 31. The secretariat is to collect all the submitted reports and reports to MOA's GEF office. All the reports are to be evaluated by the office and each action plan shall be revised according to the evaluation results.

Annex 4.1

Field Survey Report on Energy Conservation & GHG Emissions Reduction in Brick Making Industry in Shuangliu County, Chengdu City

According to the framework and requirement of the subcontract of Phase III of *UNDP/GEF Energy Conservation & GHG Emissions Reduction in Chinese TVEs – Phase II*, a study tour group, led by Ms. Wang Guiling, PMO deputy director, consisting of subcontractor experts went to Shuangliu County, and conducted a seven-day tour from Aug 10 to 16, 2005. Workshops with County Government, SME Bureau, Environmental Protection Bureau and Construction Bureau, field study and questionnaire answering on replication enterprises had been held in order to remove the market, policy, technology and financing obstacles that have been identified in the process of producing, marketing and applying energy efficiency technology in Xi'an city's brick making industry. Another purpose of the tour is to direct the establishment of LPIC in the city and promote its capacity building. The field study results are as follows:

1. Brief Introduction of Brick Making Industry in Shuangliu County

Shuangliu County is in the outskirts of Chengdu City covering 1,067 km^2. It has 26 towns (street offices) and population of 906 thousand. In recent years, Shuangliu County persists in planning the development of city and rural areas as a whole and the new industrialization, agricultural industrialization and unification of city and rural areas make rapid progress. In 2004, the GDP of Shuangliu County was 17.345 billion Yuan, the fiscal revenue was 1.35 billion Yuan and the farmer's annual income per capita was 4,293 Yuan. Its comprehensive strength ranks the first in Sichuan Province for 9 years in succession, ranking the 45th among "one hundred prosperous countries" in China. The fiscal revenue from Jan to July 2005 accumulated to 1.024 billion Yuan. The economic developing trend is very strong.

1.1 Status of Brick Making Industry in Shuangliu County

(1) Developing process

The development of brick making industry in Shuangliu has three periods:

The first is the initial period of development of collective "Five Small Kinds of Enterprises" in rural areas (1980-1994). At the beginning of reform, over 70 clay brick making enterprises set up in Dongshan, Mumashan and other towns and villages. The output reached 1.2 billion pieces. All these enterprises promoted the rural industrial development at that time, but they destroyed surrounding plants and air environment for their careless management, small scale and lagged equipments.

The second is the carving out period driven by industrial multi-economy (1995-1999). Since 1995, industrial economy of Shuangliu has been in the key phase of the second carving out period. The TVEs began technical upgrading and structure adjustment. The "Five Pillar Industries" had certain scale and the main body includes medicine, electronic equipments, machine manufacture, new construction materials and light industry products. In this period, the reform in investment structure attracts a large mount of informal capital invested in construction engineering and materials industries. There were over 100 clay brick making enterprises. The output was nearly 2 billion pieces of standard bricks and over 10 thousand rural labors were employed in the industry. Brick making industry became the main economic pillar and the ways for farmer getting rich. This period is the most flourishing period for clay brick making enterprises in Shuangliu County.

The third is the transition period of restriction for clay bricks and encouragement for

new shale brick (2000 to now). In 1999, to change the situation in which the most brick products are clay bricks, protect farmland save energy and resources effectively, 7 national government agencies issued the schedule for restricting clay brick production in the whole country. On May 21, 2003, Chengdu Municipal government issued Provisional Measures on Prohibiting Production and Use of Solid Clay Brick in Chengdu. The documentation prescribed that since June 1, 2003, the production and use of solid clay brick should be prohibited. Within Chengdu's administrative region, no project shall be passed for newly building, rebuilding or expanding solid clay brick production lines. Those enterprises that get soil from arable shall be closed and the production of those that get soil from non-arable land shall be stopped by December 31, 2005. Shuangliu County took effective measures actively and made the schedule for production restricted and forbidden according to the arrangement of Chengdu City. From Jan 2001, Shuangliu began to close, stop, combine and transfer the clay brick making enterprises in Shengli, Gongxing, Huangjia, Huayang and other towns on shallow mounds. After 3-year effort, by March 2003, Shuangliu had closed over 50 clay brick making enterprises in towns on shallow mounds. By May 2004, nearly 20 clay brick making enterprises in towns on deep mounds were closed. All clay brick making enterprises have been closed or transferred products. For the rich shale resources in Shuangliu County, during the period of production restricted and close, many brick making enterprises began turn to shale brick production which doesn't require high investment and technical level. At present, there are 55 shale brick making enterprises in Shuangliu County, and the scale designed and actual production capacity has reached the level in the most flourishing period of clay brick production.

(2) Industrial scale

At present, there are 55 brick making enterprises. The annual out is 1.5 to 1.8 billion pieces bricks, which occupies 30% of the total brick output in Chengdu City. As shown in Table 1, in 2004, the staff of brick making industry represented 15% of that of TVEs in Shuangliu, but the total output value just occupied 0.5% of that of TVEs.

Table 1 Basic Data of Brick Making Industry in Shuangliu County

	Unit	Brick industry		TVEs		Percentage of brick industry to TVEs in 2004 (%)
		2003	2004	2003	2004	
Number of Factories		48	52	4,970	5,042	1
Total output value	100 million RMB Yuan	5,000	5,500	890,000	1,070,000	0.5
Staff employed	Person	8,500	11,700	70,714	78,281	15
Total profit payments and tax turnover	10,000 RMB Yuan	520	560	93,000	125,000	0.4

(3) Energy consumption

Small-scaled brick making industry in Shuangliu is energy-intensive. 244.44 thousand Tce was consumed and total CO_2 emission was 618.43 Ton in 2004 (see Table 2). The adoption of energy efficiency and GHG emission reduction technologies shall contribute to local environment quality improvement and enhancement of technical level.

Table 2 Energy Consumption and CO_2 Emission of Brick Making Industry in Shuangliu

	Unit	2003	2004
Output	10,000 pieces	135,200	174,600
Energy consumption Per Unit	Tce per 10,000 pieces	1.4	1.4
Total energy consumption	10,000 Tce	18.928	24.444
CO_2 emission	10,000 Ton	47.888	61.843

(4) Ownership reform

Ownership reform has been conducted since 1999. At that time all of the 102 brick making enterprises were owned by villages. In 1999 Shuangliu began the ownership reform in brick making industry according the unite arrangement of Sichuan Province. By 2000, 60% of brick making enterprises had finished the ownership reform; by 2001, the percentage reached 90%; by 2002, all the brick making enterprises had finished ownership reform. Currently, 94.5% of the 55 enterprises are private owned (see Table 3). After the reform finished, the investment for technology upgrading is increased evidently. The reason is that many enterprises were managed by individuals in the form of contract; the contractors focused on benefit in short time and had little enthusiasm for technology upgrading.

Table 3 Ownership Reform in Brick Making Industry

	Number of enterprises	Enterprises to conduct property reform	Enterprises with property reform finished	
			Private owned	Co. Ltd.
Number	55	0	52	3
Percentage	100%	0	94.5%	5.5%

1.2 Main Problems for the Development of the Brick Making Industry

(1) The low technical level, the limited sources for technical information and the low educational level of staff

The proportion of mechanization is quite low and only 6 enterprises adopt the technical process of artificial drying and the rest adopt natural drying.

Table 4 shows that the most technical information is got from industrial magazines and government agencies. For the Association of New Materials Industry in Shuangliu was established at the beginning of 2005, its role on technical information communication is not brought into play absolutely. Only 3 enterprises get technical information from the association.

Table 4 Technical Information Sources

Sources	Number of enterprises
Network	3
Associations	3
Industrial magazine	20
Domestic enterprise	2
Government agencies	15
Friends	10
Technical transfer market	2
Total	55

Table 5 shows the staff structure in the industry. Less than 2% employees have got primary and medium professional title. The low educational and technical level of staff is one of the reasons why the technical level of the industry is low.

Table 5 Statistics of the Staff in Brick Making Industry

	Number	Percentage (%)
Total number of staff employed	11,700	100
High professional title	0	0
Medium professional title	85	0.7
Preliminary professional title	122	1.0
Junior or senior high school	3,850	32.9
Other	7,643	65.3

For the scale of most enterprises is small and the technical level is low, the quality of products is irregular. Many products have good appearance but others are lack of angles and with cracks for the improper duration for burning.

(2) Disordered market

For the shale brick making enterprises started late and their experiences are deficient, the capacity of market analysis is relatively weak the problem of supply exceeding demand is severe.

(3) Difficulties in financing

Co-financing of all of the 6 replication enterprises are from the accumulation of enterprises' development. For the more and more requirement on brick making industry are put forward by Sichuan Province and Chengdu City, it's very difficult for enterprises to get bank loan as investment on technical upgrading. The reason is that the brick factories utilize the rented resource and have no property right over the land, so the land cannot be mortgaged. Most factories have not enough equipment and workshop building as mortgage, so it is very hard for them to get loan.

2. Management Status of the Brick Making Industry in Shuangliu County

2.1 Governmental Agencies

The main administrations and their responsibilities for brick making industry in Shuangliu are shown in Figure 1.

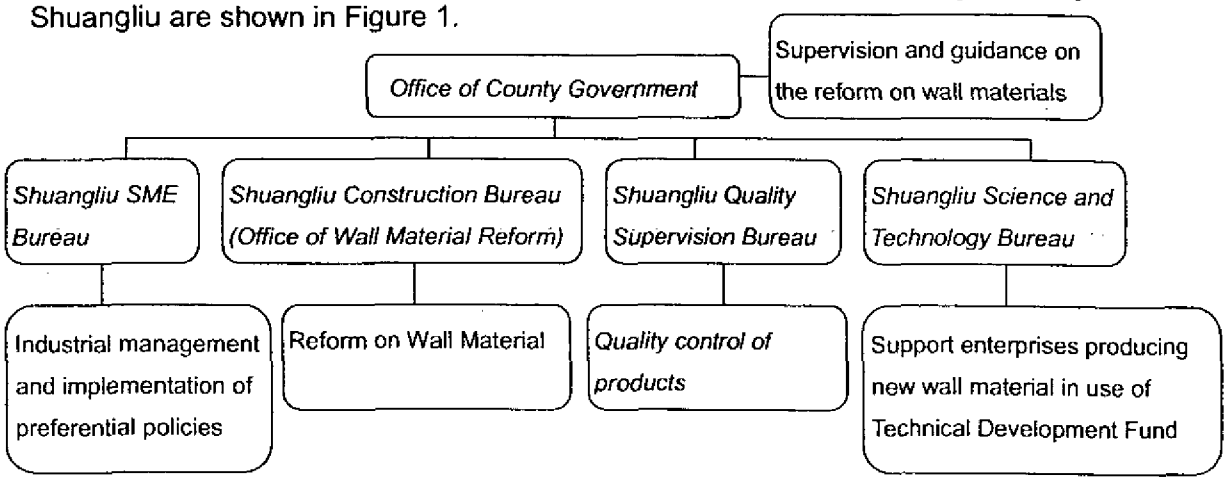

Figure 1 Organizational Structure of the Supervision on Brick Making Industry

In practice, the Shuangliu Land Resource Bureau, Shuangliu Environmental Protection Bureau and Shuangliu Safety Supervision Bureau all have responsibilities related to brick making industry. To accelerate the scaled and intensive development of the industry, Shuangliu fetched in a set of leading enterprises with the investment of several hundreds of million. So it is necessary to develop the effective mechanism for coordination and cooperation among different agencies.

2.2 Industrial Association

Some problems exist in the production of wall materials, especially the shale bricks in Shuangliu County and surrounding districts, countries and cities, like the low production level and booming development, which cause severe supply exceeding demand. With the rapid step for development to the south of Chengdu City, most enterprises in the New Area in the north of Shuangliu, as an important part of New City in south of Chengdu, face the threat to living space. It is urgent to strengthen the cooperation in the industry and develop multi-industry on wall materials. Therefore, the shale brick making enterprises set up the Association of New Materials Industry (hereinafter referred to Association) in Shuangliu County at the beginning of 2005 with the support of Shuangliu SME Bureau and related government agencies. Its members are composed of over fifty enterprises in Shuangliu. Furthermore, the leaders of over 10 administrations, like City Construction Bureau, Land Resource Bureau, Quality Supervision Bureau, were invited to be the advisories. After its establishment, the Association has provided over 10 enterprises with technical instruction and service. Under the leading of government, the Association conducted price rectification for shale brick in sale and prevented unfair competition.

It has been just less than one year since the Association was established, so it didn't play its role in technical information transfer and developing industrial rule for development absolutely.

3. LPIC Building in Shuangliu County

To strengthen the supervision on safety production, development and use of resources, quality of products, energy consumption and environmental protection in shale brick making enterprises, promote the standardized management and technology upgrading in enterprises, Shuangliu County set up the LPIC in Shuangliu which is led by County Office for Promotion and relies on Shuangliu SME Bureau. The LPIC will push the energy conservation and emission reduction to further development in Shuangliu.

The 13 member parties of LPIC include Office of County Government (County Office for Promotion), SME Bureau, Construction Bureau (Office of Wall Materials Reform), Land Resource Bureau, Science and Technology Bureau, Industrial and Business Bureau, Price Bureau, Environmental Protection Bureau, National Tax Bureau, Quality Supervision Bureau and Safety Supervision Bureau. The deputy head of Shuangliu County in charge of industry will be the director of LPIC, the deputy directors of LPIC include the director of County Office for Promotion, deputy director of Office of County Government, director general of Construction Bureau and director general of SME Bureau. The office of LPIC is located in Office of SME Bureau.

The main responsibilities of Shuangliu SME Bureau include: to organize and implement the local laws, regulations, and policies related to TVEs and SMEs' development; to protect the legal rights and benefits of TVEs and SMEs and provide planning, instruction, supervision, coordination and service for them; to study the development strategy for TVEs and SMEs; to instruct the reform of TVEs and SMEs and suggest on the policies related to the big problems during their development; to instruct the technical improvement, innovation and upgrading of TVEs and SMEs;

Information statistic and service for TVEs and SMEs. The development of brick making industry is one of the important responsibilities of SME Bureau. Furthermore, the Association is set up under the SME. Thus the model of "LPIC plus Association" is developed. It ensures the general understanding on brick making industry in Shuangliu that LPIC relies on SME Bureau. It is helpful for LPIC's development and its instruction on future energy conservation and emission reduction.

4. Policies Related to Brick Making Industry in Shuangliu County

During the Tenth Five-year period, Chengdu City became the National Model City for Environmental Protection, but the problems on resources and environment are severe, such as the too low percentage of wastewater treated to the total in the districts and countries except for the central areas, more severe pollution from cars and the low level of integrated use of industrial solid waste. According to related materials, among 15 cities junior to province, the resource pressure of Chengdu ranked No. 7 and the city ecological pressure index ranked No.15, so the pressure on the resource and ecological environment is huge. During the Eleventh Five-year period, the economy growth of Chengdu will keep high speed, the process of industrialization will be accelerated and the cost for pollution control will be higher and higher. This requires more arduous tasks for land, energy and environmental protection. Therefore the development of circular economy will be the necessary choice to solve the problems on resource, energy and environment.

In August 2005, Chengdu issued the Temporary Opinion for Development of Circular Economy of Chengdu Municipal Government. The Opinion confirms the target for development of circular economy in Chengdu in the future 5 years: By 2010, the ecological industrial circular system, resource circular system and green consumption system should be set up, formulate the effective incentive mechanism, policy and regulation system and institutional assurance system and accelerate the building of resource saving and environmental friendly society. This documentation prescribes that to promote energy conservation and energy consumption reduction actively in the future 5 years and develop activities for resource saving in production, construction, currency and consumption; Pay attention to technology and equipments on reduce, reuse and recycle to provide technical assurance for efficient resource use, recycling and waste discharge reduction. These polices establish good policy basis for further energy conservation and reduction of energy consumption activities of brick making industry in Shuangliu.

Sichuan Province, Chengdu City and Shuangliu County formulate special policies for the development of brick making industry as follows

4.1 Prohibition of Production and Use of Solid Clay Brick

On May 21, 2003, Chengdu Municipal government issued Provisional Measures on Prohibiting Production and Use of Solid Clay Brick in Chengdu. It said, since June 1, 2003, the production and use of solid clay brick should be prohibited. Within Chengdu's administrative region, no project shall be passed for newly building, rebuilding or expanding solid clay brick production lines. Those enterprises that get soil from arable shall be closed and the production of those that get soil from non-arable land shall be stopped by December 31, 2005. In order to reinforce the effect of the Provisional Measures on Prohibiting Production and Use of Solid Clay Brick, it also made some stipulations on responsibilities and punishments for institutions engaged in designing and constructing solid clay brick production lines.

Shuangliu County has actively implemented the above-mentioned document and closed over 70 clay brick making enterprises in the deep or shallow mound areas. All of the clay brick making enterprises in Shuangliu were closed or transferred products.

4.2 Levying Only Half of the Value-added Tax

According to the Notice on Levying Value-added Tax for Utilization of Some Resources and other Products, which was issued by Ministry of Finance and State Administration of Taxation of China on December 1, 2001, some new wall materials and products such as shale brick shall enjoy the favorable policy that only half of the value-added tax shall be levied. The policy was vigorously implemented in the 6 surveyed enterprises in Shuangliu County.

The implementation of the Provisional Measures on Prohibiting Production and Use of Solid Clay Brick has restricted the production and marketing of the solid clay brick. The supplementary policies such as levying half of the value-added tax for shale brick and levying all the value-added tax for solid clay brick, has discouraged the production of solid clay brick. The solid brick has been forced out of Chengdu market. The former 33% market shall enjoyed by solid brick has been replaced by shale brick and there is a promising market for the production of shale brick.

4.3 Environmental Protection Policies

According to the newly issued Regulation on Collecting and Using Pollution Fee and the Implementing Method formulated by some provincial department, Shuangliu County has worked out the specific way to collect SO2 pollution fee. The fee is paid according to the actual SO2 emission amount tested by local environment protection administration. The unit fee standard for SO2 emission is 0.6 Yuan/kg.

Shuangliu Environmental Protection Bureau requires new built, rebuilt or enlarged brick making enterprises to implement EIA and Three Qualifications System.

Shuangliu Environmental Protection Bureau conducts survey and research on environmental capacity and implements plan for pollutant's amount control. Specific measures include (1) close and wash out the small enterprises and lagged production process with severe pollution and bad benefit to reduce pollution load ;(2) make the amount control as main factors for project examination and approval to realize increase on production and reduction in pollutant; (3) enhance the level of pollution prevention and control of enterprises; (4) conduct on line monitoring and controlling for the key pollution sources to ensure the general discharge meeting the standard.

The above documentations prescribe stricter requirement for pollution control and energy efficiency enhancement of brick making enterprises in Shuangliu County.

5. Brief Introduction of the Replication Enterprises

After the assessment of products, production scale and process, management level and the enthusiasm on energy saving technology upgrading, this project selected 6 enterprises for the replication project. The average annual output of 6 enterprises are over 25 million pieces, occupied 50% of the total output of Shuangliu. Their production processes are representative to some degree. The basic information of replication enterprises is shown in Table 6.

Table 6 Information on Energy Saving Technology Upgrading of Replication Enterprises in Shuangliu

No.	Enterprise	Before Renovation				Technical Renovation	Before Renovation			
		Output (10,000 bce/a.)	Energy Use/Unit Product (tce/10,000 bce)	Total energy use (tce)	CO2 Emissions (t/a.)		Output (10,000 bce/a.)	Energy Use/Unit Product (tce/10,000 bce)	Energy Savings (tce/a.)	CO2 emission Reduction (t/a.)
1	Shuangliu Gaofeng Shale Hollow Brick Plant	2,400	1.97	4,729.04	11,789.51	① Replace the old brick and felt inside the kiln ② Replace the base and roof of brakes	3,000	1.30	2,012.51	5,017.18
2	Shuangliu Changhong Shale Hollow Brick Plant	2,400	1.86	4, 470.66	11,145.35	①Install reactive power compensation for the inductance burthen ②Replace the old brick and felt inside the kiln, then enhance pressurization ③ Replace the hammer blow engine from PC-800 to PC-1200	3,000	1.25	1,839.52	4,585.93
3	Chengdu Sanli Shale Hollow Brick Ltd.	2,700	1.87	5, 048.68	12,586.36	①Install reactive power compensation for the inductance burthen ②Replace the old brick and felt inside the kiln, then enhance pressurization ③ Replace the hammer blow engine from PC-800 to PC-1200	3,200	1.20	2,144.90	5,347.23
4	Shuangliu Liugonghui neng Shale Brick Plant	2,600	1.76	4, 568.28	11,388.71	①Replace the old brick and felt inside the kiln, then enhance pressurization, adopt infrared thermoscope ②Replace the current electric transformer ③Build artificial desiccation room with 8-10 paths	3,300	1.28	1,564.30	3,899.79
5	Shuangliu Jiancha Shale Brick Plant	2,400	1.87	4, 476.28	11,159.36	①Install reactive power compensation for the inductance burthen ②Replace the old brick and felt inside the kiln, then enhance pressurization ③ Replace the hammer blow engine from PC-800 to PC-1200	3,000	1.25	1,848.95	4,609.42
6	Shuangliu Huayangho nghuo Shale Hollow Brick Plant	2,700	1.87	5,056.95	12,606.98	①Install reactive power compensation for the inductance burthen ②Replace the old brick and felt inside the kiln, then enhance pressurization ③ Replace the hammer blow engine from PC-800 to PC-1200	3,300	1.28	1,958.04	4,881.39

When replication enterprises finished the technology renovation, the production capacity will be increased by 18% to 25%, the energy consumption per unit product will be decreased by over 25%. The CO_2 emission will be reduced by 20% on average.

6. Conclusions and Recommendations

6.1 Conclusions

(1) The implementation of the 3rd phase project will make full use of the local shale resources and reduce the GHG emission.

(2) The technical level is low, the technical information sources are limited and the educational level of staff is low.

(3) Limited capital sources restrict the technology upgrading of enterprises.

(4) The incentive policies on energy conservation and emission reduction are imperfect.

6.2 Recommendations

(1) Expand the technical information sources and conduct technical training

LPIC should expand the technical information sources by visit, lectures of experts and association publicizing the technical information regularly.

LPIC should conduct training on technology and energy efficiency management for technicians on the basis of the technical level of the industry. This will provide human resource for energy efficiency and for removing market, policy, technical and financial obstacles.

(2) Provide financial support for technology upgrading of brick making enterprises

LPIC should strengthen the financial support for technology upgrading of brick making enterprises, and direct all kinds of capital like personal investment, informal loans and etc into brick making industry.

(3) Perfect the incentive mechanism which encourages enterprises to develop energy saving technology upgrading.

(4) Strengthen the dissemination on energy conservation and emission reduction.

LPIC should promote the enterprises' understanding on importance of energy saving and reducing energy consumption and encourage more enterprises to adopt energy saving measures to reduce the energy consumption.

Annex 4.2

Statute of Policy Implementation Committee, Shuangliu County

General Provisions

Clause 1 Shuangliu Policy Implementation Committee (hereinafter referred to as the LPIC) is an institution under the leadership of Shuangliu County Government, which is established to assist the local brick making industry in applying high efficient energy saving technology and overcoming various policy, market, technology and financing barriers to the application.

Clause 2 The objective of the LPIC is to disseminate energy efficient technology and introduce high efficient management system at TVEs to produce high quality and energy efficient product thereby reducing energy consumption and GHG emissions and promoting the sustainable development of brick making TVEs in Shuangliu.

Organization of the LPIC

Clause 3 The membership of the LPIC is comprised of thirteen parties including Office of County Government (County Office for Promotion), SME Bureau, Construction Bureau (Office of Wall Materials Reform), Land Resource Bureau, Science and Technology Bureau, Fiscal Bureau, Industrial and Business Bureau, Price Bureau, Environmental Protection Bureau, Power Supply Bureau, National Tax Bureau, Quality Supervision Bureau and Safety Supervision Bureau.

Clause 4 The LPIC shall have 16 delegates (including one director and two deputy directors) composed of leaders from Office of County Government, County Office for Promotion, Construction Bureau, Environmental Protection Bureau, Land Resource Bureau, Science and Technology Bureau, Quality Supervision Bureau, Safety Supervision Bureau, Fiscal Bureau, Industrial and Business Bureau, Price Bureau, National Tax Bureau, Power Supply Bureau and Association of New Wall Materials Industry.

Clause 5 The delegates, to be nominated by the managing leaders of respective agencies and appointed after the agreement of all member parties, shall serve a term of three years. If any member party wishes to renew its delegate to the committee, a written application for the renewal should be submitted to the office of LPIC for approval.

Clause 6 The LPIC will instate one director and four deputy directors. The deputy head of Shuangliu County in charge of industry will be the director of LPIC, the deputy directors of LPIC include the director of County Office for Promotion, deputy director of Office of County Government, director general of Construction Bureau and director general of SME Bureau; The Deputy Director can take care of routine matters as Director in his absence. In addition to the normal duties and obligations of a delegate of the LPIC, the Director (or Deputy Director) chair meetings of the LPIC, signs Minutes and formal correspondence on behalf of the LPIC.

Clause 7 Under the LPIC, an office is established to be in charge of handling routine matters, conduct the activities required in the PIC's documentation and conference summary and communications with the PIC and the project

management office of the UNDP/GEF Chinese TVEs Project. The office is located in the office of SME Bureau. Director of SME Bureau will be the director of Office.

Clause 8 The office staff consists of local experts and staff of SME Bureau in Shuangliu.

Functions of the LPIC

Clause 9 Main responsibilities of the LPIC are, under the guidance and with the coordination of the national PIC and the national project management office, to facilitate to remove policy, market, technology and financing barriers encountered by the local brick making TVEs to policy enforcement. Detail responsibilities include the following.

1. Develop and implement action plan aimed at promoting regulatory reform related to the monitoring of energy efficiency at brick making TVEs, and facilitation of the transform of the project implementation into a market-oriented mechanism.
2. Push forward TVEs to sign the VA with local government authorities.
3. Provide TVEs with domestic and international information on advanced technology and policies on energy conservation and emission reduction.
4. Promote the enforcement of national and local policies, regulations and standards related to energy efficiency, technical renovation and environmental protection within brick making sector in Shuangliu.
5. Establish incentive mechanism to promote energy efficient technologies, and have best practices in energy conservation and emissions reduction replicated throughout the county.
6. Recommend to the national PIC rewards to organization(s) or individual(s) with remarkable performance

Clause 10 Responsibilities of member parties are:

1. Office of County Government should be responsible for assisting the Director of LPIC in strengthening the lead and the supervision of wall materials reform in the county.
2. SME Bureau should be responsible for administrative supervision on brick making industry, implementing of national, provincial and municipal preferential polices related to integrated use of resources and technical renovation and management of the industrial association.
3. Construction Bureau (Office of Wall Materials Reform) should be responsible for implementation of Standard for Design of Energy Saving Building for Living, assisting in solving the technical problems on energy saving building and new wall materials; formulating the detailed rules for implementation of wall materials reform; levying, returning and management of the New Wall Materials Fund; associate related agencies to develop and implement planning for wall materials; certification of wall materials enterprises.

4. Land Resource Bureau should be responsible for management of land used by brick making enterprises and the application for Permit for Mining and Permit for Land Use, organizing brick making enterprises to conduct the re-cultivation.

5. Science and Technology Bureau should be responsible for supporting the enterprises in use or production of new wall materials and demonstration projects by Science and Technology Development Fund; Bringing the research and technology development into the Key Science and Technology Plan first.

6. Fiscal Bureau should be responsible for implementation of national preferential policies related to renovation on wall materials and energy saving building and assisting in the supervision on New Wall Materials Fund.

7. Industrial and Business Bureau should be responsible for the registration and annual examination of brick making enterprises.

8. Price Bureau should be responsible for the levying of New Wall Material Fund.

9. Environmental Protection Bureau should be responsible for the EIA for brick making enterprises and levying pollutant discharge fee; supporting the enterprises in production of new wall materials and demonstration projects on energy saving building by environmental protection fund.

10. Power Supply Bureau should be responsible the power supply for brick making enterprises.

11. National Tax Bureau should be responsible for implementation of national and local preferential tax policies related to production of new wall materials and energy saving building.

12. Quality Supervision Bureau should be responsible for the supervision on the standard and quality of products and monitoring construction material market.

13. Safety Supervision Bureau should be responsible for the supervision and guidance on safe production for brick making enterprises.

Working Procedures

Clause 11 The LPIC operates by means of meetings, once half a year. The Director, or the executive deputy director at the director's absent, will chair the meetings. A meeting will be considered duly valid if more than 50% of its members are present.

Clause 12 The LPIC Director may call interim meetings as per the request of PIC and the PMO. Minutes of the meeting should be developed if necessary.

Clause 13 Minutes of meetings and progress reports will be submitted, by means of telephone or e-mail, to the national PIC and the project management office on a regular basis.

Supplementary Articles

Clause 14 This statute will become effective on the date after it is discussed and approved by all LPIC members. The Office of LPIC reserves the right for the explanation of this statute.

Annex 4.3

Action Plan of the LPLC in Shuangliu County

1. Project Background

The project of "UNDP/GEF Energy Conservation & GHG Emission Reduction in Chinese TVEs" has been funded by GEF. The aim of the project is to help Chinese TVEs that engaged in brick-making, cement, casting and coking to adopt energy efficiency technologies and to reduce GHG emission.

During the project's first phase, there are all kinds of obstacles to the adoption of energy efficiency technologies have been identified and evaluated and strategies to remove the obstacles have been formulated. During the second phase, it has been proposed to establish top-down PLC both at central and local level. The LPLC shall be the new mechanism to remove the policy obstacle and to promote energy efficiency in Chinese TVEs by adopting a market transformation approach. During the third phase, 11 replication areas will be selected to develop LPIC building and overcome the market, policy, technology and financing barriers to the adoption of energy efficiency technologies on the base of experiences in Phase I and II.

In order to realize the objectives set for the project's third phase, to create a sound environment for the replication enterprises and the brick making industry that these enterprises belong to, to promote the implementation of policies, laws and statutes, to establish a mechanism favorable for enterprises to adopt energy efficiency and GHG emission reduction and to extend the experiences accumulated by the demonstration enterprises, the LPIC in Shuangliu County has formulated the action plan.

2. Major Obstacles to Shuangliu TVEs' Adopting Energy Saving Technologies

(1) The technical level is low, the technical information sources are limited and the educational level of staff is low;

(2) The enterprises have difficulties in obtaining finance because they have no land tenure right and have no capital for mortgage;

(3) The incentive policies on energy conservation and emission reduction are imperfect.

3. Objective

3.1 Short-term objective（2005-2008）

(1) The government signs Energy Efficiency Voluntary Agreement with 6 replication enterprises.

(2) The replication enterprises conduct energy saving technology upgrading and to realize the objective of decreasing unit product's energy consumption by 10% to 15% on the basis of the energy consumption level of different enterprises (with the data of 2004 as baseline).

3.2 Medium and long term objectives（2009-2010）

(1) In 2010, compared with the data of 2004 (baseline), the ultimate objective of decreasing unit product's energy consumption by 15% to 20% will be realized on the basis of the energy consumption level of different enterprises.

(2) To extend the Energy Efficiency Voluntary Agreement in brick making industry and to establish enterprises' self-improving mechanism to promote energy efficiency by adopting a market transformation approach.

4. Implementing Plan

4.1 Government signs EE Voluntary Agreement with promoted enterprises.

Time: July 2005—December 2008

Objective: Association signs Energy Efficiency Voluntary Agreement with replication enterprises; on the basis of the energy consumption level of different enterprises, energy efficiency technical upgrading will be finished before December 31, 2008 and unit product's energy consumption be decreased by 10% to 15% compared with the data of 2004(baseline). By December 31, 2010 unit product's energy consumption will be decreased by 15% to 20%.

Tasks:

(1) Consult with enterprises and formulate energy saving technology upgrading plans that are to be assessed;

(2) Identify barriers to the implementation of the plan;

(3) LPIC consults with local government and formulates incentive policy;

(4) Work out Energy Efficiency Voluntary Agreement together with replication enterprises;

(5) Provide technical and financial support;

(6) Sign Energy Efficiency Voluntary Agreement;

(7) According to the stipulations of Energy Efficiency Voluntary Agreement, the implementing progress of the tasks is to be supervised by the third party that has been confirmed by the parties involved in Energy Efficiency Voluntary Agreement;

(8) Summarize the experiences accumulated by replication enterprises and get ready for popularizing the experiences in brick making industry in Shuangliu.

4.2 Conduct training for technicians of brick making enterprises and establish the energy efficiency supervisor system

Time: September 2005-June 2008

Objectives: To provide human resource for energy efficiency and for removing market, policy, technology and financing obstacles.

Tasks:

(1) 3-5 technicians are selected from different local brick enterprises to attend the training.

Time: September 2005

Locus: Shuangliu county of Sichuan Province

Contents:

a. The development trend of brick making industry;

b. The practical technologies of brick making industry;

c. Laws, statutes and technical standards related to brick making industry;

d. Rules for safe operation in brick making industry;

e. *Energy efficiency management for brick industry.*

(2) Establish Energy Efficiency supervisor system in brick factories

Time: June 2006-June 2008

Tasks:

a. Technicians who participated in the above-mentioned training will be the Energy Efficiency supervisors of different enterprises. The supervisors establish supervisor system (draft) according the enterprises' realities.

b. Operate according to the system and make records.

c. Compare energy efficiency situations before and after establishing the system.

d. Find out the system's shortcomings and revise the system accordingly and form formal system.

e. Exchange the experiences accumulated from implementing Energy Efficiency supervisor system within Shuangliu county.

4.3 Strengthen the capacity building of the Association of New Wall Materials Industry in Shuangliu

Time: December 2005—June 2008

Objective: Strengthen the capacity building of the association to make it play more important role in popularization of new wall materials and self-discipline of brick making enterprises.

Tasks:

(1) Set up the full time group in charge of routines of the association and establish the routine system, examination and assessment system, adjustment system for production and sale, regular meeting system, training system on technology and safety for staff under the guidance of administrations;

(2) Develop extensive communication and cooperation and explore the ways for shale brick making enterprises to survive and develop;

(3) Collect information on technical trend of new wall materials, set up the database for policies and technologies related on brick industry and new wall materials and develop the system to publicize information regularly.

4.4 Strengthen the capacity of enterprises to obtain information

Time: January 2008—January 2010

Objective: Strengthen the capacity of enterprises to obtain information

Tasks:

(1) Organize the visit to provide brick making enterprises with chances to learn domestic and international advanced technology and experiences;

(2) Invite industrial experts to give technical courses of lectures;

(3) Industrial association will set up the database for policies and technologies related on brick industry and new wall materials and develop the system to publicize the information regularly.

4.5 Implementation of preferential policies for those enterprises that sign Energy Efficiency Voluntary Agreement

Time: July 2008–December 2009

Objectives: Implementation of preferential policies for those enterprises that sign Energy Efficiency Voluntary Agreement

Tasks:

(1) Win credibility surety fund, technical renovation fund and wall materials reform fund for those medium and small scale enterprises;

(2) Guide the enterprises to conduct energy efficiency and GHG emission reduction activities and accelerate the depreciation of the equipment listed in government's cleaner production catalogue.

(3) The proportion of the cost incurred for researching and developing technologies for energy efficiency and GHG emission reduction shall be increased and included in overhead expenses.

4.6 Strengthen dissemination and popularization

Time: December 2009—December 2010

Objective: Publicize energy conservation and emission reduction; popularize the Energy Efficiency Voluntary Agreement to realize the target of energy conservation and CO2 emission reduction.

Tasks:

(1) Publicize policies and regulations on energy conservation and emission reduction and Energy Efficiency Voluntary Agreement by local newspaper, broadcast, TV and network;

(2) Organize an on-the-spot meeting to introduce the typical enterprises that conduct energy efficiency and introduce their experiences;

(3) Train those enterprises that are willing to sign Energy Efficiency Voluntary Agreement with government.

5. Follow-up and report of the action plan

According to local realities, LPIC formulates report on the previous year's work every January and works out Annual Working Plan of LPIC of Shuangliu County. The report is to be submitted to national PIC secretariat before January 31. The secretariat is to collect all the submitted reports and reports to MOA's GEF office. All the reports are to be evaluated by the office and each action plan shall be revised according to the evaluation results.

Annex 5.1

Field Survey Report on Energy Conservation & GHG Emissions Reduction in Brick Making Industry of Xi'an City

According to the framework and requirement of the subcontract of Phase III of *UNDP/GEF Energy Conservation & GHG Emissions Reduction in Chinese TVEs – Phase II*, a study tour group, led by Ms. Wang Guiling, PMO deputy director, consisting of subcontractor experts went to Xi'an city, and conducted a four-day tour from Nov 5 to 9, 2005. Workshops, field study and questionnaire answering had been held in order to remove the market, policy, technology and financing obstacles that have been identified in the process of producing, marketing and applying energy efficiency technology in Xi'an city's brick making industry. Another purpose of the tour is to direct the establishment of LPIC in the city and promote its capacity building. The field study results are as follows:

1. Brief Introduction of Brick Making Industry in Xi'an City

Xi'an, named Chang'an in ancient time, is the biggest central city in northwest of China. It has 9 districts and 4 countries, covering 9,983 km^2. It has population of 7.166 million. Xi'an is located in the middle of Qinchuan Plain and has rich soil resources, especially the loess resources are very rich and the quality is quite good.

1.1 Status of Brick Making Industry in Xi'an City

In recent years, with the rapid development of city construction of Xi'an, the brick making industry has the best development trend. At present, there are 408 brick-making enterprises in all districts and countries of Xi'an, of which there are 72 hollow brick-making enterprises with the annual output of 2.25 billion pieces of standard bricks. The structure of the output is including the 0.86 billion pieces of hollow bricks and 1.39 billion pieces of clay bricks. The hollow bricks are used for the construction in city and towns; the clay bricks are used for house built in rural areas, construction under horizon plane in city and municipal construction. As shown in Table 1, in 2004 the output of TVEs was 19.64 billion Yuan including 0.271 billion Yuan of brick making industry with the proportion of 1.38%. There were 22.9 thousand employees in TVEs including 19.7 thousand in brick making industry with the proportion of 8.6%.

Table 1 Basic Data of Brick Making Industry in Xi'an City

	Unit	Brick industry		TVEs		Percentage of brick industry to TVEs in 2004 (%)
		2003	2004	2003	2004	
Number of Factories		250	268	19,230	20,079	1.33
Total output value	100 million RMB Yuan	2.68	2.71	194.10	196.40	1.38
Initial fixed capital	100 million RMB Yuan	1.71	1.72	14.99	15.64	11
Staff employed	10,000 Persons	1.90	1.97	22.62	22.90	8.6
Total profit payments and tax turnover	10,000 RMB Yuan	6559	6691	78,521	83,638	8

Brick making industry is energy-intensive. 292.5 thousand tce was consumed and total CO_2 emission was 731.3 Ton in 2004 (see Table 2). The adoption of energy efficiency and GHG emission reduction technologies shall contribute to local environment quality improvement.

Table 2 Energy Consumption and CO_2 Emission of Brick Making Industry in Xi'an

	Unit	2003	2004
Output	100 million pieces	21.7	22.5
Energy consumption Per Unit	Tce per 10,000 pieces	1.3	1.3
Total energy consumption	10,000 Tce	28.21	29.25
CO_2 emission	10,000 Ton	70.53	73.13

1.2 Technology Status of the Brick Making Industry in Xi'an City

(1) The low level of present technologies

Among the total 268 production lines, only 3 were designed by professional designing institute and most of the rest are designed by the TVEs themselves (see Table 3). The production scale of enterprises is small with the annual output of less than 30 million pieces. The proportion of mechanization is quite low and all the technical process is natural drying rotary kiln. The quality of brick products is at the middling to the low side in China.

Table 3 Statistics of Brick Making Line Design

	Total of lines	Types of Production Lines				
		Designed by institute	Designed by the maker	Designed by domestic maker	Energy calculation	
					Done	To be done
Number	268	3	159	106	3	265
Percentage %	100	1.12	59.33	39.55	1.12	98.88

(2) Information sources

Table 4 Technical Information Sources

Sources	Number of enterprises
Network	0
Associations	154
Colleges, universities and scientific institutes	21
Domestic enterprise	51
Foreign countries	0
Government agencies	12
Friends	1
Technical transfer market	29
Total	268

Table 4 shows that the most technical information is got from associations, other major sources include domestic enterprises and colleges, universities and scientific institutes. It can be concluded that associations play an important role in brick making industry's energy conservation.

It can be learnt from Table 5 that middle and high school graduates represent 44.43% of local brick industry staff and only 2.50% employees have got primary professional title. The educational and technical level of workers should be enhanced.

Table 5 Statistics of the Staff in Brick Making Industry

	Number	Percentage (%)
Total number of staff employed	19,700	100
High professional title	108	0.55
Medium professional title	213	1.08
Preliminary professional title	279	1.42
Junior or senior high school	9,344	47.43
Other	9,756	49.52

1.3 Problems of the Development of Brick Making Industry in Xi'an City

(1) Low price of products with good quality, lack of industrial self-discipline

From 2003, the cost of brick making has been increasing for the price of coal and electricity and the wages of workers kept rising (see Table 6). However, at the same time the price of brick is falling and the brick making enterprises decreasing the price of its products one after another. So some enterprises have to control the cost by simplifying production process and the quality of bricks is worse and worse. The unfair competition results in the products with poor quality have better sale than those with good quality. The absence of industrial self-discipline prevents the development of brick making industry.

Table 6 Comparison between Brick Price in Xi'an

	Coal price	Electricity price	Wage of workers	Cost of brick making	Sale Price
Unit	Yuan per ton	Yuan per kWh	Yuan per month	Yuan per piece	Yuan per piece
2003	560	0.35	700	0.12	0.18
2004	640	0.42	1000	0.14	0.15

(2) Insufficient supervision of government and disordered market

For the supervision of related administrations is not sufficient, the sale market of brick making industry in Xi'an is very disordered. The Test Report of one enterprise is borrowed by another enterprise for use, even the back Report is altered for future use. Some building sites only have one Test Report but use bricks produced by several enterprises. In some districts and countries, the bricks are sold by brick-mongers. The brick-mongers carried the bricks with good quality to building sites in the beginning, but after that, they bought bricks with poor quality at lower price and carried those to building sites. The phenomenon that bricks with good and poor quality sold in the market at the same time weakens the competitive capacity of enterprises. All of these causes the quality of brick products in Xi'an is not good. According to the Opinion on Dighting the Quality Conditions of Bricks used in Construction, nearly 40% of the porous and hollow bricks used in constructions under spot-check are not qualified.

(3) Absence of market admittance system, qualification system of enterprises and certification system of products with good quality

For the absence of qualification system of enterprises and certification system of products with good quality, many small and medium-scaled brick making enterprises are producing bad bricks. Related governmental departments should not only strengthen the supervision, beat false and bad products, but also support the well qualified enterprises to produce good products. The strict certification system of products should be implemented for the built brick making enterprises to ensure the quality of bricks produced and used in construction; the strict examination and approval should be used for the new built ones. Furthermore, the related departments should organize experts to assess the brick making enterprises. Only the products certificated may enter the market of construction materials and the construction enterprises using products uncertified should be punished.

2. Management Status of the Brick Making Industry in Xi'an City

2.1 Governmental supervision

(1) Three administrations for brick making industry in Xi'an (see Figure 1)

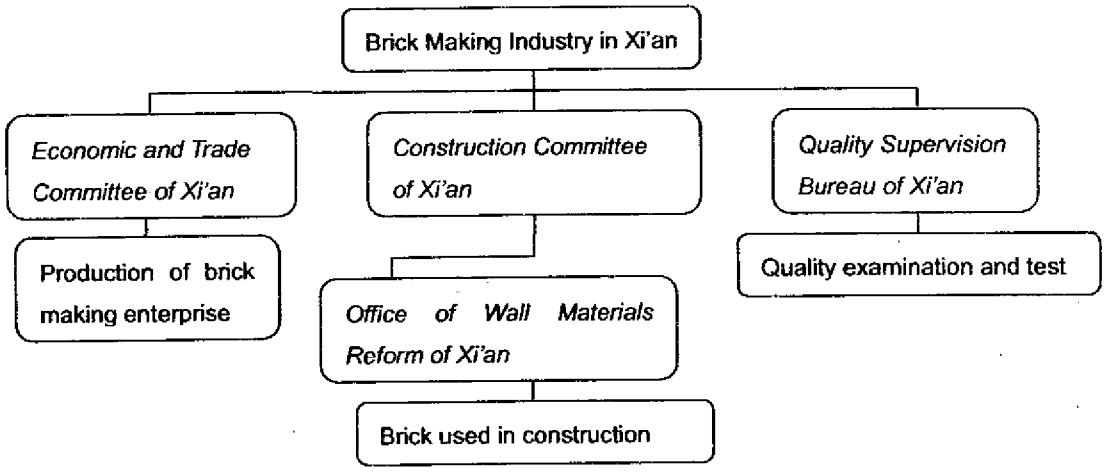

Figure 1 Organizational Structure of Supervision on Brick Making Industry in Xi'an

Economic and Trade Committee of Xi'an is responsible for the production of brick making enterprises. Office of Leading Group for Energy Saving Construction and Wall Materials Reform (hereinafter referred to as Office of Wall Materials Reform of Xi'an) is set up within a division of Construction Committee of Xi'an and responsible for the supervision on bricks used in construction. Quality Supervision Bureau of Xi'an is responsible for the examination and test of brick quality. In practice, some laws and regulations are not implemented well for the insufficient and ineffective cooperation among above departments.

(2) Insufficient work of staff in Office of Wall Materials Reform

Office of Wall Materials Reform in Xi'an was set up under the Construction Committee of Xi'an according to the Opinion on Accelerating Wall Materials Reform and Popularization of Energy Saving Construction of State Council. Article 10 of The Measures for Management of Levy and Use of New Wall Materials Fund issued by Ministry of Finance prescribes that Office of Wall Materials Reform is responsible for the levy of New Wall Materials Fund. For the staff is insufficient (only one person), the levy of New Wall Materials Fund is the major operation. The supervision on the market of brick use and the popularization of new products and technologies are neglected. This leads to the bad products with lower price is applied in the market and the competition of enterprises is disordered. In fact this phenomenon that the staff in

Office of Wall Materials Reform is not sufficient is very special in China. In other provinces or cities, the Office of Wall Materials Reform is usually an independent agency under the Construction Committee and has 10 staff. For the municipal government of Xi'an thought that the documentation of Ministry of Finance mentioned above prescribes that New Wall Materials Fund will be levied until Dec 31, 2005, at that time, the Office may be difficult to operate for without the Fund, and so the Office was not set up as an independent agency but within a division.

To solve the problems above, an organization should be set up to assist departments in implementing laws and regulations, strengthening industrial supervision, pushing industrial self-discipline, dighting market and popularizing new technology and products.

2.2 Coordination of Association of Wall Materials Industry in Xi'an

With the development of reform and the changes of governmental responsibilities, industrial association plays more and more important role in service, agency and rights protection. In April 7, 2004, the Association of Wall Materials Industry (hereinafter referred to as the Association) in Xi'an was set up relying on the Xi'an Wall Materials Research and Design Institute (hereinafter referred to as the Institute). To realize the purpose of providing service for enterprises and government, protecting industrial benefit and reflecting the voice of enterprises, the Association played important role in assisting government in industrial management and promoting the healthy development of wall materials industry in Xi'an.

Since set up, the Association has done a lot of work in industrial survey, establishing self-discipline rules, coordinating conflicts and benefit within industry, assisting related agencies in honoring excellent enterprises and developing technical service consultancy and communication.

3. LPIC Building in Xi'an City

3.1 LPIC Establishment and Its Characteristics

On the basis of the status of brick making industry in Xi'an, the purpose and the effective work of the Association, the LPIC will be set up on the basis of Association to help brick making industry in TVEs reduce energy consumption and GHG emission, promote the sustainable development of TVEs in Xi'an and the improvement of the environment. It's a breakthrough that LPIC is set up on the base of the association during the LPIC building.

(1) Strong technical background

The Association relies on the Institute. The Institute is the unique professional research and design Institute directed by former National Construction Materials Bureau engaging in research on sintering products for wall materials. It has the qualification of Grade A for national construction design, construction contract and construction consultancy and supervision. During its over 40 years' history, the Institute devoted in research and development of clay sintering products, porous brick, hollow brick and other new wall materials, engineering design, engineering contract and supervision. Many national professional agencies are set up in the Institute, like UN China Development Center of Wall Materials, National Monitoring and Test Center for the Quality of Wall Materials in Construction Materials Industry & National Certification Lab, National Test Center of Heat Energy of Bricks in Construction Materials Industry and National Information Net on Technical Information for Wall Materials. The Magazine of Brick edited by the Institute is the unique national core magazine on technical information for construction materials issued domestic and in the abroad in public. So the LPIC building has strong technical background.

(2) Promoting the governmental woks by the breakthrough of technology

Officers from Industrial Management Office of Economic Commission of Xi'an, Office of Wall Materials Reform, Technical Supervision Bureau of Xi'an and Environmental Protection Bureau of Xi'an will be invited as member of LPIC and participate in the works of LPIC to strengthen the communication between government and enterprises. The technical advantage of the Institute will be taken to promote the industrial policy development, and the policies are helpful to push the technical development. Thus the positive circle is formed and will promote the technical improvement of brick making enterprises.

(3) Combination of technology and policy for dighting market

For LPIC is accomplished in technology, familiar with policies and enterprises management and it is easy to communicate with departments, it will assist the three major administrations in brick making industrial management to remedy the insufficient staff, assist related departments implementing laws according to laws and regulations, disseminate and implement national technical standard for the purpose of promotion of industrial technical progress and improvement of product quality and dighting the market.

(4) Combination of technology and policy for agglomeration of enterprises and industrial self-discipline

LPIC will take the advantage of accomplished in technology and policies to provide technical support and policy consultancy and build good relationship with enterprises. It will guide the enterprises' communication and coordination and obeying the related laws and regulations to realize the industrial self-discipline.

3.2 Key Work of LPIC

(1) Acting as the bridge between the government and enterprises, among enterprises and related industries, reflecting the industrial opinions to government and conveyed national policies to industry;

(2) Implementing the direction price of production sale in the industry to standardize the market and protect industrial benefit;

(3) Assisting in implementing the law and strengthening product quality supervision;

(4) Cooperating with government in developing new product identification, qualification examination and certification of product;

(5) Developing technical consultancy, training and technical visits abroad, promoting technical communication and cooperation and popularize the new product and new technology.

3.3 Organizational Structure of LPIC

The organizational structure of LPIC is shown in Figure 2; the main services include the technical and policy consultancy.

(1) Technical Consultancy: developing technical service consultancy, organizing and leading consultancy group composed of experts in brick making industry, helping enterprises to solve the problems met during the process of energy saving technology upgrading; developing domestic and international technical communication and cooperation, popularizing new products, new production process, new technology and new materials; organizing enterprises to hold or participate in the domestic and international production exhibit, helping enterprises to exploit domestic and international market; conducting trainings on staff, technology, standards, new wall

materials and energy conservation and consumption reduction in wall material industry.

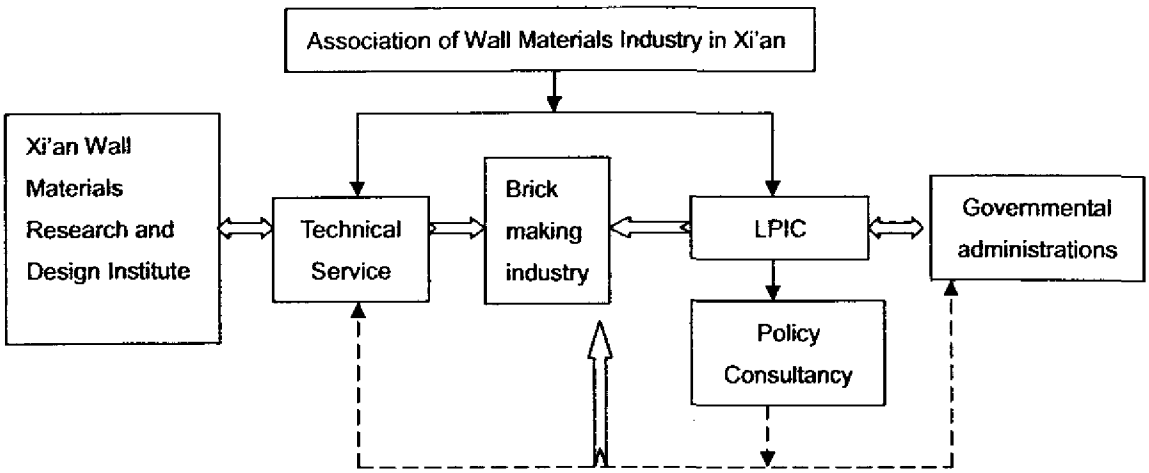

Figure 2 Organizational structure of LPIC in Xi'an

(2) Policy coordination: developing policy consultancy and coordination, providing advice and information for local policy formulation and consultancy service on related polices for enterprises.

① Support from related polices are needed for the popularization of new technology. Supporting policies should be formulated constantly in the development of wall materials reform and energy saving building. At present, application of rectangle-holed hollow bricks should be promoted. LPIC may assist local government in formulating product standard, construction rules and other related policies.

② LPIC can cooperate and assist government in implementing laws, strengthen supervision on production enterprises and construction enterprises, popularize the industrial pact; Assist government in developing product list, setting up identification of production enterprises' qualification, implementing brand development strategy and standardize the market.

4. Policies Related to Brick Making Industry in Xi'an

4.1 Forbidden production and use of solid clay brick

In June 2001, State Economy and Trade Commission issued *Notice on Including 10 Capital Cities into the Name List of Cities that are forbidden to use Solid Clay Bricks before Certain Time Limit* and Xi'an city was listed as one of the ten cities. According to the notice, the use of solid clay brick shall be completely forbidden by June 30, 2003. The No. 59 document, Shaanxi Provincial Managing Rules on Wall Materials Innovation and Building Energy Conservation, which was issued by Shaanxi government, specifies that it is forbidden to build or enlarge enterprises or production line for producing solid clay brick.

Based on these documents, the *Implementing Opinions on Forbidding the Use of Solid Bricks before Certain Time Limit Bricks* was jointly issued by Xi'an Rural and Urban Construction Committee and Xi'an Economy Committee in March 2003. As to the use of solid clay bricks, this document makes it clear that since January 1, 2003, it is forbidden to use solid clay bricks for any construction above horizon plane or any newly built, rebuilt and extended work conducted in high &new technical development zones, economic development zones and Qujiang Tour and Holiday Village that are

located in the six suburban districts (Beilin, Xincheng, Lianghu, Yanta, Weiyang and Baqiao); since July 1, 2003, it is forbidden to use solid clay bricks for any newly built, rebuilt and extended work conducted in the exurban districts (Chang'an, Lintong, Yanliang, Lantian, Gaoling, Zhouzhi and Huxian. Farmers are encouraged to use new wall materials to build houses and the use of solid brick shall be gradually limited and forbidden.

It is also specified that since the day this document is issued, no solid clay brick factories shall be approved to be built, the old solid brick factories should change the line of production to hollow brick or other new wall materials and no relocated old factory is allowed to product solid clay bricks. It is also specified that Xi'an Office of Wall Materials Reform is in charge of the work of forbidding the use of solid clay brick.

Xi'an began to extend the use of hollow bricks in 1990. According to the requirement of Implementing Rules on Levying and Using New Wall Materials Fund, before a constructional project is started, the Office shall levy Wall Materials Fund according to the estimated building area and the standard of 6 Yuan per m^2. If the constructor fails to pay the fund, he shall not get building permission. This has promoted the work of forbidding the use of solid clay brick.

Because of institutional reform, now there are only one people working for Office of Wall Materials Reform and the supervision and examination are not sufficient. This result in the forbidden solid clay brick and bad brick are used in the market. In Xi'an, there exists some bad phenomenon, such as the Test Report of one enterprise is borrowed by another enterprise for use, even the back Report is altered for future use; Some building sites only have one Test Report but use bricks produced by several enterprises. In some districts and countries, the bricks are sold by brick-mongers. The brick-mongers carried the bricks with good quality to building sites in the beginning, but after that, they bought bricks with poor quality at lower price and carried those to building sites and the negative circular is formed.

4.2 Popularization of Energy Saving in Building

In June 6, 2005, Office of State Council issued *Notice on Further on Promotion of Wall Materials Reform and Popularization of Energy Saving in Building ([2005] 33 document).* This Notice make it clear that in the west areas with rich clay resources, the hollow clay products should be developed and the production and use of solid clay bricks are limited. This document creates broader development space for production of clay bricks with high perforation rate, especially for the rectangle-holed bricks with better heat-engineering performance.

(1) Shaanxi Provincial Government issued *Notice on Key Work on Building Resource Saving Society in the near Future* on Sep 12, 2005. This Notice requires deepening the institutional reform, popularizing new technology and new materials for energy saving in building and promoting energy saving rebuilding for current buildings. This document makes it clear that it will create good policy environment for popularization and use of rectangle-holed bricks to implement the Guidance Opinion on Development of Land Saving House and Public Construction issued by Ministry of Construction and Standard for Energy Saving Design of Public Building and meet the design standard with energy saving target of 50% in new built and rebuilt building.

(2) Comparison of rectangle-holed bricks and round-holed bricks

Round-holed bricks are the KP1 bricks popularized now, the type of hole is small round hole and the diameter of the hole is 180 mm and the thermal conductivity is 0.52 W/(m•k); The Rectangle-holed bricks has rectangle holes and same specification with KP1 type, there are 11 rows of holes and the total number of rectangle holes is 33. The performance comparison is shown in Table 7.

Table 7 Performance Comparison of rectangle-holed bricks and round-holed bricks

	Type of hole	Number of holes	Perforation rate%	Total heat resistance of 240mm thick wall (m^3•K/W)	Intensity Grade
rectangle -holed bricks	Rectangle hole	33	33	0.794	MU15-20
round-ho led bricks	Small round hole	26	24	0.635	MU10-15

Rectangle-holed bricks have better performance than round-holed bricks in heat engineering performance, mechanics characters, perforation rate and construction factors. According to some expert's introduction, if the round-holed hollow brick is changed to rectangle-holed one, the TVEs cost doesn't increase while the perforation rate is increased from 25% to 33%. Suppose the coal consumption of brick making industry in Xi'an is 220-250 thousand tce per year, if the brick is changed to rectangle-holed brick, about 20 thousand tce can be saved every year, reducing CO2 emission by 50 thousand tons. Experts analyzed that if the rectangle-holed bricks are used in building, the 50% of energy will be saved without any materials additive. So to improve the energy saving effect in building further and realize the target of 50% energy saving, the rectangle-holed bricks should be popularized in the whole country.

(3) Development and use of rectangle-holed bricks

There are some procedures for popularization of rectangle-holed bricks: product development → standard formulation → standardization production → development of construction standard → design → use. But in practice, the delay of construction standard formulation prevents the popularization. LPIC will assist Office of Wall Materials Reform in Xi'an in applying for project establishment and development and design of construction standard from provincial construction standard office to popularize the rectangle-holed bricks effectively.

5. Tax Policies

According to the *Notice on Collecting Value-added Tax for Utilization of Some Resources and Other Products*, which was issued by Ministry of Finance and State Tax Administration on December 1, 2001, some new wall materials and products shall enjoy the preferential policy that only half of the value-added tax shall be collected. The TVEs that produce solid clay brick do not enjoy this preferential policy. In Xi'an, brick TVEs pay taxes at the rate of 6%. Since a part of brick is sold to individuals who do not need invoice, tax authorities have no way to supervise and control brick TVEs. For convenience's sake, some TVEs pay a fixed amount of tax to the government. Therefore, it is hard to use tax to guide TVEs to produce energy efficiency products.

Measures for Management on Wall Materials Reform and Energy Saving Building in Shaanxi Province prescribes that the enterprises producing new wall materials can enjoy the tax preferential policies: Lowering the tax grade for land use, value-added tax exemption is used for the wall materials composed of no less than 30% wastes, the income tax exemption is applied in the wall materials composed of a large amount of coal stone, slag, and coal ash. These policies promote the development of new wall materials and clay bricks with high perforation rate.

6. Environmental Protection Policies

Construction materials industry is an important industry in the national economy and

one of the industries with severe air pollution. The following systems are closely related to construction materials industry: Environment Impact Assessment System for Constructional Projects; Three Qualifications System for Constructional Projects; Pollution Discharge Fee System; System for Pollution Reporting and Registration and Pollution Discharge License and System for Time-limited Pollutant Treatment and Treatment of Hazardous Waste by Administrative Bodies.

National Construction Materials Industrial Bureau issued *Opinion on Environmental Protection in Construction Materials Industry* on March 11,1997. This document requires that the examination of project establishment in new building, rebuilding and technology upgrading projects should be implemented strictly. All construction projects should implement EIA system and Three Qualifications System for Constructional Projects which requires the environmental protection equipments should be designed, constructed and in operation with main engineering simultaneously. The enough environmental investment should be ensured. After the project finished, the pollutant discharge should meet the national or local standard for discharge.

According to the Management Statute on Levying and Using Pollutant Discharge Fees put into force on July 1,2003, the existing enterprises should declare the type and amount of pollutant and offer related materials; the local environmental protection administrations should check and ratify the type and amount of pollutant within the purview prescribed for check and ratifying, confirm the pollutant discharge fees should be paid on the basis of levying standard the type and amount of pollutant. The fees should be proclaimed. But in Xi'an, local protectionism exists in the treatment of brick making enterprises by Environmental Protection Bureau of Xi'an. The waste (gas) emission becomes a cause for levy and the production scale of enterprises is the levy standard. Certain amount pollutant discharge fee will be levied (see Table 8). In practice, the fee may be reduced on the basis of the actual conditions. The loose law implementation is very severe.

Table 8 Standard for Levying Smoke Gas Emission Fee in Brick Making Industry

Production Scale/10,000 Pieces	>2000	1000~2000	<1000
Levying Standard/Yuan	3000	2000	500~1000

7. Financial Status of the Brick Making Industry in Xi'an City

Most of the fund of the brick making industry in Xi'an came from bank loan and collective fund. At that time, bank loan had been directed by administrative decisions. With the development of China's market economy, most funds used for technical upgrading has been collected by enterprises themselves or from borrowing social fund and bank loan.

Some of fund has been accumulated by the enterprise itself and the fund borrowed from society includes fund borrowed from the managers and employees. Since Xi'an City is located in north western of China, where economy is quite underdeveloped, the farmers' annual income is 3270 Yuan per capita and the above-mentioned two parts of fund accounts for only a minor part of the total fund. With China's financial reform, the public-owned banks have been reformed into commercial banks. In the process of applying for bank loan, the key problem the enterprises faced with is the provision of mortgage. Since the brick factories utilize the rented resource and have no property right over the land, so the land cannot be mortgaged. Most factories have not enough equipment and workshop building as mortgage, so it is very hard for them to get loan.

In 1996, People's Bank of China adopted the policy of deflation and "loan trace out all life". This policy has made local banks would rather turn over the savings than run the risk of granting loans to enterprises.

In recent years, bank loans have followed the pointed direction of the national policy and policy-oriented fund. This part of fund has been channeled to technology-intensive industries or trades that are closely related to national economy and the people's livelihood. Inadequate attention has been paid to industries such as brick production that are labor-intensive, low in technical content, small-scaled and distributed in remote areas. How to provide mortgage for enterprises, especially TVEs, has become the bottleneck restricting TVEs' adopting advanced technologies.

TVE technical upgrading discount interest is the major government fund that is available for local TVEs. The total discount interest in Shaanxi province is 10 million Yuan and 2 million is allocated to Xi'an city. The threshold for apply this fund is very high, requiring that the enterprise's fixed capital is over 5 million Yuan. Therefore, brick making TVEs can hardly apply for this fund.

As to new wall materials fund, according to Some Rules on Promoting Building Energy Conservation and Wall Materials Reform in Xi'an City, after finishing a project, the construction body applies to Xi'an Construction Committee for checking and acceptance. If the project reaches building energy conservation requirements specified when the project is approved, the building energy consumption extra charge paid by the construction body shall be refunded. If only part requirements are reached, then the corresponding extra charge shall be refunded. If no requirement is reached, no charge is refunded. The fund that is not refunded to the construction bodies shall be included in building energy conservation and new wall materials reform fund. Every year, about 10 million Yuan is levied and by now more than 100 million Yuan has been levied. This fund can be used for brick TVEs' technical upgrading. But in 1990s, 4 million Yuan was granted to the state-owned Xi'an Brick Factory for technical upgrading and the factory closed down soon after it got the fund. Ever since then, Xi'an Wall Reform Office has become extremely cautious about the use of the fund especially private enterprises are involved due to two reasons: first, they are afraid that the public might accuse them of bribery in handing out the fund and second, they have little ability to control and supervise the enterprise who might fail to pay back the fund.

8. Brief Introduction of the Replication Enterprises

In Xi'an, 15 enterprises are selected for the replication project. Their products include porous bricks, hollow bricks, standard bricks and ordinary bricks, the average annual output of 15 enterprises are over 20 million pieces. They have advanced equipments and over 24-door rolling kiln and are representative to some degree in Xi'an. The most important is that the 15 selected enterprises attached importance to technology upgrading, energy saving and enterprises management, it is helpful for the replication of energy saving technology. The basic conditions of replication enterprises are shown in Table 9.

Table 9 Basic Information of Replication Enterprises in Xi'an

No.	Enterprise	Annual output (million pieces)	Main equipments				Technical upgrading intent
			Brick extrusion machine		Kiln		
			Model	Production capacity (piece per hour)	Model	Production capacity (piece per hour)	
1	Xi'an Chang'an Hongfang Construction Material Plant	26	40/450	12,000	40-door annular kiln	3,500	Kiln pressurization technology, capacitance compensation, well-proportioned mixture supply, test of energy conservation of kiln, energy saving technical service
2	Chang'an Qinling Construction Material Plant	20	45/40	14,000	28-door annular kiln	2,200	Capacitance compensation, energy saving blower technology, well-proportioned mixture supply.
3	Xi'an Weiyang Dongfang Hollow Brick Plant	24.90	450	17,000	40-door annular kiln	4,000	Kiln pressurization technology, heat preservation for kiln technology, capacitance compensation, energy saving blower technology, energy saving vacuum technology, well-proportioned mixture supply
4	Xi'an Xinyue Gongmao Ltd.	34	450	17,000	30-door annular kilns	5,000	Kiln pressurization technology, heat preservation for kiln technology, frequency conversion technology for hot wind blower, energy saving blower technology, energy saving vacuum technology, well-proportioned mixture supply, energy saving technical service
5	Chang'an Xibei Construction Material Plant	24	45-40	10,000	22-door annular kiln 24-door annular kiln	2,900	Kiln pressurization technology, capacitance compensation, energy saving blower technology, energy saving vacuum technology
6	Xi'an Baqiao Baling Hollow Brick Plant	24	450	15,000	38-door annular kiln	8,000	Kiln pressurization technology, capacitance compensation, energy saving blower technology, well-proportioned mixture supply
7	Xi'an Baqiao Baling Shijiadao Hollow Brick Plant	22	450	12,000	32-door annular kiln	3,000	Kiln pressurization technology, heat preservation for kiln technology, energy saving vacuum technology, energy saving technical service, old equipments in urgent need updating and renovation
8	Xi'an Baqiao Molingmiao Brick Plant	20	450	18,000	24-door annular kiln	2,400	Kiln pressurization technology, capacitance compensation, energy saving blower technology, well-proportioned mixture supply, energy saving technical service

9	Xi'an Baqiao Hongqi Xiangyanggou Brick Plant	25	450	12,000	40-door annular kiln	3,000	Kiln pressurization technology, capacitance compensation , energy saving blower technology, energy saving vacuum technology, energy saving technical service
10	Xi'an Hongqi New Construction Material Plant	44	45-50	18,000	38-door annular kiln 24-door annular kiln	6,000	Kiln pressurization technology , heat preservation for kiln technology, capacitance compensation, frequency conversion technology for hot wind blower, well-proportioned mixture supply, energy saving technical service, hollow brick and porous brick production
11	Shaanxi Shenlu New Construction Material Plant	22	450	12,000	38-door annular kiln	3,600	Kiln pressurization technology , heat preservation for kiln technology, capacitance compensation, building a new energy saving kiln, brick machine renovation
12	Xi'an Baqiao Hongqi Shenlufang Brick Plant	26	450	14,000	38-door annular kiln	2,700	Kiln pressurization technology, heat preservation for kiln technology, heat preservation and pressurization technology for desiccation room, capacitance compensation , well-proportioned mixture supply, test of energy conservation of kiln, energy saving technical service
13	Xi'an Shenwei Wall Material Plant	28	50-45	12,000	28-door annular kiln 24-door annular kiln	4,500	Kiln pressurization technology, energy saving vacuum technology, well-proportioned mixture supply, test of energy conservation of kiln, energy saving technical service, hollow brick and porous brick production
14	Xi'an Xiangfa New Construction Material Plant	23	450	12,000	28-door annular kiln	1,100	Energy saving vacuum technology, building a new energy saving kiln, brick machine renovation
15	Xi'an Baqiao Baling Liucun Brick Plant	21.48	350	10,000	38-door annular kiln	4,000	Kiln pressurization technology, capacitance compensation , energy saving blower technology, Well-proportioned mixture supply, test of energy conservation of kiln, hollow brick and porous brick production

15 enterprises plan to build an energy saving annular kiln for future learning and reference.

9. Conclusions and Recommendations

(1) LPIC can assist government in strengthening the supervision on brick making industry

The weak and insufficient supervision of government on local brick making industry leads to the worse quality of brick in use and the confusion of the brick product market. LPIC can assist government in strengthening the supervision on the industry, promoting industrial self-discipline, developing products list, setting up identification of production enterprises' qualification, implementing brand development strategy to standardize the market and create good market environment for enterprises.

(2) LPIC can instruct brick making enterprises in technology upgrading and innovation

The technical level of brick making enterprises is relatively low and the production process is lagged. LPIC can use its advanced technical and quality management to help enterprises to develop energy saving technology upgrading and production process innovation and popularize the new product in order to promote technical progress and quality improvement. LPIC can organize industrial experts to conduct training and visit termly to help enterprises know the domestic and international industrial trend and direction.

(3) LPIC can assist brick making enterprises in energy conservation and GHG emission reduction and implementation of environmental protection policies

In Xi'an, the environmental protection policies are not implemented effectively and little importance was paid on energy conservation by brick making enterprises. In the future, LPIC should help the enterprises conduct energy conservation and GHG emission reduction and implement national and provincial environmental protection policies.

(4) LPIC can assist in popularization of rectangle-holed brick

The progress of popularization of use of rectangle-holed brick is slow in Xi'an. After the standard of 50% of energy saving in building is issued, LPIC can assist in formulating standard for rectangle-holed brick design and construction and develop its popularization. LPIC can use all kinds of media to disseminate and change lagged idea on use of brick.

Annex 5.2

Statute of Policy Implementation Committee, Xi'an City

General Provisions

Clause 1 Xi'an Policy Implementation Committee (hereinafter referred to as the LPIC) is an institution under the leadership of Association of Wall Materials Industry in Xi'an, which is established to assist the local brick making industry in applying high efficient energy saving technology and overcoming various policy, market, technology and financing barriers to the application.

Clause 2 The objective of the LPIC is to disseminate energy efficient technology and introduce high efficient management system at TVEs to produce high quality and energy efficient product thereby reducing energy consumption and GHG emissions and promoting the sustainable development of brick making TVEs in Xi'an.

Organization of the LPIC

Clause 3 The membership of the LPIC is comprised of six parties including Xi'an Wall Materials Research and Design Institute, Xi'an Economic Committee, Office of Leading Group for Energy Saving Construction and Wall Materials Reform in Xi'an (hereinafter referred to Office of Wall Materials Reform), Xi'an Technical Supervision Bureau, Xi'an Environmental Protection Bureau, Xi'an Quality Supervision and Test of Wall Materials Product Station.

Clause 4 The LPIC shall have 6 delegates from the above-mentioned six member parties. Deputy director of Xi'an Wall Materials Research and Design Institute will be the Director of LPIC; Deputy director general of Office of Wall Materials Reform and station master of Xi'an Quality Supervision and Test of Wall Materials Product Station will be the deputy director of LPIC; The members are composed of director of General Division of Xi'an Economic Committee, director general of Check Division of Xi'an Technical Supervision Bureau and deputy director general of Xi'an Environmental Protection Bureau.

Clause 5 The delegates, to be nominated by the managing leaders of respective agencies and appointed after the agreement of all member parties, shall serve a term of three years. If any member party wishes to renew its delegate to the committee, a written application for the renewal should be submitted to the office of LPIC for approval.

Clause 6 The LPIC will instate one director and two deputy directors. Deputy director of Xi'an Wall Materials Research and Design Institute will be the Director of LPIC; Deputy director general of Office of Wall Materials Reform and deputy station master of Xi'an Quality Supervision and Test of Wall Materials Product Station will be the deputy director of LPIC; The Deputy Director can take care of routine matters as Director in his absence. In addition to the normal duties and obligations of a delegate of the LPIC, the Director (or Deputy Director) chair meetings of the LPIC, signs Minutes and formal correspondence on behalf of the LPIC.

Clause 7 Under the LPIC, an office is established to be in charge of handling routine matters, conduct the activities required in the PIC's documentation and conference summary and communications with the PIC and the project management office of the UNDP/GEF Chinese TVEs Project. The office is located in the office building of the Xi'an Wall Materials Research and Design Institute. Deputy station master of Xi'an Quality Supervision and Test of Wall Materials Product Station will be the Office Director.

Clause 8 The office staff consists of Deputy Director of LPIC and three staff of Association of Wall Materials Industry in Xi'an

Functions of the LPIC

Clause 9 Main responsibilities of the LPIC are, under the guidance and with the coordination of the national PIC and the national project management office, to facilitate to remove policy, market, technology and financing barriers encountered by the local brick making TVEs to policy enforcement. Detail responsibilities include the following.

1. Develop and implement action plan aimed at promoting regulatory reform related to the monitoring of energy efficiency at brick making TVEs, and facilitation of the transform of the project implementation into a market-oriented mechanism.
2. Push forward TVEs to sign the VA with local government authorities.
3. Take advantage of strong technical background of Xi'an Wall Materials Research and Design Institute to provide TVEs with domestic and international advanced technical information, organize the replication enterprises to participate in the information communication among enterprises in use of energy saving and emission reduction technologies and popularize the management experiences on energy saving and emission reduction.
4. Promote the enforcement of national and local policies, regulations and standards related to energy efficiency, technical renovation and environmental protection within brick making sector in Xi'an.
5. Set up the identification agencies for enterprises' qualification, develop good wall materials list and brand development strategy and popularize the new technology and new products.
6. Promote the national and local regulations, standards and measures on environmental protection and energy conservation implemented in TVEs.

Clause 10 Responsibilities of member parties are:

1. Association of Wall Materials Industry should be responsible for strengthening the communication and coordination between governmental departments and brick making enterprises, organizing LPIC's united activities in Xi'an and making the work of LPIC part of work plan of the Association.
2. Xi'an Wall Materials Research and Design Institute should be responsible for developing and popularizing new products, new technology, new production process on wall materials and assisting in technical service and consultancy.

3. Industrial Management Office of Xi'an Economic Committee should be responsible for coordination of LPIC's work and strengthening the macro management of TVEs and has the responsibility of instruction, coordination, supervision and service.

4. Office of Wall Materials Reform should be responsible for promoting the supervision on units in use of bricks and coordination of LPIC.

5. Check Division of Xi'an Technical Supervision Bureau and Xi'an Quality Supervision and Test of Wall Materials Product Station are the industrial administrations and are easy to conduct coordination in the industry.

6. Xi'an Environmental Protection Bureau should be responsible for supervision on implementation of environmental protection laws and putting forward the specific requirement on environmental improvement to make the replication enterprises discharge meeting standard.

Working Procedures

Clause 11 The LPIC operates by means of meetings, once half a year. The Director, or the executive deputy director at the director's absent, will chair the meetings. A meeting will be considered duly valid if more than 50% of its members are present.

Clause 12 The LPIC Director may call interim meetings as per the request of PIC and the PMO. Minutes of the meeting should be developed if necessary.

Clause 13 Minutes of meetings and progress reports will be submitted, by means of telephone or e-mail, to the national PIC and the project management office on a regular basis.

Supplementary Articles

Clause 14 This statute will become effective on the date after it is discussed and approved by all LPIC members. The Office of LPIC reserves the right for the explanation of this statute.

Annex 5.3

Action Plan of the LPLC in Xi'an City

1. Project Background

The project of "UNDP/GEF Energy Conservation & GHG Emission Reduction in Chinese TVEs" has been funded by GEF. The aim of the project is to help Chinese TVEs that engaged in brick-making, cement, casting and coking to adopt energy efficiency technologies and to reduce GHG emission.

During the project's first phase, there are all kinds of obstacles to the adoption of energy efficiency technologies have been identified and evaluated and strategies to remove the obstacles have been formulated. During the second phase, it has been proposed to establish top-down PLC both at central and local level. The LPLC shall be the new mechanism to remove the policy obstacle and to promote energy efficiency in Chinese TVEs by adopting a market transformation approach. During the third phase, 11 replication areas will be selected to develop LPIC building and overcome the market, policy, technology and financing barriers to the adoption of energy efficiency technologies on the base of experiences in Phase I and II.

In order to realize the objectives set for the project's third phase, to create a sound environment for the replication enterprises and the brick making industry that these enterprises belong to, to promote the implementation of policies, laws and statutes, to establish a mechanism favorable for enterprises to adopt energy efficiency and GHG emission reduction and to extend the experiences accumulated by the demonstration enterprises, The LPIC in Xi'an city has formulated the action plan.

2. Major Obstacles to Xi'an TVEs' adopting Energy Saving Technologies

(1) The supervision is quite inadequate, the bad products with low price are in use in the market, the competition among enterprises is disordered and the price self-discipline is absent;

(2) The governmental management mechanism is not harmonious, the production and use are disjointed for the insufficient relationship between administrations on production enterprises and construction enterprises;

(3) The management system of Office of Wall Materials Reform is imperfect; the popularization of new products can't be listed in the agenda, which prevents the popularization;

(4) The market is disordered, lack of identification of enterprises' qualification and good energy saving products list;

(5) The organizations or departments, which provide professional energy saving technical service, are insufficient, and there are too few supporting polices on use of new technology and development of energy saving products.

(6) The enterprises have difficulties in obtaining finance because they have no land tenure right and have no capital for mortgage.

3. Objective

3.1 Short-term objective (2005-2008)

(1) The association signs Energy Efficiency Voluntary Agreement with replication enterprises.

(2) To conduct energy saving technology upgrading and to realize the objective of decreasing unit product's energy consumption by 10% (with the data of 2004 as

baseline).

(3) To establish an effective mechanism for brick making industry's sustainable energy efficiency and GHG emission reduction.

3.2 Medium and long term objectives (2008-2010)

(1) In 2010, compared with the data of 2004 (baseline), the ultimate objective of decreasing unit product's energy consumption by 15% will be realized.

(2) To extend the Energy Efficiency Voluntary Agreement in brick making industry and to establish enterprises' self-improving mechanism to promote energy efficiency by adopting a market transformation approach.

4. Implementing Plan

4.1 Signature of EE Voluntary Agreement by Government with replication enterprises

Time: July 2006—December 2008

Objective: Association signs Energy Efficiency Voluntary Agreement with replication enterprises; energy efficiency technical upgrading will be finished before December 31, 2008 and unit product's energy consumption be decreased by 10% compared with the data of 2004(baseline). By December 31, 2010 unit product's energy consumption will be decreased by 15%.

Tasks:

(1) Consult with enterprises and formulate energy saving technology upgrading plans that are to be assessed;

(2) Identify barriers to the implementation of the plan;

(3) LPIC consults with local government and formulates incentive policy;

(4) Work out Energy Efficiency Voluntary Agreement together with replication enterprises;

(5) Sign Energy Efficiency Voluntary Agreement;

(6) Summarize the experiences accumulated by replication enterprises and get ready for popularizing the experiences in brick making industry in Xi'an.

4.2 Popularize Energy Efficiency Voluntary Agreement

Time: July 2007—December 2008

Objective: LPLC further popularizes Energy Efficiency Voluntary Agreement in Xi'an.

Tasks:

(1) Train staff from Xi'an city's brick industry and publicize GEF project;

(2) Conduct survey of brick TVEs in Xi'an. Circulate energy efficiency cases and the latest energy saving technology pamphlets;

(3) Collect information of TVEs that are willing to conduct energy efficiency technical upgrading, encourage the enterprise to sign the Energy Efficiency Voluntary Agreement.

4.3 Establish the Identification Agency for Enterprises' Qualification with Government

Time: January 2006—December 2008

Objective:

To wash out lagged production process, ban small vertical kiln, and horse-hoof shaped kiln and less than 18-door annular kiln in brick making industry in Xi'an; To support the enterprises producing new wall materials equipped with high technical level equipments and good products, only the enterprises with identified qualification may enter construction market to enhance the technical level of brick making enterprise, standardize market and popularize new energy saving technology.

Tasks:

(1) Organize and set up the expert group for "identification of enterprises' qualification";

(2) Assist government in formulating policies related to "identification of enterprises' qualification";

(3) Hold "Assessment work meeting on identification of brick making enterprises' qualification";

Time: March 2006

Location: Xi'an Association of Brick Making Industry

Task: Formulate standard for identification of qualification, assess the enterprises applying for the identification and publicize the list of qualified enterprises.

4.4 Develop list of good energy saving wall materials

Time: January 2006—December 2008

Objective: Implement the brand development strategy, publicize famous products in the industry, formulate the famous brand awareness in the industry and promote technical progress and quality improvement of products; encourage and popularize rectangle-holed bricks which has better heat insulation and preservation performance to accelerate the process of realizing the target of 50% of energy saved in building and beat the false and bad products.

Tasks:

(1) Associate with Construction Committee, Office of Wall Materials Reform, Quality and Technology Supervision Bureau and Quality Supervision and Test of Wall Materials Product Station to set up Assessment Group for Wall Materials and develop assessment. The main factors considered include heat engineering performance, mechanics performance, perforation rate, production and building construction on the basis of national standard for good quality product;

(2) Develop list for good quality products in Xi'an;

(3) Assist government in formulating preferential policies for enterprises producing products in the list and construction enterprises in use products in the list;

(4) Strengthen the dissemination of the products in the list.

4.5 Assist in conduct law enforcement

Time: January 2006—December 2008

Objective:

Strengthen the LPIC building in Xi'an and make it play more important role in popularization of new wall materials and promotion of self-discipline of the brick making enterprises.

Tasks:

(1) Associate with government to strengthen the supervision on construction sites;

(2) Set up effective appeal mechanism;

Objective: Strengthen the supervision on the construction enterprises in use of unqualified products

Contents: a. Setting of the hot line for appeal in LPIC office;

b. Build appeal network in the Xi'an Wall Materials Network;

c. Setting mailbox for appeal in main streets in Xi'an;

d. Publicize the appeal mechanism and provide those give true information with premium of 1,000 to 5,000 Yuan

4.6 Popularize the rectangle-holed bricks

Time: February 2006—July 2009

Objective: Realize saving 50% of energy in building and popularize the rectangle-holed bricks

Tasks:

(1) Develop new rectangle-holed bricks products and assist government in formulating the product standard;

(2) Formulate the preferential policies for rectangle-holed brick making enterprises to encourage the enterprises standardized production;

(3) LPIC assists in applying for project establishment to Office for Construction Standard in Provincial Construction Department and designs the construction standard;

(4) LPIC associates with Design Institute to design;

(5) Publicize and popularize to building construction enterprises and formulate related policies.

4.7 Set up Center for Energy Saving Research and Test

Time: February 2006—August 2009

Objective: Develop research on energy saving and help replication enterprises solve technical problems in the technology upgrading to ensure the energy conservation and emission reduction in wall materials.

Tasks:

Associate with Monitoring and Test Center for the Quality of Wall Materials in Construction Materials Industry, Test Center of Heat Energy of Bricks in Construction Materials Industry to develop the research on kiln pressurization and heat preservation technology, capacitance compensation technology, well-proportioned mixture supply technology and test of energy conservation of kiln technology, etc.

4.8 Conduct training and experiences sharing

Time: December 2007—December 2010

Objectives: Strengthen enterprises' capacity building, improve the integrated competitive capacity, and popularize the new technology and new products to realize energy conservation and emission reduction.

Tasks:

(1) Conduct training regularly;

Contents: a. Development of brick making industry;

b. New technology and technical standard in brick making industry;

c. Energy efficiency management in brick making industry.

(2) Hold annual meeting of brick making industry in Xi'an;

Time: Every February

Contents: a. Publicize national and provincial policies on wall materials and energy saving in building;

b. Commend and encourage advanced enterprises and person in the industry;

c. Share advanced enterprises' experiences;

d. Pay attention to the selective examination for quality supervision on bricks used in building construction and supervision on bricks used in construction sites, publicize the unqualified production enterprises and construction enterprises;

e. Print and circulate pamphlets on energy saving cases;

(3) Visit the demonstration enterprise in GEF/UNDP Energy Conservation and Emission Reduction Project in Sichuan Province

Time: May 2007

Contents: Visit the energy saving annular kiln of demonstration enterprise and share the experiences on energy saving and emission reduction.

(4) Conduct an on-the-spot meeting for typical energy saving cases of replication enterprises and introduce their experiences in VA in May 2008;

(5) Organize replication enterprises to learn clean-water-wall technology abroad and develop domestic and international technical communication and cooperation; attend domestic and international product exhibit and exploit market.

4.9 *Strengthen dissemination and popularization*

Time: December 2006—December 2010

Objective: Publicize energy conservation and emission reduction, enhance the public's understanding on brick used in construction, and promote public supporting the wall materials reform to realize the target of energy conservation and CO2 emission reduction.

Tasks:

(1) Publicize policies and regulations on wall materials reform and energy saving building by local newspaper, broadcast, TV and network;

(2) Publicize information and the development status on wall materials reform;

(3) Publicize the advantage of new wall materials for citizens by exhibit board and real product.

5. Follow-up and Report of the Action Plan

According to local realities, LPIC formulates report on the previous year's work every January and works out *Annual Working Plan of LPIC of Xi'an City*. The report is to be submitted to national PIC secretariat before January 31. The secretariat is to collect all the submitted reports and reports to MOA's GEF office. All the reports are to be evaluated by the office and each action plan shall be revised according to the evaluation results.

Annex 6.1

Survey Study Report on Energy Conservation & GHG Emissions Reduction in Brick Making Industry of Xianyang City

According to the framework and requirement of the subcontract of Phase III of *UNDP/GEF Energy Conservation & GHG Emissions Reduction in Chinese TVEs – Phase II*, a study tour group, led by Ms. Wang Guiling, PMO deputy director, consisting of subcontractor experts went to Xianyang city, and conducted a five-day tour from Oct 31 to Nov 4, 2005. Workshops, field study and questionnaire answering had been held in order to remove the market, policy, technology and financing obstacles that have been identified in the process of producing, marketing and applying energy efficiency technology in Xianyang city's brick making industry. Another purpose of the tour is to direct the establishment of LPIC in the city and promote its capacity building. The field study results are as follows:

1. Brief Introduction of Brick Making Industry in Xianyang City

Xianyang is in the hinterland of northwest of China. On the north of Xianyang is the Jiuzong Mountain, and to the south is Qin Mountain. Xi'an City is on its east and the Yangling National High Agricultural Technology Industry Demonstration Area is on the west. It covers 10,196 km^2. Xianyang has rich soil plateau shaped by Yellow River, especially the loess resources are very rich and the quality is quite good. Brick making industry has good development in Xianyang.

In 2004, there were 880 brick-making enterprises in Xianyang City. There were 21,560 employees in brick making industry. The tax payment was 17.6 million Yuan (see Table 1).

Table 1 Basic Data of Brick Making Industry in Xianyang City

	Unit	2003	2004	Growth
Number of enterprises		845	880	4.1%
Total output value	10,000 RMB Yuan	21,400	25,440	18.9%
Takings	10,000 RMB Yuan	44,100	49,800	12.9%
Initial fixed capital	10,000 RMB Yuan	96,000	117,600	22.5%
Staff employed	Persons	20,625	21,560	4.5%
Tax payment	10,000 RMB Yuan	1,520	1,760	15.8%

The number of enterprises in 2004 increased by 4.1% than that in 2003, but the growth is rather less than the growth of total output value and tax payment. So the conclusion is that the general production scale is enlarged.

By the comparison between the energy consumption in 2003 and 2004, it is found that the energy efficiency is enhanced (see Table 2).

Table 2 Energy Consumption and CO_2 Emission of Brick Making Industry in Xianyang

	Unit	2003	2004
Output	10,000 pieces of standard bricks	52,647	57,276
Energy consumption Per Unit	Tce per 10,000 pieces	1.4	1.35
Total energy consumption	Tce	73,706	77,323
CO_2 emission	Ton	169,015	173,273

In 2004, the output increased by 8.7% and the energy consumption decreased by 3.5%, so the total energy consumption only increased by 4.9%, and the CO2 emission only increased by 2.5%. The adoption of energy efficiency and GHG emission reduction technologies shall contribute to local environment quality improvement.

1.1 Property Right Status of Brick Making Industry in Xianyang

Property right reform has been conducted since reform policy been implemented in rural China. The technical process adopted by local brick TVEs is natural drying and most TVEs cover more than 100 mu land. The land is owned by towns or villages. Therefore, property right reform is conducted in the form of contract to separate ownership and management right and promote enterprises' development.

All the 880 brick TVEs have finished the property right reform (see Table 3).

Table 3 Property Right Reform in Brick Making Industry

	Number of enterprises	Enterprises to conduct property reform	Enterprises with property reform finished		
			Contract	Joint-Stock	Stock partnership
Number	880	0	811	39	30
Percentage	100%	0	92.2%	4.4%	3.4%

1.2 Technology Status of the Brick Making Industry in Xianyang City

(1) Current technologies

Among the total 960 production lines in 880 brick making enterprises, only 2 were designed by professional designing institute and most of the rest are designed by the TVEs themselves. The production scale of enterprises is small with the annual output of less than 30 million pieces. All the technical process is natural drying rotary kiln.

(2) Information sources

It can be learnt from Table 4 that the educational level of staff in brick making industry in Xianyang is low. Staff with middle and high school and lower education level represent 77.1% of local brick making industry. The low educational level of workers is not good for energy efficiency technology adoption and application. The statistics is shown in Table 4.

Table 4 Statistics of the Staff in Brick Making Industry

	Number	Percentage (%)
Total number of staff employed	21,560	100
High professional title	760	3.5
Medium professional title	1,102	5.1
Preliminary professional title	2,300	10.7
College and junior college	768	3.6
Junior or senior high school	9,600	44.5
Other	7,030	32.6

Table 5 shows that the most technical information is got from association and

government agencies. It can be concluded that the guidance of association and government agencies play an important role in brick making industry's energy conservation. On the other hand, the fact that only 8% of technical information is from technical transfer market shows that the mercerization level of technical information is relatively low.

Table 5 Technical Information Sources for Brick Making Industry in 2004

Sources	Number of enterprises	Percentage %
Network	44	5
Associations	326	37
Colleges, universities and scientific institutes	0	0
Domestic enterprise	176	20
Foreign countries	0	0
Government agencies	264	30
Friends	0	0
Technical transfer market	70	8
Total	880	100

1.3 Financial Status of the Brick Making Industry in Xianyang City

In the process of applying for bank loan, the key problem the brick making enterprises faced with was the provision of mortgage. Since the brick factories utilize the rented resource and have no property right over the land, so the land cannot be mortgaged. Most factories have not enough equipment and workshop building as mortgage, so it is very hard for them to get loan.

To solve the problem above mentioned, Xianyang City set up Fund for Supporting SMEs in 2005. At the same time, the Financing Credit System, Assurance System and Loan Risk Sharing Mechanism for SMEs were formed. All of these are helpful attempt for brick making enterprises applying for loan and getting capital needed in the development. Now 2 brick making enterprises have applied bank loan of 3.2 million successfully.

1.4 Brief Introduction of the Replication Enterprises

The 14 replication enterprises in Xianyang City have finished property right reform. This promotes the technology upgrading in enterprises. Since 2000 when property reform was finished, the capital for technology upgrading accumulates to 24.6 million Yuan. Table 6 shows that 87% of the capital is from self-funding and informal financing. It reflects the strong willing of these enterprises for energy saving technology upgrading.

Table 6 Financial Source for Technology Upgrading in Replication Enterprises in Xianyang

	Total	Self-funding	Bank loan	Governmental investment	Informal financing
Investment for technology upgrading (10,000 RMB)	2,460	1,230	320	0	910
Percentage	100%	50%	13%	0	37%

The 14 enterprises selected for the replication project all have annual output of over 20 million pieces. They attached importance to energy saving technology upgrading. They will be good demonstration for other enterprises in local areas. It is helpful for the replication of energy saving technology. The basic conditions of replication enterprises are shown in Table 7.

Table 7 Basic Information of Replication Enterprises in Xianyang

No.	Enterprise	Annual output (million pieces)	Main equipments				Intent on Technical upgrading
			Brick extrusion machine		Kiln		
			Model	Production capacity (piece per hour)	Model	Production capacity (piece per hour)	
1	Xianyang Weicheng Zhouling Hollow Brick Plant	50	45/40	18,000	34-door annular kiln	7,800	Capacitance compensation, energy saving vacuum technology, test of energy conservation of kiln, energy saving technical service, smoke purification
2	Xianyang Weicheng Dizhang Liucun Brick Plant	37.5	45-B	10,000	38-door annular kiln	9,000	Kiln pressurization technology, capacitance compensation, well-proportioned mixture supply, door of tube kiln pressurization technology, energy saving technical service, porous brick and hollow brick production instead of solid brick
3	Xingping Xiwu Vacuum Brick Plant	38	450, 45/40B	10,000	22-door annular kiln 24-door annular kiln	3,500	Kiln pressurization technology, capacitance compensation, well-proportioned mixture supply, door of tube kiln pressurization technology, energy saving technical service, porous brick and hollow brick production instead of solid brick
4	Xianyang Weicheng Zhouling Zhuoxing Brick Plant	32	45/45	16,000	26-door annular kilns	7,000	Kiln pressurization technology, heat preservation for kiln technology, frequency conversion technology for hot wind blower, energy saving vacuum technology
5	Binxian Nanyuzi Hollow Brick Plant	20	40/40	5,000	24-door annular kiln	2,000	Kiln pressurization technology, heat preservation for kiln technology, pressurization and heat preservation for desiccation room, capacitance compensation, energy saving technical service
6	Qindu Maquan Chatian Brick Plant	32	45/40	19,000	26-door annular kiln	7,000	Kiln pressurization technology, heat preservation for kiln technology, frequency conversion technology for hot wind blower, energy saving vacuum technology
7	Xianyang Weicheng Dongjiao Construction Material Plant	20	40-B	10,000	24-door annular kiln	2,000	Kiln pressurization technology, capacitance compensation, well-proportioned mixture supply, door of tube kiln pressurization technology, energy saving technical service
8	Xianyang Qindu Pingling Jingwei Brick Plant	30	400, 35/35	10,000	34-door annular kiln	7,800	Kiln pressurization technology, capacitance compensation, energy saving blower technology, well-proportioned mixture supply, porous brick and hollow brick production instead of solid brick

9	Xianyang Qindu Jianqiang Brick Plant	31	40/40	10,000	26-door annular kiln	7,000	Kiln pressurization technology, heat preservation for kiln technology, capacitance compensation, frequency conversion technology for hot wind blower, energy saving vacuum technology, porous brick and hollow brick production instead of solid brick
10	Xi'an Lingzhao New Construction Material Plant	26	450	10,000	34-door annular kiln	3,000	Kiln pressurization technology, capacitance compensation, well-proportioned mixture supply, energy saving technical service
11	Gaoling Weihe Jigang Construction Material Plant	23	400	12,000	28-door annular kiln	5,000	Kiln pressurization technology, heat preservation for kiln technology, capacitance compensation, building a new energy saving kiln, brick machine renovation
12	Chang'an Zhoudu Wall Material Industry Ltd.	25	132	20,000	38-door annular kiln 36-door annular kiln	5,000	Kiln pressurization technology, heat preservation for kiln technology, capacitance compensation, frequency conversion technology for hot wind blower, energy saving blower technology, well-proportioned mixture supply, test of energy conservation of kiln, energy saving technical service
13	Xi'an Chang'an Xidu Construction Material Ltd.	25	40/450	12,000	44-door annular kiln	3,300	Kiln pressurization technology, capacitance compensation, frequency conversion technology for hot wind blower, energy saving blower, well-proportioned mixture supply
14	Xi'an Chang'an Luxing Xinzhuang Brick Plant	20	450	11,000	24-door annular kiln	2,800	Kiln pressurization technology, heat preservation for kiln technology, capacitance compensation, energy saving blower technology, energy saving technical service

2. LPIC Building in Xianyang City

2.1 Management Status of the Brick Making Industry in Xianyang

Several agencies and departments are related to energy saving tasks in brick making industry. To ensure the healthy development of the industry and improve the effectiveness of industrial supervision, Xianyang municipal government strengthened coordination and guidance for the brick making industry. In 1995, the Xianyang Leading Group for Brick Making Industry Rectification was founded (hereinafter referred to Leading Group). The Leading Group relies on the Xianyang Economic and Trade Committee and has Rectification Office. It is responsible for planning and coordinating the work in brick making industry. The member parties include Xianyang Economic and Trade Committee, Xianyang Land Bureau, Xianyang Technical Supervision Bureau and Xianyang Construction Committee. Figure 1 is the organizational structure of the management in brick making industry.

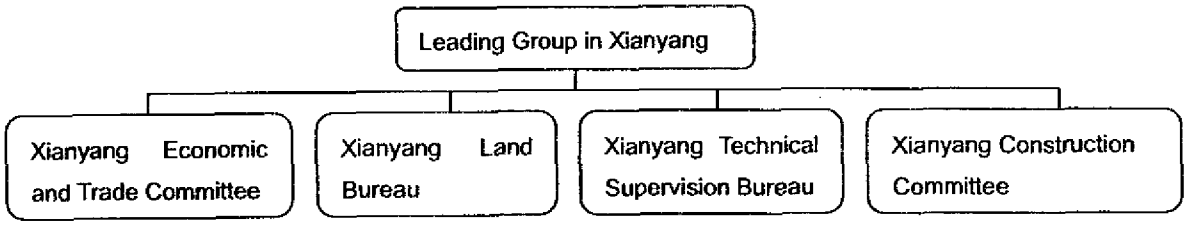

Figure 1 Organizational Structure of the Management in Brick Making Industry

At present, the key work of Leading Group includes:

The first is to strengthen the supervision. Rectification Office organizes municipal construction, environmental protection agencies to conduct law enforcement together, examine and punish the enterprises with 24-door annular kiln or annual output less than 15 million pieces. The unqualified wall materials are forbidden to sell. The secondly is to strengthen energy dissemination and popularization. The dissemination activities are developed in brick making enterprises in 13 countries and districts by dissemination materials and other media. Energy saving will be promoted on the basis of hollow brick production to reduce harmful gas emission.

2.2 Establishment of LPIC in Xianyang

2.2.1 The main reasons for LPIC relying on the Leading Group

(1) Since established ten years ago, the Leading Group has promoted the healthy development of brick making industry in Xianyang by united law enforcement, market rectification and popularization of new technology.

(2) The mechanism of the Leading Group is very similar with that of LPIC. Under its coordination, all government agencies cooperate closely and conduct the policies and laws enforcement well.

2.2.2 The reasons for new member parties' participation in LPIC

Some deficiency exists in the work of Leading Group, such as the environmental protection should be promoted, technical strength is weak and the industrial self-discipline should be strengthened

(1) Environmental protection should be promoted

In the environmental protection system in China, CO2 is not included in the pollutant monitoring system, so environmental protection bureau conducts loose law enforcement for the enterprises which have not severe pollution but CO2 emission.

These enterprises usually just are required to pay a certain amount of discharging fee.

(2) Technical strength is weak

In the survey we found that the formulation and implementation of management policies for brick making industry in Xianyang were good but the technical strength is relatively weak. Therefore, the key work of LPIC after its establishment is to enhance the technical level of brick making enterprises in Xianyang. For Xianyang is near Xi'an, and Xi'an Wall Materials Research and Design Institute is the unique professional research and design Institute directed by former National Construction Materials Bureau engaging in research on sintering products for wall materials, LPIC may play its role of coordination to take advantage of the strong technical background of Xi'an, and Xi'an Wall Materials Research and Design Institute and realize the technical relation with different areas in order to improve the technical level of brick making industry in Xianyang. This model that LPIC promotes technical improvement by policies will be one of the characteristics of LPIC in Xianyang.

(3) Work of industrial association should be strengthened

Xianyang has rich and good loess resources, which are the advantaged materials for brick making industry. However, because of the lagged production process and equipments, the quality of brick is not good. Furthermore, there are so many brick making enterprises that the price competition is very scorching. Some new built brick making plants sell products at lower price in order to recover the cost as soon as possible. To ensure the balanced, stable and sustainable development of the industry, Association of Brick Making Industry (hereinafter referred to Association) was founded by brick making enterprises voluntarily. During this survey, enterprisers told us that only if the industry is good, the enterprises will be good. If the industry is good, the enterprises will get the most benefit; if the industry is poor, the enterprises will lose most.

The Association will set down the direct price for the industry to make enterprises out of bad competition, communicate with government and cooperate with government on market supervision.

The Association will provide free but aperiodic mini technical support for its members and recommend enterprises for identification. By now, there are 18 members of the Association have passed the identification and enter the building market in city areas. But products of other enterprises only can be sold in rural areas. The difference between technical support and sale area will stimulate enterprises to join in the Association initiatively and the scale of the Association is larger and larger.

To make the Association as a member party of LPIC is a breakthrough for the organizational structure of LPIC and another characteristic of LPIC in Xianyang.

3. Policies Related to Brick Making Industry in Xianyang

3.1 Strict supervision on production conditions and quality of products

Xianyang city perfects policy system and management system to provide policy basis for the development of energy saving activities. In April 29, 2005, Xianyang City and Rural Construction and Planning Bureau, Xianyang Quality and Technical Supervision Bureau and Xianyang Economic and Trade Commission issued the *Opinions on the Implementation of Rectification on Brick Quality and Forbidden Solid Clay Bricks before Certain Time Limit* and *Notice on Further Forbidden Solid Clay Bricks and Clay Products, Development of New Wall Materials and Popularization for Energy Saving Building*. These documentations require that forbidden of solid clay bricks will be realized in the whole city planning areas before June 30, 2006. The requirements for rectification in brick making enterprises are:

Close the clay brick making enterprises which have no soil plateau and destroy farmlands. Wash out non-vacuum extrusion machines in which the diameter of mud vat is less than 400 mm. Close small brick plants whose annual output is below 15 million pieces of bricks, brick making enterprises located in the city planning area and enterprises in possession of or purchase some soil plateau before certain time limit. Close the enterprises with lagged production process and equipments and the product's quality and environmental protection of those can't meet some standards.

Carry out the identification system for products of built brick making enterprises. The system will be carried out by annual assessment and annual handing out certification to ensure the quality of bricks produced in enterprises and used in building construction. For the new built brick making enterprises, the qualifications for project examination and approval will be stricter. The examination and approval procedures will be conducted only if the enterprises have the Permission of Mining approved by land resource management agency, Test Report finished by Technical Supervision Bureau and comments of wall materials reform related agencies.

3.2 Strengthen supervision on forbidden solid clay bricks and dight the market of bricks' use

Xianyang Office of Wall Materials Reform checked on the energy saving examination, construction engineering supervision and return of special fund strictly according to the target of "solid clay bricks are forbidden to be used in construction above horizon plane in city areas before June 30, 2006" put forward by Shaanxi Provincial Government. Now, the target has been met two and half years earlier in the city area in Xianyang. By the end of 2004, 5 countries except for city area had met the target in advance, and the left 8 countries are taking all kinds of measures to meet the target. The output of solid clay bricks in 2004 is reduced by 20 million pieces of standard bricks than 2003 in Xianyang because of effective measures.

In June and October 2005, Xianyang Office of Wall Materials Reform in association with Rectification Office, Xianyang Economic Committee, Xianyang Technical Supervision Bureau and the Association conducted examination on law enforcement. 28 brick making enterprises, 10 new wall materials enterprises and over 10 building construction sites were examined, among which 10 brick making enterprises have problems like absence of certification, disordered management, lagged equipments, unqualified products, operation against regulations and false certifications. The examination group drafted the punishment for the enterprises like supplementing related procedures, changing equipments before time limit, penalty and stopping production. Law enforcement in production, quality and market restricted the production of solid clay bricks.

According to the requirement of *Implementing Rules on Levying and Using New Wall Materials Fund* and *Temporary Measures for Management on Wall Materials Reform and Energy Saving Building in Xianyang*, before a constructional project is started, the Office shall levy Wall Materials Fund according to the estimated building area and the standard of 6 Yuan per m^2. If the construction organization fails to pay the fund, he shall not get building permission. After all constructional projects are checked and accepted, the fund will be returned according to the ratio for new construction materials used to construction organization. In 2004, the fund levied at the city and country level reached 3.839 million Yuan and the fund returned reached 2.2 million Yuan. It is helpful to direct construction organization to use new construction materials. Polices, regulations and economic incentives are used for the work on forbidden solid clay bricks.

3.3 Certification of New Energy Saving Construction Materials

According to *Managing Measures for Certification of New Wall Materials and Products for Energy Saving Building in Xianyang*, Xianyang Office of Wall Materials Reform held Assessment Meeting for New Energy Saving Construction Materials, organized experts to assess the brick making enterprises applying for the certification. Only the products certificated may enter the market of construction materials and the construction enterprises using products uncertified should be punished. This activity made the brick making enterprises with small scale and unstable product quality conduct technology upgrading.

4. Environmental Protection Polices

Brick making industry is an important industry in Xianyang, and the following systems are closely related to it: Environment Impact Assessment System for Constructional Projects; Three Qualifications System for Constructional Projects; Pollution Discharge Fee System; System for Pollution Reporting and Registration and Pollution Discharge License and System for Time-limited Pollutant Treatment and Treatment of Hazardous Waste by Administrative Bodies.

National Construction Materials Industrial Bureau issued *Opinion on Environmental Protection in Construction Materials Industry* on March 11, 1997. This document requires that the examination of project establishment in new building, rebuilding and technology upgrading projects should be implemented strictly. All construction projects should implement EIA system and Three Qualifications System for Constructional Projects which requires the environmental protection equipments should be designed, constructed and in operation with main engineering simultaneously. The enough environmental investment should be ensured. After the project finished, the pollutant discharge should meet the national or local standard for discharge.

In June 2003, the Managing Rules on Levying and Using Pollutant Discharge Fees was issued by State Environment Protection Administration and put into force on July 1, 2003. The Provisional Method on Levying Pollution Fees, which was promulgated by the State Council on February 5, 1982, and the Provisional Method on Compensated Using Exclusive Fund for Pollution Source Treatment, which was promulgated by the State Council on July 28, 1988, was abolished at the same time.

According to it, the fee levying ways and scope has been adjusted: the former fee charging for pollution discharge that over a certain standard is changed to charge fee both for within-standard and over-standard pollution discharge. Formerly, fee was charged on the basis of one single over-standard factor. Now, various pollutants are converted into an equivalent pollutant and fee shall be charge according to the converted total pollution. The fee charged is included into government financial budget and managed as exclusive fund for environment protection. The expenses incurred by environment administrations are covered by government finance. In this way, the pollution discharge fee levied become or fair and reasonable.

5. Barriers for Brick Making Industry in Xianyang City

5.1 Tax

According to the Notice on Collecting Value-added Tax for Utilization of Some Resources and Other Products, which was issued by Ministry of Finance and State Tax Administration on December 1, 2001, some new wall materials and products shall enjoy the preferential policy that only half of the value-added tax shall be collected. The enterprises that produce solid clay brick do not enjoy this preferential policy. In Xianyang City, brick making enterprises pay taxes at the rate of 6%. Since a part of brick is sold to individuals who do not need invoice, tax authorities have no way to supervise and control brick making enterprises. For convenience's sake, some brick

making enterprises pay a fixed amount of tax to the government. Therefore, it is hard to use tax to guide enterprises to produce energy efficiency products

5.2 How to Conduct Activities on Forbidden Solid Clay Bricks after the Wall Materials Reform Fund Stopped

According to The Measures for Management of Levy and Use of New Wall Materials Fund issued by Ministry of Finance, New Wall Materials Fund will be levied until Dec 31, 2005. It is a big problem for the Xianyang Office of Wall Materials Reform how to conduct activities on forbidden solid clay bricks after the wall materials reform fund stopped levying in construction organizations since 2006. It is the key work and difficulties in the future that how the 8 countries which haven't met the target for forbidden solid clay bricks continue the work without economic measures and how the 5 countries which have met the target keep their performance.

5.3 Lack of Technical Support for the Establishment of Energy Saving Test Agencies

To ensure the quality of products in energy saving market, Xianyang Office of Wall Materials Reform is making preparations for the establishment of energy saving test agencies. In the survey we were told that the feasibility study for this agency is not conducted for the weak technical strength in Xianyang. So we suggested they cooperate with Xi'an Wall Materials Research and Design Institute to rely on its strong technical advantages and make great efforts for the market rectification.

6. Conclusions

6.1 Practice Shows Establishment of LPIC is the External Demand of Local Government for Energy Saving Upgrading

A few years ago, some areas of China pursued economic development blindly and were unwilling to use advanced technology, even didn't hesitate to destroy environment to realize economic growth. In recent years, local governments have realized that the importance of advanced technology for environmental protection. Xianyang Leading Group was established on this background. The purpose of LPIC to be established in Xianyang is to not only help local areas use advanced production technologies, reduce energy consumption and produce good and energy saving products, but also reduce pollutant discharged and protect environment. The purpose is accordant with local government's development plan and the LPIC has good replication and development future.

6.2 The Replication of LPIC is the Affirmation and Promotion for the Xianyang Leading Group

Since the Leading Group was established over 10 years ago, under the guidance of municipal government, its member parties have cooperated closely and made great achievement in supervision on forbidden solid clay bricks and energy saving building. LPIC to be established in Xianyang is the affirmation for the work of Xianyang Leading Group and promotion for its future work.

6.3 Taking Full Advantage of NGO

Xi'an Wall Materials Research and Design Institute have strong technical strength as a famous research organization in wall materials. The LPIC in Xianyang will get technical support from Xi'an Wall Materials Research and Design Institute and conduct energy conservation and emission reduction more effectively.

7. Suggestions

(1) LPIC may combine the work of Rectification Office of Leading Group to develop

survey on enforcement of policy on forbidden solid clay bricks, apply for New Wall Materials Fund and know the policy trends on forbidden solid clay bricks.

(2) Some achievements on forbidden solid clay bricks have been gained, but in rural areas, solid clay bricks are used in low rise buildings built personally. The enforcement and supervision on forbidden solid clay bricks are relatively weak. LPIC can use all kinds of media to disseminate, change lagged idea on use of brick and promote the scientific idea on use of brick.

(3) The educational level of staff in brick making industry in Xianyang is relatively low. LPIC should organize the industrial experts to develop training for them and some visits to help them know the domestic and international technical trend in brick making industry.

(4) It is difficult to implement environmental protection policies in brick making industry in Xianyang. LPIC should help brick making enterprises develop energy conservation and emission reduction and implement national and provincial environmental protection policies.

Annex 6.2

Statute of Policy Implementation Committee, Xianyang City

General Provisions

Clause 1 Xianyang Policy Implementation Committee (hereinafter referred to as the LPIC) is an institution depending on Xianyang Leading Group of Rectification of Brick Production Order, which is established to assist the local brick making industry in applying high efficient energy saving technology and overcoming various policy, market, technology and financing barriers to the application.

Clause 2 The objective of the LPIC is to disseminate energy efficient technology and introduce high efficient management system at TVEs to produce high quality and energy efficient product thereby reducing energy consumption and GHG emissions and promoting the sustainable development of brick making TVEs in Xianyang.

Organization of the LPIC

Clause 3 The membership of the LPIC is the same with that of Xianyang Leading Group of Rectification of Brick Production Order, comprised of twelve parties including Economic Committee, TVE Bureau, Technology Supervision Bureau, Land Resource Bureau Environmental Protection Bureau, Planning Bureau, Industry and Commerce Bureau, Agricultural Bureau, Power Supply Bureau, Police Station, Supervisory Bureau for Work Safety and Association of Wall Materials Industry.

Clause 4 The LPIC shall have 14 delegates. Vice Mayor of Xianyang Municipal Government will act as the Director of LPIC; Deputy Secretary-General of Xiayang Municipal Government and Deputy Director of Xianyang Economic Committee will act as the deputy directors of LPIC; The members are composed of directors or heads of Economic Committee, TVE Bureau, Technology Supervision Bureau, Land Resource Bureau Environmental Protection Bureau, Planning Bureau, Industry and Commerce Bureau, Agricultural Bureau, Power Supply Bureau, Police Station, Supervisory Bureau for Work Safety and Association of Wall Materials Industry.

Clause 5 The delegates, to be nominated by the managing leaders of respective agencies and appointed after the agreement of all member parties, shall serve a term of three years. If any member party wishes to renew its delegate to the committee, a written application for the renewal should be submitted to the office of LPIC for approval.

Clause 6 The LPIC will instate one director and two deputy directors. Vice Mayor of Xianyang Municipal Government will act as the Director of LPIC; Deputy Secretary-General of Xiayang Municipal Government and Deputy Director of Xianyang Economic Committee will act as the deputy directors of LPIC; The Deputy Director can take care of routine matters as Director in his absence. In addition to the normal duties and obligations of a delegate of the LPIC, the Director (or Deputy Director) chair meetings of the LPIC, signs Minutes and formal correspondence on behalf of the LPIC.

Clause 7 Under the LPIC, an office is established to be in charge of handling routine matters, conduct the activities required in the PIC's documentation and conference summary and communications with the PIC and the project management office of the UNDP/GEF Chinese TVEs Project. The office is located in the Office of Economic Committee. Deputy Director of Economic Committee will act as the Office Director.

Clause 8 The office staff consists of local experts and three staff of Association of Wall Materials Industry in Xianyang.

Functions of the LPIC

Clause 9 *Main responsibilities of the LPIC are, under the guidance and with the* coordination of the national PIC and the national project management office, to facilitate to remove policy, market, technology and financing barriers encountered by the local brick making TVEs to policy enforcement. Detail responsibilities include the following.

1. Develop and implement action plan aimed at promoting regulatory reform related to the monitoring of energy efficiency at brick making TVEs, and facilitation of the transform of the project implementation into a market-oriented mechanism.
2. Push forward TVEs to sign the VA with local government authorities.
3. Provide TVEs with advanced information on technology on emission reduction, policies and management, organize the replication enterprises to participate in the information communication among enterprises in use of energy saving and emission reduction technologies.
4. Promote the national and local regulations, standards and measures on environmental protection and energy conservation implemented in TVEs.
5. Set up effective incentive mechanism for energy conservation and emission reduction the implement the mechanism in TVEs.

Clause 10 Responsibilities of member parties are:

1. Economic Committee should be responsible for coordination of LPIC's work and responsible for PIC, and strengthening the macro management of TVEs and has the responsibility of instruction, coordination, supervision and service.
2. Planning Bureau should be responsible for the unitive layout and planning for new-built and rebuilt brick TVEs.
3. Environmental Protection Bureau should be responsible for supervision on implementation of environmental protection laws and putting forward the specific requirement on environmental improvement to make the replication enterprises discharge meeting standard.
4. Technology Supervision Bureau should be responsible for instructing the technical renovation in brick making industry and provide with technical instruction.

5. Land Resource Bureau should be responsible for providing services on land use of TVEs.
6. TVE Bureau is the industrial administration of brick making industry. It is good for coordination in the industry.
7. Industry and Commerce Bureau should be responsible for the revenue management administration of brick TVEs.
8. Agricultural Bureau should be responsible for the administration of brick TVEs in association with TVE Bureau.
9. Power Supply Bureau should be responsible fore the power supply for the TVEs.
10. Police Station should be responsible for the social security and the normal production order.
11. Supervisory Bureau for Work Safety should be responsible for administration and supervision of the work safety of brick TVEs.
12. Association of Wall Materials Industry should be responsible for strengthening the production and dissemination of new wall materials; supply information, training and coordination for supply and demand; and organization of technical communication and study among the TVEs.

Working Procedures

Clause 11 The LPIC operates by means of meetings, once half a year. The Director, or the executive deputy director at the director's absent, will chair the meetings. A meeting will be considered duly valid if more than 50% of its members are present.

Clause 12 The LPIC Director may call interim meetings as per the request of PIC and the PMO. Minutes of the meeting should be developed if necessary.

Clause 13 Minutes of meetings and progress reports will be submitted, by means of telephone or e-mail, to the national PIC and the project management office on a regular basis.

Supplementary Articles

Clause 14 This statute will become effective on the date after it is discussed and approved by all LPIC members. The Office of LPIC reserves the right for the explanation of this statute.

Annex6.3

Action Plan of the LPLC in Xianyang City

1. Project Background

The project of "UNDP/GEF Energy Conservation & GHG Emission Reduction in Chinese TVEs" has been funded by GEF. The aim of the project is to help Chinese TVEs that engaged in brick-making, cement, casting and coking to adopt energy efficiency technologies and to reduce GHG emission.

During the project's first phase, there are all kinds of obstacles to the adoption of energy efficiency technologies have been identified and evaluated and strategies to remove the obstacles have been formulated. During the second phase, it has been proposed to establish top-down PLC both at central and local level. The LPLC shall be the new mechanism to remove the policy obstacle and to promote energy efficiency in Chinese TVEs by adopting a market transformation approach. During the third phase, 11 replication areas will be selected to develop LPIC building and overcome the market, policy, technology and financing barriers to the adoption of energy efficiency technologies on the base of experiences in Phase I and II.

In order to realize the objectives set for the project's third phase, to create a sound environment for the replication enterprises and the brick making industry that these enterprises belong to, to promote the implementation of policies, laws and statutes, to establish a mechanism favorable for enterprises to adopt energy efficiency and GHG emission reduction and to extend the experiences accumulated by the demonstration enterprises, The LPIC in Xianyang city has formulated the action plan.

2. Major Obstacles to Xi'an TVEs' adopting Energy Saving Technologies

(1) The traditional idea and custom for production and use of bricks restricted the acceptance of new technology;

(2) The supervision is quite inadequate, the bad products with low price are in use in the market, the competition among enterprises is disordered and the price self-discipline is absent;

(3) Technical strength in the industry is weak;

(4) The educational level of staff in the industry is low;;

(5) It is hard to implement the environmental protection policies on levying pollutant discharging fee in brick making industry in Xianyang.

3. Objective

3.1 Short-term objective (2005-2008)

(1) The association signs Energy Efficiency Voluntary Agreement with replication enterprises.

(2) To conduct energy saving technology upgrading and to realize the objective of decreasing unit product's energy consumption by 10% (with the data of 2004 as baseline).

(3) To establish an effective mechanism for brick making industry's sustainable energy efficiency and GHG emission reduction.

3.2 Medium and long term objectives (2008-2010)

(1) In 2010, compared with the data of 2004 (baseline), the ultimate objective of

decreasing unit product's energy consumption by 15% will be realized.

(2) To extend the Energy Efficiency Voluntary Agreement in brick making industry and to establish enterprises' self-improving mechanism to promote energy efficiency by adopting a market transformation approach.

4. Implementing Plan

4.1 Signature of EE Voluntary Agreement by Government with replication enterprises

Time: July 2006—December 2008

Objective: Association signs Energy Efficiency Voluntary Agreement with replication enterprises; energy efficiency technical upgrading will be finished before December 31, 2008 and unit product's energy consumption be decreased by 10% compared with the data of 2004(baseline). By December 31, 2010 unit product's energy consumption will be decreased by 15%.

Tasks:

(1) Consult with enterprises and formulate energy saving technology upgrading plans that are to be assessed;

(2) Identify barriers to the implementation of the plan;

(3) LPIC consults with local government and formulates incentive policy;

(4) Work out Energy Efficiency Voluntary Agreement together with replication enterprises;

(5) Provide technical and financial support;

(6) Sign Energy Efficiency Voluntary Agreement;

(7) According to the stipulations of Energy Efficiency Voluntary Agreement, the implementing progress of the tasks is to be supervised by the third party that has been confirmed by the parties involved in Energy Efficiency Voluntary Agreement;

(8) Summarize the experiences accumulated by replication enterprises and get ready for popularizing the experiences in brick making industry in Xianyang.

4.2 Popularize Energy Efficiency Voluntary Agreement

Time: 2007

Objective: LPLC further popularizes Energy Efficiency Voluntary Agreement in Xianyang.

Tasks:

(1) Train staff from Xianyang city's brick industry and publicize GEF project;

(2) Conduct survey of brick TVEs in Xianyang. Circulate energy efficiency cases and the latest energy saving technology pamphlets;

(3) Collect information of TVEs that are willing to conduct energy efficiency technical upgrading, encourage the enterprise to sign the Energy Efficiency Voluntary Agreement;

(4) Sign the Energy Efficiency Voluntary Agreement with replication enterprises.

4.3 Associate with Xianyang Office of Wall Materials Reform to Finish the Work

on Prohibition of Solid Clay Bricks in the Whole City

Time: December 2005—December 2006

Objective:

To carry out and meet the target of "solid clay bricks are forbidden to be used by the end of 2006" put forward by Shanxi Provincial Office of Wall Materials Reform

Tasks:

(1) For the 5 countries which have met the target, their performance and fruit should be strengthened and the fluctuation should be prevented. Furthermore, the activities for prohibition of solid clay bricks should be extended to towns and villages. The Demonstration Construction Engineering for Energy Saving Building should be developed well;

(2) For the 8 countries which haven't met the target for forbidden solid clay bricks, work strength and input should be enhanced to direct enterprises to conduct technology upgrading on hollow brick production instead of solid clay bricks and ensure to meet the target by the end of 2006;

(3) According to the No. [2005] 10 documentation issued by Office of Provincial Government, the rectification on brick quality and prohibition of solid clay bricks should be combined closely to realize "prohibition of use" to "prohibition of production".

4.4 Conduct Certification of Energy Saving Products and the Dissemination and Popularization

Time: February 2006—December 2008

Objective: Implement the Managing Measures for Certification of New Wall Materials and Products for Energy Saving Building in Xianyang strictly.

Tasks:

(1) Associate with Xianyang Office of Wall Materials Reform to organize experts group to assess the enterprises applying for the certification regularly. The qualified enterprises will be awarded the certificate and permitted to enter the construction market;

(2) Conduct annual examination for the certificated enterprises and products and change the new certificate; the unqualified enterprises in the year will not be certificated;

(3) Associate with related agencies to conduct examination of law enforcement in the construction sites irregularly every year; those who don't use certificated products will be punished.

(4) Strengthen the technology upgrading and renovation, fetch in and absorb international advanced technology on the basis of local conditions; promote renovation on wall materials and popularize the energy saving building.

4.5 Associate with Xianyang Office of Wall Materials Reform to conduct examination on the prohibition of use of solid clay bricks

Time: July 2006—December 2010

Objective:

To know the implementation of Opinions on the Implementation of Rectification on

Brick Quality and Forbidden Solid Clay Bricks before Certain Time Limit and Notice on Further Forbidden Solid Clay Bricks and Clay Products

Tasks:

(1) Xianyang Office of Wall Materials Reform will organize the statistic issued by office of municipal government on the new built, rebuilt and enlarged construction projects;

(2) Examine whether the construction projects have Permit for Construction checked and issued by construction administrations;

(3) Examine whether the construction projects have paid Wall Materials Fund according to the estimated building area and the standard of 6 Yuan per m^2;

(4) Examine whether the construction projects have used solid clay bricks in constructions above horizon plane;

(5) New wall materials used in low rise house personal built in rural areas;

(6) Punishment for those activities against the Opinion;

(7) Summarize the examination.

4.6 Conduct Special Activities on Prohibition of Use of Solid Clay Bricks during the "Energy Saving Dissemination Week" in the Whole Country

Time: 2006—2010

Objective: Enhance the public's understanding on brick used in construction, and promote public enthusiasm for supporting the wall materials reform.

Tasks:

(1) Publicize policies and regulations on wall materials reform and energy saving building by local newspaper, broadcast, TV and network;

(2) Publicize information and the development status on wall materials reform;

(3) Publicize the advantage of new wall materials for citizens by exhibit board and real product.

5. Follow-up and Report of the Action Plan

According to local realities, LPIC formulates report on the previous year's work every January and works out Annual Working Plan of LPIC of Xianyang City. The report is to be submitted to national PIC secretariat before January 31. The secretariat is to collect all the submitted reports and reports to MOA's GEF office. All the reports are to be evaluated by the office and each action plan shall be revised according to the evaluation results.

Annex 7.1

Field Survey Report on Energy Conservation & GHG Emissions Reduction in Foundry Industry in Nanjing City

According to the framework and requirement of UNDP/GEF Energy Conservation & GHG Emissions Reduction in Chinese TVES – Phase II consisting of three phase, a study tour group, led by Ms. Wang Guiling, PMO deputy director, consisting of subcontractor experts, went to Nanjing city and conducted a four-day tour from April 5 to 8, 2006. Workshops with SME Bureau and Environmental Protection Bureau, field study and questionnaire answering for replication enterprises had been held in order to remove the market, policy, technology and financing obstacles that have been identified in the process of producing, marketing and applying energy efficiency technology in foundry industry of Nanjing. Another object of the tour is to direct the establishment of LPIC in the district and promote its capacity building. Results are as the following.

1. General Status of Foundry in Nanjing City

Nanjing city is located in eastern China, the middle of lower reaches of Yangtze River. The area of Nanjing is 6,598km^2 and made up of 11 districts and 2 counties. It has the population of 6,238 thousand. For international manufacturing are centralizing in Yangtze River Delta, electronics industry, automobile industry, petrifaction industry, steel industry and electric power industry have been developed rapidly in Nanjing city.

1.1 Status of Foundry Industry

The foundry industry is the foundation of the machine building industry of Nanjing, and it started early. There were 360 foundry enterprisers; 450 thousands/year total throughputs approximately; 45 thousands practitioners in early 1990s.Then, state foundry factory were moved to the outskirts of Nanjing, TVEs were developed rapidly. Numerous small enterprises were united or bankrupted in the middle of 1990s because of bad management. Now it is stable phase of foundry industry development, there are 220 foundry enterprisers, 320 thousands t/a total output and 25 thousands employees. Products have been supplied for machine factories in Nanjing and other cities and some of them for export.

Table 1 Basic Data of Foundry Industry in Nanjing (2005)

	Unit	Foundry	TVEs	The foundry industry accounts for the TVEs (%)
Number of enterprises		220	12,872	1.71
Staff employed	thousand persons	25	550	4.52
Total output value	million	4,952	166,775	2.97

1.2 Ownership Reform

The reform of foundry enterprises' ownership started from 1997 and completed approximately up to now, but it was insufficiently. There are two situations: 20% of state owned enterprisers have not been reformed, 70% of them have been reformed insufficiently, and 10% of them have been reformed adequately. Because ownership reform for permanent assets is lagged and started in 2003. TVEs have been reformed rapidly; with 80% of them have been reformed to private enterprises.

Table 2 statistics for ownership reform of foundry industry

Type of enterprises	Enterprises to conduct ownership reform	Enterprises with ownership reform insufficiently	Enterprises with ownership reform finished
State-owned enterprises	20%	70%	10%
TVEs	0	20%	80%

As a whole, ownership reform will accelerate the development of foundry industry. The managers of enterprise will pay more attention to economic benefit after ownership reform. Energy conservation is beneficial to reduce cost for foundry industry which is an industry with high energy consumption. After the manager realized this, they would pay more attention to energy conservation.

1.3 Energy Consumption

Coke, coal, electricity, oil are used mostly in foundry industry. It is hard to know the accurate quantity of energy consumption because of insufficient statistic for individual enterprise and different method for calculation. According to estimation, the energy consumption of the foundry industry was 2,164 thousand tce per year and CO_2 emission was 5,399 thousands t/a. Therefore, the adoption of energy efficiency and GHG emission reduction technologies will contribute to local environment quality improvement.

Table 3 Energy Consumption and CO_2 Emission of Foundry Industry in Nanjing (2005)

	unit	amount
Output	Thousand tons	320
Energy consumption Per Unit	Tce per ton	0.68
Total energy consumption	Thousand Tce	216.4
CO_2 emission	Thousand tons	539.9

According to statistic, the rate of waste product is 10% to 15% approximately. It can be reduced greatly. It will decrease energy consumption and cost that improvement of the quality and management, decrease of rate of waste product, and recycle of the pig iron and steel scrap.

1.4 Feature of industry development

There are some features of foundry industry in Nanjing as follows: sufficient technical professionals, stable market, entire casting types, disparity of the level of equipment, general stable production capacity, level of casting quality was stable and improved partially, and insufficient potential for development.

(1)Technician

Many universities are located in Nanjing city, so it will provide human resource and technical support for local foundry. For example, Southeast University is one of the universities which establish foundry specialty earliest. Some foundry technicians engaged in Nanjing Institute of Technology, Nanjing University of Aeronautics and Astronautics, Nanjing University of Science and Technology and Nanjing University of Technology.

In addition, some foundry technicians have been employed in the early built machine

factory. The total number of the technicians is about 350 including 120 with high professional titles.

(2)Equipment

The enterprises with high level manufacture technology are on the top of internal enterprises. These enterprises are most state-owned factories, joint venture and foreign funded corporations. The level of majority of foundry enterprises is low and especially in some private enterprises with traditional operation. As a whole, in the area of grit-mould foundry: colophony foundry take place of a drying model. There are 6 automatic model product lines, 3 mechanization plastic product lined and 1 auto colophony granule product line; in special foundry : Product lines include 2 V- way product lines , 8 automatic die-casting machines, 5 automatic shaping machines, 14 automatic foundry machines. Special foundry enterprises include 8 factories engaged in melt-model foundry, centrifugal foundry and low-pressure foundry.

(3)Market

Most foundry products are used by local machine enterprises; Supply and demand is stable in civil casting. The surplus casting will be exported to Australian, Canada and American etc, and some of them will be sold to other cities in Zhejiang and Jiangsu province.

(4)Financial source

Self-fund and bank loans are the main source of investment. Head office takes responsibility for self-fund in the enterprise which contained complete product types. These enterprises include some separated from the state-owned enterprise nominally and management independently. These enterprises with small investment and slow development attach importance to cold machining and neglect heat machining. Informal financing is the main source of investment in the SME, bank loan is carried through by mortgage loan.

Enterprises devote to energy conservation and technical renovation carefully because of high risk, big investment and the difficulty in getting bank loan. The low investment and quick profit project were implemented in the small enterprises. For example, cast iron melting is a technique with great energy consumption in the foundry process. Cupolas are used widely but it has low heat efficiency. Many enterprises are interested in using furnace inside hot wind because it could save energy. But part of physical heat were used in this technique, most of physical heat and chemical heat were wasted. Many enterprises never use this part of energy because of the big investment.

2. Management of Nanjing Foundry Industry

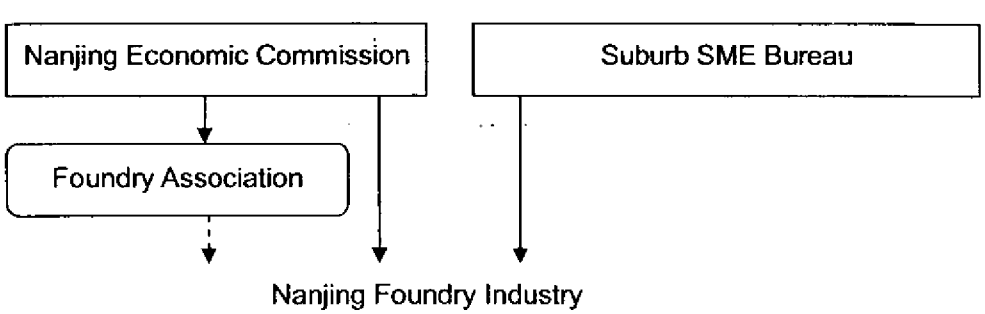

Figure 1 Management of Nanjing Foundry Industry

Main administrative agencies of industrial enterprises are Nanjing Economic Commission and Suburb SME Bureau. Primary responsibilities of Nanjing Economic Commission are: to compile and implement industrial program and plan; to give and implement suggestions about how to carry out the national and provincial industrial policy; to guide industrial structure adjustment; to make industrial program, plan, regulation and policies, etc. Primary responsibilities of Suburb SME Bureau are: to carry out state and provincial policy and regulation for SMEs' development; constitute the development plan and annual plan of the TVEs, to guide industrial structure adjustment and product structure adjustment of TVEs. Nanjing Foundry Association has the responsibilities on industrial survey, statistic, information collection and sharing, training, coordination, service, self-discipline and tasks assigned by governments like participation in drafting industrial plan and standard. The association now is a self-discipline agency direct by Nanjing Civil Administration Bureau.

Therefore, it is necessary to establish a coordination mechanism among Suburb SME Bureau, Foundry Association and other agencies for technical renovation in foundry enterprises and sustainable development in the future.

3. LPIC Building in Nanjing city

LPIC was established dependent on Suburb SME Bureau to establish efficient coordination mechanism, promote adoption and replication of energy saving technology, reduce the GHG emission and accelerate SMEs' sustainable development.

The membership of the LPIC is comprised of seven parties, including Nanjing Suburb SME Bureau, Nanjing Foundry Association, Jiangsu Metallurgy Design and Research Academy, Lishui County SME Bureau, Jiangning District SME Bureau, Liuhe District SME Bureau, Yuhuatai District Development and Reform Bureau. The LPIC shall have 11 delegates, director general of the Nanjing Suburb SME Bureau will act as the director of LPIC, and the deputy director general of Nanjing Suburb SME Bureau will act as the deputy director of LPIC. The office is located in SME Association.

As a guiding government agency for TVEs' reform and technical renovation, the Suburb SME Bureau is familiar with the requirement and development characteristic of TVEs. For the project focus on TVEs and foundry industry is one important field of it, LPIC dependent on Suburb SME Bureau will ensure the entire understand on the foundry industry in Nanjing. It is convenient to guide the development and work of energy conservation and GHG emission reduction in next step. In LPIC, Nanjing Suburb SME Bureau is responsible for coordination with related department in the city, guidance on making project work plan and related polices. It also supports subcontractors of this project, provides necessary service, and encourages the successful persons and agencies on energy conservation and GHG emission reduction.

4. Policies Related to Foundry Industry in Nanjing City

Heavy industry which consumes more water, coal and electricity occupied 80% of whole industry. Environment was polluted severely, because the pollutant discharged excessively. Quantity of three wastes exceeds city's environmental capacity. Air quality is slightly polluted in the whole province averagely. But it is medium polluted in Nanjing city. Main reason of the pollutant discharged excessively is inefficient resource use, for example, ten thousand Yuan of industrial increment will consumer 285 m^3 of water, which is 5 times more than of the developed country's. Main reasons of the resource waste include low resource output rate, low resource using rate, low recycle rate and low comprehensive use rate. These are also the main causes of high cost and low profit in enterprises.

Industry Circular Economy Development Plan was issued on July 1st 2005. Nanjing will rebuild ecologically at three levels including industrial park, industrial chains and enterprise in the next 5 to 10 years. Nanjing will enter circular economy phase. The ten thousand Yuan of industrial increment will consume 1.52 tons of coal. It will achieve the index of State Medium and Long Term Specific Plan 5 years earlier. The wastage of crude oil and coal for ten thousand Yuan of industrial increment will decrease to 1.25 and 1.10 ton. The wastage of water and electricity will decrease to 175m^3 and 940 kilowatt-hours.

4.1 Environmental Protection Policy

Nanjing government pays attention to environmental protection especially in changing the pollution discharge fee and gross control. Base on Information for Expropriation Way (try out) of Village and Street Enterprise Excessive Pollution Discharge Fee in Jiangsu Province, specific charging standard with two modes for concentrative and unorganized excessive exhaust gas discharged was established.

Almost all "black" foundry enterprises were moved out from the city zone, the enterprise located outskirts were arranged to move away. Some of colored metal foundry enterprises still stay in city zone.

After "The Promotion Law for Cleaner Production" putting in practice, for each department strengthens propagandize, consciousness for cleaner production have been strengthened in foundry enterprise. Cleaner production has been an important work in the big enterprise, while started in the small enterprise.

4.2 Industry Policy

Preferential policy of value-added tax repayment after levy was promulgated by PRC government. This policy is used for some specific foundry enterprise and executed by five stages from 1994 years. Information of Value-added Tax Repayment after Levy for casting was promulgated by ministry of finance and state revenue bureau in 2001. According to this information, 35% of value-added tax would be repaid to the enterprises for research and development.

5 enterprises have been listed in the name list of the enterprises which enjoy the policy for value-added tax levy first and repayment later through report and approval. The policy was implemented up to the end of 2005 year, and formal message have been not received yet.

4.3 Financing Policy

Several Opinions for Acceleration of Development of Private Economy issued by Jiangsu provincial committee and provincial government requests the enterprises to accelerate establishment and improvement of the credit assurance system. From 2004 to 2006, 2 hundred million would be used for increasing registration capital of credit guarantee agency each year. The special capital from each level of government would be used for support the development of private economy. Opinion on Acceleration of Development of SME Credit Guarantee System was promulgated by Nanjing government. From 2004 to 2006, 20 million would be used for supplying the allowance to the agencies which provide service for private enterprise and are listed in the supported agencies each year. This special capital would meet 2000 SMEs' requirements.

According to Regulation on Promotion of SME, the special capital will be listed in the financial budge on the basis of actual condition. At present, the special capital is raised by Nanjing government and used for development of SME.

The implementation of policies mentioned above could extend the financing sources

and help to energy conservation and technical innovation.

5. Brief Introduction of Replication Enterprises

After the assessment of products, production scale and process, management level and the enthusiasm on energy saving technology upgrading, this project selected 6 goodish managed village private enterprises and popularize energy conservation and technical innovation. The basic information of replication enterprises and technology innovation are shown in Table 4.

Table 4 Basic information on Replication Enterprises

No.	Enterprise	Main Products	Employee	Tax (thousand)	Annual Output (ton/year)	Main Equipments	
						Name	Specification
1	Huafeng Oil Pump Co.Ltd	diesel oil pump, single- urn pump, oil transportation pump,etc	486	2820	7800	cupola	5 Ton, 2 sets
2	Shuanglong Anti- abrade Alloy Co.Ltd	engineering machine, fitting of construction machine	95	1850	2200	cupola	3 Ton, 2 sets
3	Nanjing Jiali Metalwork Co.Ltd	forgeable piece and casting	160	2100	2200	cupola	3 Ton, 2 sets
4	Zhongshan Foundry Co. Ltd	fittings of machine ,ship and automobile	292	3140	10000	cupola	7 Ton, 2 sets
5	Lishui Xusheng Foundry Co.Ltd	cast-iron piece	210	3400	6500	cupola	5 Ton, 2 sets
6	Dongjun Machine Co.Ltd	black and colored metal machine casting	127	760	4000	cupola	5 Ton, 2 sets

6. Conclusion and Recommendations

6.1 Conclusion

The implementation of the 3rd phase project will make full use of the resources, reduce the GHG emission, reduce gap between the enterprises, enhance the statistic and energy consume computation level, mitigate the financing pressure and improve the incentive policy.

6.2 Recommendations

(1) Expand the technical information sources and reduce the gap between technical levels.

LPIC should expand the technical information sources by visit, lectures of experts and technical information publicized by association regularly. And it will supply opportunity to enterprises for technical communication to reduce the gap of technical level.

(2)Establish statistic and calculation system on energy consumption

LPIC should train the technician for statistic and calculation management on energy consumption, and establish corresponding statistic and calculation management.

(3) Provide financial support for the foundry industry

LPIC should strengthen the financial support for technology upgrading of foundry enterprises, and direct all kinds of capital like personal investment, informal loans and etc into foundry industry.

(4) Improve the incentive mechanism which encourages enterprises to develop energy saving technology upgrading.

Annex 7.2

Statute of Policy Implementation Committee, Nanjing City

General Provisions

Clause 1 Nanjing local Policy Implementation Committee (hereinafter referred to as LPIC) is an institution led by the Nanjing Suburb SME Bureau (hereinafter referred to as bureau), which is established to help foundry TVEs in the city to remove policy barriers in applying energy saving technologies.

Clause 2 The objective of the LPIC is to establish effective coordination mechanism, disseminate energy efficient technology and introduce high efficient management system at TVEs to produce high quality and energy efficient product thereby reducing energy consumption and GHG emissions and promoting the sustainable development of foundry TVEs in Nanjing.

Organization of LPIC

Clause 3 The membership of the LPIC is comprised of seven parties including Nanjing Suburb SME Bureau, Nanjing Foundry Association, Jiangsu Metallurgy Design and Research Academy, Lishui County SME Bureau, Jiangning District SME Bureau, Liuhe District SME Bureau, Yuhuatai District Development and Reform Bureau.

Clause 4 The LPIC shall have 11 delegates (including one director and one deputy director) composed of director, secretary-general and section chief of Nanjing Suburb SME Bureau, Nanjing Foundry Association, Jiangsu Metallurgy Design and Research Academy, Lishui County SME Bureau, Jiangning District SME Bureau, Liuhe District SME Bureau, Yuhuatai District Development and Reform Bureau.

Clause 5 LPIC delegates, to be nominated by the local government, shall serve a term of three years. If any member organization wishes to delegate its membership to a delegate from within the same office as the actual member a written application of such delegation should be submitted to the municipal government for approval.

Clause 6 The LPIC will instate one director and one deputy directors. The executive director of the Nanjing suburb small and medium enterprise bureau shall be Director of LPIC, and deputy director of the Nanjing suburb small and medium enterprise bureau shall be Deputy Director of LPIC. The Deputy Director can act as Director in his absence. In addition to the normal duties and obligations of a member of LPIC, the Director (or acting Director) chairs meetings of LPIC, signs Minutes and formal correspondence of LPIC.

Clause 7 Under the LPIC, an office is established to be in charge of handling routine matters, conduct the activities required in the PIC's documentation and conference summary and communications with the PIC and the project management office of the UNDP/GEF Chinese TVEs Project. The Office is established within the Nanjing SME Association.

Clause 8 The office staff includes the members of Association; the deputy director general of Nanjing Suburb SME Bureau will act as Office Director.

Functions of LPIC

Clause 9 Main responsibilities of the LPIC are, under the guidance and with the coordination of the national PIC and the national project management office, to facilitate to remove policy, market, technology and financing barriers encountered by the local foundry TVEs to policy enforcement, to ensure project phase II develop successfully. Detail responsibilities include the following.

1. Develop and implement action plan aimed at promoting regulatory reform related to the monitoring of energy efficiency at foundry TVEs, and facilitation of the transform of the project implementation into a market-oriented mechanism.
2. Supervise TVEs to sign the VA with local government.
3. Provide TVEs with domestic and international information on advanced technology and policies on energy conservation and emission reduction.
4. Promote the enforcement of national and local policies, regulations and standards related to energy efficiency, technical renovation and environmental protection in foundry industry in Nanjing.
5. Establish incentive mechanism to promote energy efficient technologies, and introduce the successful practices of energy conservation and emissions reduction throughout the district.
6. Recommend to the national PIC rewards to organization(s) or individual(s) with remarkable performance.

Clause 10 Responsibilities of member parties are:

1. Nanjing Suburb SME Bureau is responsible for coordination with related department in the city, guidance on making project work plan and related polices. It also supports subcontractors of this project, provides necessary service, and encourages the successful persons and agencies on energy conservation and GHG emission reduction.
2. Nanjing Foundry Association is responsible for technical support, drafting plan, information, organization, summarization and dissemination, and communication with replication TVEs and data statistics.
3. Jiangsu Metallurgy Design and Research Academy are responsible for project scheme, feasibility study, technical service and cooperation with replication TVE.
4. Lishui County SME Bureau, Jiangning District SME Bureau, Liuhe District SME Bureau, Yuhuatai District Development and Reform Bureau are responsible for cooperation to complete the project, guidance and service for the implementation agency, overcoming the policy obstacles in implementation and encouragement of the replication TVEs to conduct energy conservation projects.

Governance and working procedures

Clause 11 LPIC will operate by means of meetings, once half a year. The Director or

the Deputy Director in his absence will chair the meetings. A meeting will be considered duly valid if more than 50% of its members are present.

Clause 12 The LPIC Director may call interim meetings as per the request of PIC, and the PMO.

Clause 13 Minutes of meetings and progress reports will be submitted to the national PIC on a regular basis.

Supplementary Articles

Clause 14 *This statute will become effective after it is discussed and approved by all* LPIC members. LPIC reserves the right for the explanation of this statute.

Annex 7.3

Action Plan of the LPLC in Nanjing City

1. Project background

The project of "UNDP/GEF Energy Conservation & GHG Emission Reduction in Chinese TVEs" has been funded by GEF. The aim of the project is to help Chinese TVEs that engaged in brick-making, cement, casting and coking to adopt energy efficiency technologies and to reduce GHG emission. 11 replication areas will be selected to develop LPIC building and overcome the market, policy, technology and financing barriers to the adoption of energy efficiency technologies.

In order to realize the objectives set for the project's third phase, to create a sound environment for the replication enterprises and the foundry industry that these enterprises belong to, to promote the implementation of policies, laws and statutes, to establish a mechanism favorable for enterprises to adopt energy efficiency and GHG emission reduction and to extend the experiences accumulated by the demonstration enterprises, the LPIC in Nanjing City has formulated the action plan.

2. Major Obstacles to Nanjing Foundry Industry Adopting Energy Saving Technologies

(1) Great gap in technical level among foundry enterprises;

(2) Unsuitable statistics method for energy consumption;

(3) The financing sources are too limited, and the ability to use informal financing is weak;

(4) Insufficient incentive policy for improvement of energy saving technologies.

3. Objective

3.1 Short-term objective (2006-2008)

(1) The government signs Energy Efficiency Voluntary Agreement with replication enterprises.

(2) The replication enterprises conduct energy saving technology upgrading and to realize the objective of decreasing unit product's energy consumption by 15% (with the data of 2005 as baseline).

(3) To establish an effective mechanism for foundry industry's sustainable energy efficiency and GHG emission reduction.

3.2 Medium and long term objectives (2009-2010)

(1) In 2010, compared with the data of 2005 (baseline), the ultimate objective of decreasing unit product's energy consumption by 20% will be realized.

(2) To extend the Energy Efficiency Voluntary Agreement in foundry industry and to establish enterprises' self-improving mechanism to promote energy efficiency by adopting a market transformation approach.

4. Implementing Plan

4.1 Government signs EE Voluntary Agreement with promoted enterprises.

Time: July 2006-December 2008

Objective: Government signs Energy Efficiency Voluntary Agreement with replication enterprises; technical upgrading shall be finished before December 31, 2008, and unit product's energy consumption be decreased by 15% compared with the data of 2005(baseline). By December 31, 2010 unit product's energy consumption will be decreased by 20%.

Tasks:

(1) Consult with enterprises and formulate energy saving technology upgrading plans that are to be assessed;

(2) Identify barriers to the implementation of the plan;

(3) LPIC consults with local government and formulates incentive policy;

(4) Work out Energy Efficiency Voluntary Agreement together with replication enterprises;

(5) Provide technical and financial support;

(6) Sign Energy Efficiency Voluntary Agreement;

(7) Summarize the experiences accumulated by replication enterprises and get ready for popularizing the experiences in foundry industry in whole city.

4.2 Develop Capacity Building of Technicians and Managers in Foundry Industry

Objective: Strengthen the capacity of foundry TVEs in soliciting and identifying information on energy efficiency and new technology thereby raising their technical level, lowering the reject rate and product cost and reducing energy consumption.

Tasks:

(1) 3-5 technicians are selected from separate enterprises to attend the training.

Time: every three months from 2005 to 2008

Contents:

a. The development trend of foundry industry;

b. The practical technologies of foundry industry;

c. Laws, statutes and technical standards related to foundry industry;

d. Computation and statistic for energy consumption in foundry industry.

(2) Organize enterprises to visit enterprises with high technical level to learn advanced experiences.

Time: January 2007-January 2010

4.3 Conduct Survey in Foundry Industry

Time: January 2007-January 2008

Objective: Identify the scope, type, production and energy consumption of foundry industry in whole city.

Tasks:

(1) Conduct survey in foundry industry in whole city;

(2) Analyze the result of survey and finish the report of survey;

(3) Enter into the conclusion of the survey;

(4) Compile the develop plan of foundry industry in whole city .

4.4 Assist those enterprises that sign Energy Efficiency Voluntary Agreement in applying for SME Credibility Guarantee fund

Time: October 2007-December 2009

Objective: With the influence of GEF project, try to win SME Credibility Guarantee Fund for those enterprises that sign Energy Efficiency Voluntary Agreement. Extend Energy Efficiency Voluntary Agreement mechanism to the foundry industry in the district.

Tasks:

(1) In October 2007, introduce Energy Efficiency Voluntary Agreement to 10 institutions engaged in small and medium scale enterprises' credibility guarantee and recommend to them the enterprises that sign Energy Efficiency Voluntary Agreement;

(2) In October 2007, organize the enterprises that signed Energy Efficiency Voluntary Agreement and are willing to conduct technical upgrading to approach the 10 institutions engaged in small and medium scale enterprises' credibility guarantee. Focus on the movement trend of the credibility guarantee fund;

(3) From January 2008 to August 2008, assist the credibility guarantee institutions to research in that signed Energy Efficiency Voluntary Agreement and are willing to conduct technical upgrading;

(4) From September 2008 to December 2009, assist the credit guarantee institution to determine qualified enterprises.

4.5 Strengthen the dissemination and extension

Time: December 2009-December 2010

Objective: Encourage TVEs to conduct energy conservation and emission reduction voluntarily in order to reach the target of energy conservation and emission reduction

Tasks:

(1) Print pamphlets about energy efficiency and distribute them to foundry, heat treatment and forging industry;

(2) Communicate with the leader of heat treatment and foundry institute and sign long-term cooperation agreement;

(3) Summarize experience and establish the annual working objective and plan;

(4) Organize on-the-spot meeting and accelerate the technology upgrading for heat treatment and foundry;

(5) Sign Energy Efficiency Voluntary Agreement with the enterprises which have the intent of energy conservation and emission reduction and supply the essential support.

(6) Put forward opinion and measures to accelerate the foundry and heat treatment development associate with cleaner production.

(7) Assist enterprise depending on the socialization service supplied by small and

medium scale enterprises service center.

5. Follow-up and Report of the Action Plan

According to local realities, LPIC formulates report on the previous year's work every January and works out *Annual Working Plan of LPIC of Nanjing City*. The report is to be submitted to national PIC secretariat before January 31. The secretariat is to collect all the submitted reports and reports to MOA's GEF office. All the reports are to be evaluated by the office and each action plan shall be revised according to the evaluation results.

Annex 8.1

Field Survey Report on Energy Conservation & GHG Emissions Reduction in Brick Making Industry in Liaoning Province

According to the framework and requirement of the subcontract of Phase III of *UNDP/GEF Energy Conservation & GHG Emissions Reduction in Chinese TVEs – Phase II*, a study tour group, led by Ms. Wang Guiling, PMO deputy director, consisting of subcontractor experts went to Shenyang City, and conducted a four-day tour from July 19 to 22, 2005. Workshops with Liaoning Wall Materials Reform Office and Shenyang Wall Materials Reform Office, field study and questionnaire answering on replication enterprises had been held in order to remove the market, policy, technology and financing obstacles that have been identified in the process of producing, marketing and applying energy saving technology in Laoning Province's brick making industry. Another purpose of the tour is to direct the establishment of LPIC in the province and promote its capacity building. In order to guarantee the quality and effectiveness of the tour, Mr. Wang Xiwu, Senior Adviser of the PIC Secretariat, and Xu Litong, UNIDO Senior Project Management Expert, was invited to participate in the tour. Findings and results are as the following.

1. Brief Introduction of Brick Making Industry in Liaoning Province

Liaoning province is located in the south of northeast area of China. It is also the joint of Northeast Economic Zone and Around-Bohai Sea Economic Zone. The land area of Liaoning province is145.9 thousand km^2, and the sea area is 150.2 thousand km^2. Liaoning had a total population of 42.17 million in 2004.

In 2004, the industry production increased continually and steadily. Economic increment of enterprises achieved 225.57 billion; increased 23.4% compared with 2003.Generate electricity quantity, crude oil, natural gas, coal, machine tool, metallurgy equipment, mine equipment, transformer and automobile are playing an important role in China. Petrochemicals, metallurgy, electronic communication and machine are always the mainstay industry of Laoning province.

1.1 Status of Brick Making Industry

(1) Industrial scale

Up to 2004, there are 850 brick making enterprises with 10 billion pieces bricks and 2.075 billion Yuan taking. The taking only occupies 0.47% of the total taking of provincial TVES. The population of practitioner is 792.2 thousands and occupies 15.66% of the total practitioner in all TVES.

Table 1 Basic Data of Brick Making Industry in Liaoning Province (2004)

	Unit	Brick industry	TVEs	Percentage of brick industry to TVEs (%)
Number of Factories		850	1,142,105	0.07
Revenue	Billion Yuan	2.075	4434.55	0.47
Staff employed	Thousand people	792.2	505.85	15.66

From 2000 years, the output of solid clay brick decrease by 18% year by year. The

annual output is 5.1 billion piece brick in 2004, which is less 11.2 billion than output in 2000. 64 brick making enterprises were closed down in 2004.The number of enterprises decreased to 760 from 2400 in 1990s.

(2)Energy consumption

Small-scaled brick making industry in Laoning is energy-intensive. 1424.51 Thousand tce and 3551.30 thousand ton total CO_2 emission was consumed in 2004 (see Table 2). Therefore, the adoption of energy efficiency and GHG emission reduction technologies shall contribute to local environment quality improvement.

Table 2 Energy Consumption and CO_2 Emission of Brick Making Industry

	Unit	2004
Output	10,000 pieces	1,032,254
Energy consumption Per Unit	Tce per 10,000 pieces	1.382
Total energy consumption	10,000 Tce	142.451
CO_2 emission	10,000 Ton	355.130

(3)Ownership reform

Most brick making industries are state-own before ownership reform. Ownership reform started in 1999 in accordance with unified disposition of Liaoning. At present most brick making industries are private owned industries which occupied 85% of the industries in 2004 and will occupied 90% in 2010.

Table 3 Ownership Reform in Brick Making Industry

	Number of enterprises	Enterprises to conduct property reform	Enterprises with property reform finished		
			Private owned	State owned	Co. Ltd.
Number	850	0	723	68	59
Percentage	100	0	85	8	7

1.2 Main Problems for the Development of the Brick Making Industry

(1) The low technical level and the low educational level of staff

The proportion of mechanization is quite low and most enterprises adopt natural drying.

Table 4 shows the staff structure in the industry. Less than 2% employees have got primary and medium professional title. The low educational and technical level of staff is one of the reasons that the technical level of the industry is low.

Table 4 Statistics of the Staff in Brick Making Industry

	Number	Percentage (%)
Total number of staff employed	792,267	100
High professional title	0	0
Medium professional title	1,502	0.2
Preliminary professional title	8,790	1.1
Junior or senior high school	439,088	55.4
Other	342,887	43.3

For the scale of most enterprises is small and the technical level is low, the quality of products is irregular.

(2 Difficulties in financing

For the more and more requirement on brick making industry are put forward by Laoning Province, it's very difficult for enterprises to get bank loan as investment on technical upgrading. The reason is that the brick factories have no property right over the land, so the land cannot be mortgaged. Most factories have not enough equipment and workshop building as mortgage, so it is very hard for them to get loan.

2 Policies Related to Brick Making Industry in Laoning Province

Notice of Conducting Resource Saving Activities was issued in May, 2004 in Laoning. Contents of the notice include importance, objective, requirement and measure of resource saving activity. It requests to normalize the market of resource saving product, and improve service such as energy management, energy audit, energy agreement and forecast management of the electric power requirement. Administrative vice-governor Xue Weiguo put forward that Liaoning should accelerate the popularization and application of new technology, equipment and product; accelerate the energy conservation and technical renovation in the construction industry; strengthen the management of programming, land use and environmental protection; restrict and eliminate the lagged techniques and equipment. Laoning was selected as one of the ten pilot provinces for circular economy by six departments including State Development and Reform Committee, SEPA, Ministry of Science and Technology, etc.

Laoning Province formulate special policies for the development of brick making industry as follows

2.1 Prohibition of Production and Use of Solid Clay Brick

Prescription of New Wall Material Exploiture was approved in regular conference of provincial government and issued on March 18, 2002, and implemented from May 1, 2002. It was the sign of that wall material reform was brought into legal system

The clauses of the prescription include: forbid using clay solid brick above the engineering zero line in the town, restrict to use wall material consist of clay in the big and medium cities, forbid building and expanding the solid brick plant and product line, existing plant should produce new wall material or reduce the output through technical renovation. This prescription became legal foundation of prohibition of production and use of solid clay brick. According to prescription, clay solid brick should not be designed and used in the construction project, the drawing should not be approved by the auditing center, and transgressor will be punished by law.

New wall material, adiabatic and sound insulation, waterproof material and new pressurized material were listed in the Guidance on Encouraged Products of the Industrial Development. The restricted wall material include the pint-size hollow brick product line with output less than 50 thousands m^3 concrete, artificial ceramic grain product line with output less than 50 thousands m^3 using clay as main material, adding gas concrete product line with annual output less than 100 thousands m^3. The eliminated 12 product equipments include annular kiln with product capacity less than 18-door, brick making machine with400 model and less, concrete molding machine with annual output less than 100 thousands m^3, etc.

In Liaoning, there are 17 cities listed in the prohibition of production and use of solid clay brick, 15 of them have finished the assignment completely or generally.13 cities

strengthen the prohibition. Two cities meet the standard of prohibition. Yingkou and Tieling, which started to prohibit the production and use of solid clay brick from August, 2004 and March, 2005 separately, have not completed it yet.

2.2 Levying Only Half of the Value-added Tax

According to the Notice on Levying Value-added Tax for Utilization of Some Resources and other Products, which was issued by Ministry of Finance and State Administration of Taxation of China on December 1, 2001, some new wall materials and products shall enjoy the favorable policy that only half of the value-added tax shall be levied.

2.3 Specific Fund for New Wall Material

Means for Collection and Using of Specific Fund for New Wall Material was established by State Ministry of Finance and Economic and Trade Committee for normalizing the system of income distribution, mitigating of societal burden, and strengthening the management of specific fund.

The special fund was organized and implemented by local finance department and new wall material administration. Local wall material reform offices are responsible for collection and use of the fund.

The content of prescription include: the construction agency should apply to repay the special fund in the 60 days after the project finished. The local wall material office should check the project in the 60 days after the application was submitted. If the civil construction used with new wall material meets the standard of energy conservation or other construction used with new wall material, the construction agency will get the specific fund on the base of proportion of new wall material and the effect of energy conservation. The special fund was repaid and substituted the project cost.

This policy promotes the development of new wall material. From 2000 to 2004, annual output of new wall material increased by 20.5% averagely. The output of new wall material is 8.736 billion pieces of brick and occupied 62.98% of the total output in 2004. The proportion exceeds 60% for the first time. The proportion that new wall material occupied total output in Shenyang, Dalin, Fushun, Benxi, Dandong, Fuxin and Panjin is bigger than the average level of whole province.

The area of construction that used new wall material is 21.306 million m^2 in 2004 and occupied 85% of the whole finished construction area. It is 5.44 million m^2 c more than the area in 2003. The area of energy conservation construction is 20.806 million m^2 and occupied 83% of the whole finished construction area. It is increased by 22%,

It brings obvious energy conservation effect and environmental improvement that exploitation and application of new wall material. 14,415 mu of land was saved by the using of new wall material, and 840 thousand tons of coal was saved by the using of new wall material including 526.5 thousand tons of coal saved in production process and 316.6 in heating process. 250 thousand exhaust gas was reduced in the product process include 13 thousands SO_2.9.5 million industry waste residue were used in product process of new wall material.

2.4 Compensatory Interest for Technical Renovation

Liaoning Economy Committee pays the most attention to the projects of resource comprehensive use among the technology reform items. It provides 700 million yuan fund as compensatory interest for technical renovation to the project of energy conservation, water conservation, and comprehensive use of resources.

3. Management Status of the Brick Making Industry in Laoning Province

3.1 Industry Management

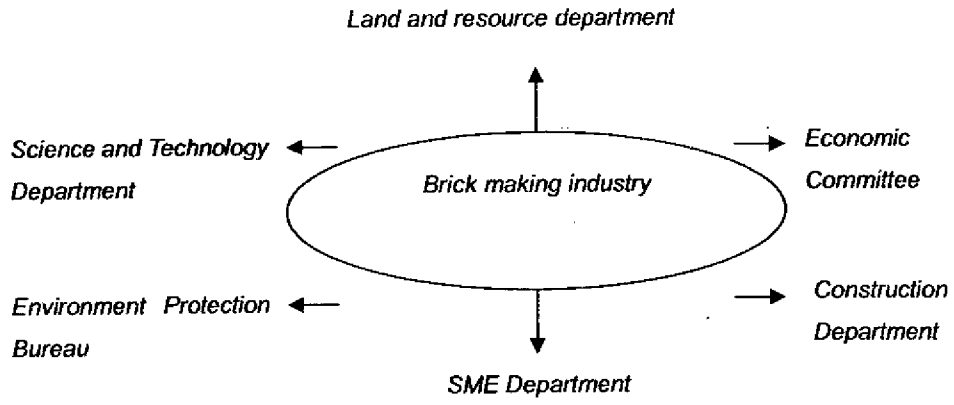

Figure 1 Organizational Structure of Supervision on Brick Making Industry in Laoning

The Supervision department include Land and resource department, SME Department, Science and Technology Department, Economic Committee, Construction Department, Environment Protection Bureau. It is hard to coordinate with each other. So it is necessary to select specific agency that is familiar with brick making industry to be responsible for coordination, energy conservation and technical innovation.

3.2 LPIC Building

The membership of the LPIC is comprised of seventeen parties including Liaoning Wall Materials Reform Office, Liaoning Provincial EPB, Liaoning Provincial Wall Materials Industrial Association, Shenyang Municipal Wall Materials Reform Office, Dalian Municipal Wall Materials Reform Office, Anshan Municipal Wall Materials Reform Office, Shenyang Municipal Wall Materials Reform Office, Fushun Municipal Wall Materials Reform Office, Benxi Municipal Wall Materials Reform Office, Dandong Municipal Wall Materials Reform Office, Jinzhou Municipal Wall Materials Reform Office, Yingkou Municipal Wall Materials Reform Office, Fuxin Municipal Wall Materials Reform Office, Liaoyang Municipal Wall Materials Reform Office, Tieling Municipal Wall Materials Reform Office, Chaoyang Municipal Wall Materials Reform Office, Panjin Municipal Wall Materials Reform Office, Huludao Municipal Wall Materials Reform Office,etc.

Liaoning Wall Material Reform Office is subordinate to Liaoning Economic Committee. It is the administrative agency for organization and guidance on the wall material reform. Its main responsibilities include: to carry out the state laws, regulations, and industrial technical policies; establish provincial laws, regulations, and industrial technical polices; supervise, guide, regulate and control brick making industry; optimize resource allocation; implement the forbiddance of the use of clay brick and development the new wall materials, promote the harmonious development of the wall material and national economy.

The advantages of LIPC supported by Laoning Wall Material Reform Office include: Wall Material Reform Office is familiar with industrial policy and regulations, and it can coordinate related agencies by local wall material reform offices and the network of Liaoning Wall Material Industrial Association. It is convenient to get the support from other departments. Liaoning Wall Materials Reform Office should be responsible for

strengthening communion between government and enterprise, supervision, coordination and guidance for brick making enterprises in the province. Local Wall Materials Reform Office should be responsible for strengthening communion between government and enterprise, supervision of the production and use.

Liaoning Wall Material Industrial Association, a nonprofit agency, takes charge of the production, study, design, quality supervision and management of wall material industry (including all kinds of wall material) in Liaoning. The members of the association come from different area, different branch and also have different ownership. It is subordinated to Liaoning Economic Committee. Its branches are as follow: secretariat office, brick making department, building block department, board material department, consultation department and drumbeating department. *Liaoning Wall Materials* is the magazine of the institute. And 120 director departments of the institute are playing an important role in the industry. As the secretary-general of Liaoning Wall Material Industrial Association, the Liaoning Wall Material Reform Office could organize specialists of the Laoning wall material industry institute to supply the technical support.

In addition, brick making industry is classified excessive air pollutant discharged industry. So the Laoning Environment Protection Bureau is an important member.

4. Brief Introduction of the Replication Enterprises

After the assessment of products, production scale and process, management level and the enthusiasm on energy saving technology upgrading, this project selected 16 enterprises for the replication project. The average annual output of 6 enterprises is over 62.15 million pieces, increased 5.13 million pieces compare with former output. The basic information of replication enterprises is shown in Table 6.

Table 6 Information on Energy Saving Technology Upgrading of 16 Replication Enterprises

NO	Enterprises	Main product	Annual output	Main equipments				Technical upgrading intent
				Brick extrusion machine		Kiln		
				model	production capacity (piece/h)	Model	Production capacity (piece per hour)	
1	The fourth brick plant in Tonggou Sujiatun Shenyang.	lacunaris brick	20000 thousands	45B	13700	36-door annular kiln	4000	Capacitance compensation, energy saving vacuum technology
2	Benxi Waitoushan town hollow brick plant	lacunaris brick hollow brick	35000 thousands	45B3	16500	38-door annular kiln	7500	Heat preservation for kiln technology, hothouse pressurization technology, frequency conversion technology for hot wind blower, energy saving vacuum technology, well-proportioned mixture supply.
3	Shenyang Wensheng brick plant	lacunaris brick clay brick	55000 thousands	450B3	10000	22-door annular kiln 38-door annular kiln	8000	Kiln pressurization technology, capacitance compensation, energy saving blower technology, test of energy conservation of kiln, energy saving technical service.
4	Shengyang Xinchengzi district Qingshuitai Gaotang hollow brick plant	lacunaris brick hollow brick	35000 thousands	45B3	10000	38-door annular kiln	8000	Kiln pressurization technology, capacitance compensation, energy saving blower technology, test of energy conservation of kiln, energy saving technical service
5	Shengyang Pingluo construction material plant	lacunaris brick hollow brick	28000 thousands	JZK55/50-25	20000	42-door annular kiln	6500	Heat preservation for kiln technology, capacitance compensation, energy saving vacuum technology, well-proportioned mixture supply.
6	Shengyang Xihuan hollow brick plant	lacunaris brick hollow brick	32000 thousands	45B3	16000	38-hole annular kiln	7000	Heat preservation for kiln technology, capacitance compensation, energy saving vacuum technology, well-proportioned mixture supply.
7	Shenyang Dongbeihong brick plant	lacunaris brick hollow brick general brick	38780 thousands	50	8400	46	8400	Hothouse pressurization technology, capacitance compensation, well-proportioned mixture supply, tunnel kiln door pressurization technology, hollow brick and porous brick production.
8	Shenyang Donglin district Gaokan red brick sixth plant	lacunaris brick hollow brick general brick	43500 thousands	145B	10000	46-door annular kiln	8000	Heat preservation for kiln technology, capacitance compensation, energy saving blower technology, hollow brick and porous brick production.

No	Enterprises	Main product	Annual output	Main equipments				Technical upgrading intent
				Brick extrusion machine		Kiln		
				model	production capacity (piece/h)	Model	Production capacity (piece per hour)	
9	Tieling Kangxing red brick plant	lacunaris brick hollow brick general brick	66000 thousands	NC500	10000	38-door annular kiln (four seat)	30000	Capacitance compensation, well-proportioned mixture supply, test of energy conservation of kiln, energy saving technical service ,hollow brick and porous brick production
10	Shenyang Sujiatun district Tonggou third brick plant	lacunaris brick	25000 thousands	45B	10000	50-door annular kiln	8000	Kiln pressurization technology, heat preservation for kiln technology, hothouse pressurization technology, capacitance compensation, energy saving blower technology
11	Shenyang Tonggou hollow brick plant	lacunaris brick hollow brick	70100 thousands	45B (two seat)	13700	40-door annular (two seat)	8000	Kiln pressurization technology, heat preservation for kiln technology, capacitance compensation, well-proportioned mixture supply, energy saving blower technology.
12	Shenyang Yuhong district Huangtukang construction material plant	lacunaris brick hollow brick	65000 thousands	50	20000	18-door annular (two seat) 38-door annular(two seat)	15000	Heat preservation for kiln technology, hothouse pressurization technology, frequency conversion technology for hot wind blower, energy saving vacuum technology, well-proportioned mixture supply.
13	Xinming Dongshenshanzi red brick third plant	general brick	25000 thousands	50	10000	40-door annular kiln	6000	Heat preservation for kiln technology, capacitance compensation, energy saving vacuum technology, tunnel kiln door pressurization technology, hollow brick and porous brick production.
14	Shenyang Yuhong district Mabei brick plant	lacunaris brick	23000 thousands	JZK45A/45B	12000	40-door annular kiln	4500	Hothouse pressurization technology, capacitance compensation, energy saving vacuum technology, well-proportioned mixture supply, test of energy conservation of kiln.
15	Benxi Minshen brick plant	hollow brick	31000 thousands	50/55	8000	40-door annular kiln	4500	Kiln pressurization technology, heat preservation for kiln technology, capacitance compensation, energy saving vacuum technology, well-proportioned mixture supply
16	Anshan Mayi brick plant	hollow brick	30000 thousands	50	10000	26-door annular kiln	3000	Kiln pressurization technology, heat preservation for kiln technology, capacitance compensation,

5. Conclusions and Recommendations

5.1 Conclusions

(1) The implementation of the 3rd phase project will make full use of the local shale resources and reduce the GHG emission.

(2) Laoning wall material reform show prodigious progress but more effort is needed to achieve the final goal.

(3) The framework of enterprise is illogical; the technical level is low and the educational level of staff is low.

(4) Limited capital sources restrict the technology upgrading of enterprises.

5.2 Recommendations

(1) Carry out the policy of prohibition of production and use of solid clay brick

LPIC should strengthen the achievements and avoid reversal in the citied that meet the standard completely or basically. LPIC should strive for making more towns to meet standard and popularize the application in country. The cities which did not meet the standard should achieve this year.

(2)Strengthen to constitute policy and law

LPIC should constitute policy for restricting and prohibiting production and use of solid clay brick and put forward the suggestion under position.

(3) Strengthen the management of new wall material cognizance

LPIC should help the new wall material enterprise to exploit the market and strengthen the supervision of production cognizance.

(4) Strengthen the regulated effect of favorable tax policy and specific fund policy.

LPIC should help the enterprises to carry out favorable tax policy and policy for levying only half of the value-added tax. LPIC should try their best to working for levy, repayment and use, and treating with the deregulation action.

(5) Expand the financing sources.

LPIC should help the enterprises to expand the financing sources, and utilize private bankroll and foreign bankroll, at the same time brick making industry should be given more support by SME loan assurance system.

Annex 8.2

Statute of Policy Implementation Committee, Liaoning Province

General Provisions

Clause 1 Liaoning Policy Implementation Committee (hereinafter referred to as the LPIC) is an institution under the leadership of Liaoning Wall Materials Reform Office, which is established to assist the local brick making industry in applying high efficient energy saving technology and overcoming various policy, market, technology and financing barriers to the application.

Clause 2 The objective of the LPIC is to build efficient coordination mechanism , disseminate energy saving technology and introduce high efficient management system at TVEs to produce high quality and energy efficient product thereby reducing energy consumption and GHG emissions and promoting the sustainable development of brick making TVEs.

Organization of the LPIC

Clause 3 The membership of the LPIC is comprised of seventeen parties including Liaoning Wall Materials Reform Office, Liaoning Provincial EPB, Liaoning Provincial Wall Materials Industrial Association, Shenyang Municipal Wall Materials Reform Office, Dalian Municipal Wall Materials Reform Office, Anshan Municipal Wall Materials Reform Office, Shenyang Municipal Wall Materials Reform Office, Fushun Municipal Wall Materials Reform Office, Benxi Municipal Wall Materials Reform Office, Dandong Municipal Wall Materials Reform Office, Jinzhou Municipal Wall Materials Reform Office, Yingkou Municipal Wall Materials Reform Office, Fuxin Municipal Wall Materials Reform Office, Liaoyang Municipal Wall Materials Reform Office, Tieling Municipal Wall Materials Reform Office, Chaoyang Municipal Wall Materials Reform Office, Panjin Municipal Wall Materials Reform Office, Huludao Municipal Wall Materials Reform Office, etc.

Clause 4 The LPIC shall have 18 delegates composed of leaders from Liaoning Wall Materials Reform Office, Liaoning Provincial EPB, Liaoning Provincial Wall Materials Industrial Association, Shenyang Municipal Wall Materials Reform Office, Dalian Municipal Wall Materials Reform Office, Anshan Municipal Wall Materials Reform Office, Shenyang Municipal Wall Materials Reform Office, Fushun Municipal Wall Materials Reform Office, Benxi Municipal Wall Materials Reform Office, Dandong Municipal Wall Materials Reform Office, Jinzhou Municipal Wall Materials Reform Office, Yingkou Municipal Wall Materials Reform Office, Fuxin Municipal Wall Materials Reform Office, Liaoyang Municipal Wall Materials Reform Office, Tieling Municipal Wall Materials Reform Office, Chaoyang Municipal Wall Materials Reform Office, Panjin Municipal Wall Materials Reform Office, Huludao Municipal Wall Materials Reform Office, etc.

Clause 5 The delegates, to be nominated by the managing leaders of respective agencies and appointed after the agreement of all member parties, shall serve a term of three years. If any member party wishes to renew its delegate to the committee, a written application for the renewal should be submitted to the office of LPIC for approval.

Clause 6 Director of Liaoning Wall Materials Reform Office will be the Director of LPIC; Deputy Director of Liaoning Wall Materials Reform Office will be the Deputy Director of LPIC; The Deputy Director can take care of routine matters as Director in his absence. In addition to the normal duties and obligations of a delegate of the LPIC, the Director (or Deputy Director) chair meetings of the LPIC, signs Minutes and formal correspondence on behalf of the LPIC.

Clause 7 Under the LPIC, an office is established to be in charge of handling routine matters, conduct the activities required in the PIC's documentation and conference summary and communications with the PIC and the project management office of the UNDP/GEF Chinese TVEs Project. The Deputy Director of Liaoning Wall Materials Reform Office will act as the Deputy Director of the Office of LPIC. The Office is established within Liaoning Wall Materials Reform Office.

Clause 8 The office staff consists of local experts, staff of Liaoning Wall Materials Reform Office and Liaoning Wall Materials Industrial Association.

Functions of the LPIC

Clause 9 Main responsibilities of the LPIC are, under the guidance and with the coordination of the national PIC and the national project management office, to facilitate to remove policy, market, technology and financing barriers encountered by the local brick making TVEs to policy enforcement. Detail responsibilities include the following.

1. Develop and implement action plan, promote regulatory reform related to the monitoring of energy efficiency at brick making TVEs, and facilitate the transform of the project implementation into a market-oriented mechanism.
2. Push forward TVEs to sign the VA with local government authorities.
3. Provide TVEs with domestic and international information on advanced technology and policies on energy conservation and emission reduction with advantage of Liaoning Wall Materials Industrial Association.
4. Promote the enforcement of national and local policies, regulations and standards related to energy efficiency, technical renovation and environmental protection within brick making sector in Liaoning.
5. Establish incentive mechanism to promote energy efficient technologies, and have best practices in energy conservation and emissions reduction replicated throughout the province.
6. Recommend to the national PIC rewards to organization(s) or individual(s) with remarkable performance

Clause 10 Responsibilities of member parties are:

1. Liaoning Wall Materials Reform Office should be responsible for strengthening communion between government and brick making TVEs, promoting the wall materials reform, strengthening supervision, coordination and guidance of brick making TVEs in the province.
2. Local Wall Materials Reform Offices should be responsible for

strengthening communion between government and brick making TVEs, and supervision of the product and use.

3. Liaoning EPB should be responsible for supervision on implementation of environmental protection laws and putting further specific requirement on environmental improvement to make the replication enterprises meet environmental standard.

4. Liaoning Wall Materials Industrial Association should be responsible for strengthening the production and use of new wall materials, providing information, training and coordinating relations between supply and demand, and organizing the technical communication among TVEs.

Working Procedures

Clause 11 The LPIC operates by means of meetings, once half a year. The Director, or the executive deputy director at the director's absent, will chair the meetings. A meeting will be considered duly valid if more than 50% of its members are present.

Clause 12 The LPIC Director may call interim meetings as per the request of PIC and the PMO. Minutes of the meeting should be developed if necessary.

Clause 13 Minutes of meetings and progress reports will be submitted to the national PIC and the project management office on a regular basis.

Supplementary Articles

Clause 14 This statute will become effective on the date after it is discussed and approved by all LPIC members. The Office of LPIC reserves the right for the explanation of this statute.

Annex 8.3

Action Plan of the LPLC in Liaoning Province

1. Project Background

The project of "UNDP/GEF Energy Conservation & GHG Emission Reduction in Chinese TVEs" has been funded by GEF. The aim of the project is to help Chinese TVEs that engaged in brick-making, cement, casting and coking to adopt energy efficiency technologies and to reduce GHG emission.

During the third phase, 11 replication areas will be selected to develop LPIC building and overcome the market, policy, technology and financing barriers to the adoption of energy efficiency technologies on the base of experiences in Phase I and II.

The LPIC in Liaoning Province has formulated the action plan in order to realize the objectives set for the project's third phase, to create a sound environment for the replication enterprises and the brick making industry, to promote the implementation of policies, laws and statutes, and to disseminate the experiences accumulated by the demonstration enterprises.

2. Major Obstacles to Liaoning Brick Making TVEs in Adoption of Energy Saving Technologies

(1) Energy supervision system is imperfect.

(2) The structure of the TVE is illogical, the technical level is low and the educational level of staff is low;

(3) Production quality is inconsistent, and development is in unbalance.

(4) The enterprises have difficulties in financing.

3. Objective

3.1 Short-term objective (2005-2008)

(1) The government signs Energy Efficiency Voluntary Agreement with replication enterprises.

(2) The replication enterprises conduct energy saving technology upgrading and to realize the objective of decreasing unit product's energy consumption by 10% by 2008 on the basis of the energy consumption level of different enterprises (with the data of 2004 as baseline).

3.2 Medium and long term objectives (2008-2010)

(1) In 2010, compared with the data of 2004 (baseline), the ultimate objective of decreasing unit product's energy consumption by 15% will be realized on the basis of the energy consumption level of different enterprises.

(2) To extend the Energy Efficiency Voluntary Agreement in brick making industry and to establish enterprises' self-improving mechanism to promote energy efficiency by adopting a market transformation approach.

4. Implementing Plan

4.1 Government signs EE Voluntary Agreement with replication enterprises.

Time: July 2005—December 2008

Objective: Government signs Energy Efficiency Voluntary Agreement with replication enterprises; on the basis of the energy consumption level of different enterprises, energy efficiency technical upgrading will be finished before December 31st , 2008 and unit product's energy consumption be decreased by 10% compared with the data of 2004(baseline). By December 31st, 2010 unit product's energy consumption will be decreased by 15%.

Tasks:

(1) Consult with enterprises and formulate energy saving technology upgrading plans that are to be assessed;

(2) Identify barriers to the implementation of the plan;

(3) LPIC consults with local government and formulates incentive policy;

(4) Work out Energy Efficiency Voluntary Agreement together with replication enterprises;

(5) Provide technical and financial support;

(6) Sign Energy Efficiency Voluntary Agreement;

(7) According to the stipulations of Energy Efficiency Voluntary Agreement, the implementing progress of the tasks is to be supervised by the third party that has been confirmed by the parties involved in Energy Efficiency Voluntary Agreement;

(8) Summarize the experiences accumulated by replication enterprises and get ready for popularizing the experiences in brick making industry in Liaoning.

4.2 Conduct training for technicians of brick making enterprises and establish the energy efficiency supervisor system

Time: January 2007-June 2008

Objectives: To provide human resource for energy efficiency and for removing market, policy, technology and financing obstacles.

Tasks:

(1) Organizing training for technicians of replication enterprises and enterprises interested in this. The training content include: The development trend of brick making industry; The practical technologies of brick making industry; Laws, statutes and technical standards related to brick making industry; Rules for safe operation in brick making industry; Energy efficiency management for brick industry.

(2)Technicians who participated in the above-mentioned training will be the Energy Efficiency supervisors of different enterprises. The supervisors establish supervisor system according the enterprises' realities.

4.3 List *Important Popularized New Technology in Brick Making Industry of* Liaoning

Time: May 2006-December 2008

Objectives: List important popularized new technology in brick making industry of Liaoning on the basis of Eleventh Five-year Plan for Wall Materials Industry in Liaoning. The list will be the foundation for technical innovation and capacity building.

Tasks:

(1) Conduct deep research on Eleventh Five-year Plan for Wall Materials Industry in

Liaoning and confirm the objective of the brick making industry in the Eleventh Five-Year;

(2) Research the existing technology, market and policy;

(3) List important popularized new technology in brick making industry of Liaoning.

4.4 Implement the policy for forbidden use of solid clay brick fully

Time: March 2006-December 2008

Objectives: Implement the policy for forbidden use of solid clay brick fully. Lead the market by policy and lead technical innovation in TVE by market

Tasks:

(1) Forbid use of solid clay brick in all cities and in the counties gradually. Phase-out clay goods in the large and medium cities;

(2) Establish the policy and measures for forbidden productiong and using solid clay brick.

4.5Promote the new wall material exploitation, production and use

Time: February 2006-December 2009

Objectives: Promote the new wall materials which are soil saving, energy saving, light, and heat insulation.

Tasks:

(1) Put further comments on adjusting the catalogue of new wall materials;

(2) Develop the researches on R&D and application of new wall materials, such as projects for using of coal refuse and for autoclaved fly ash bricks.

(3) Compile Technical Regulation for Construction in using of Perforated Concrete Bricks in Liaoning Province and Local Standard for Autoclaved Fly Ash Bricks in Liaoning Province;

(4) Conduct technical trainings to solve the problem in design and construction of buildings in using of new wall materials; carry out related technical regulation and standards.

4.6 Implementation of preferential policies for those enterprises that sign Energy Efficiency Voluntary Agreement

Time: September 2006–December 2008

Objectives: Implementation of preferential policies for those enterprises that sign Energy Efficiency Voluntary Agreement

Tasks:

(1) Strive for credit hypothecated fund for the enterprise which signed Energy Efficiency Voluntary Agreement;

(2) Assist the enterprises in implementation the tax preferential policies for waste recycle and reducing value added tax by half; strive for using the special fund for the projects in use of waste and special support on interest subsidy in Liaoning.

4.7 Strengthen dissemination and popularization

Time: December 2005—December 2010

Objective: Publicize energy conservation and emission reduction; popularize the Energy Efficiency Voluntary Agreement to realize energy conservation and CO2 emission reduction.

Tasks:

(1) Publicize policies and regulations on energy conservation and emission reduction. Organize the dissemination to introduce the replication enterprises which signed Energy Efficiency Voluntary Agreement to public.

(2) Organize an on-the-spot meeting to introduce the typical enterprises that conduct energy efficiency and introduce their experiences;

(3) Organize a meeting to commend the advanced enterprise and person.

5. Follow-up and report of the action plan

According to local realities, LPIC formulates report on the previous year's work every January and works out Annual Working Plan of LPIC of Liaoning province. The report is to be submitted to national PIC secretariat before January 31. The secretariat is to collect all the submitted reports and reports to MOA's GEF office. All the reports are to be evaluated by the office and each action plan shall be revised according to the evaluation results.

Annex 9.1

Field Survey Report on Energy Conservation & GHG Emissions Reduction in Cement Industry in Zhejiang Province

According to the framework and requirement of the subcontract of Phase III of *UNDP/GEF Energy Conservation & GHG Emissions Reduction in Chinese TVEs – Phase II*, a study tour group, led by Ms. Wang Guiling, PMO deputy director, consisting of subcontractor experts went to Hangzhou city, and conducted a four-day tour from April 10 to 13, 2006. Workshops with SME Bureau, Cement Test Station, field study and questionnaire answering on replication enterprises had been held in order to remove the market, policy, technology and financing obstacles that have been identified in the process of producing, marketing and applying energy efficiency technology in Zhejiang provincial cement industry. Another purpose of the tour is to direct the establishment of LPIC in the province and promote its capacity building. The field study results are as follows:

1. Brief Introduction of Cement Industry in Zhejiang Province

Zhejiang Province is located north of Yangtze Rive Delta. Its east is Donghai Sea, south is Fujian province, west is Jiangxi Province and Anhui Province, and north is Shanghai and Jiangsu Province. Nonmetal mineral is the main mineral products in Zhejiang. Some nonmetal mineral reserves are situated the first place in China include stone coal, alunite, tuff, etc. Hangzhou and Ningbo, this Two deputy-provincial level cities were found in Zhejiang.There are 9 city include Wenzhou, Huzhou, Jiaxing, Shaoxing, Jinhua, Quzhou, Zhoushan, Taizhou, Lishui, and 36 counties ,and 22 county-level cities in Zhejiang. The permanent inhabitant is 4.894 million; GDP was 1336.5 billion Yuan in 2005. Per capita GDP was 27552 Yuan and increased by 10.8% compared with the previous year.

1.1 Industrial scale

Zhejiang is one of the most developed provinces. The main economy indexes are on the top of whole province. The output of cement was 88.29 million ton in 2005 doubled in 5 years. The cement industry development strengthens the economy development.

Table 1 Basic Data of Cement Industry in Zhejiang province (2005)

	Unit	Cement industry	TVEs
Enterprise	number	269	1120600
Total output value	10 thousand ton	2256726	62756700
Total output	10 thousand ton	8829	

1.2 Energy consumption

Cement industry is an energy-intensive industry. In 2003, 9020 thousand tce were consumed in the cement industry, which occupied 11.3% of the total energy wastage. In 2005, the energy wastage increased to 10.15 million tce. The technical innovation for energy conservation & GHG emissions reduction should improve the environment and is useful for the continuable development of cement industry.

Table 2 Energy Consumption of Cement Industry

	Unit	2003	2005
Output	10 thousand ton	7139	8829
Energy consumption Per Unit	Tce / ton	0.126	0.115
Total energy consumption	10 thousand tce	902	1015

1.3 Ownership reform

From the beginning of 90s, distinct property right was regarded as the entrance of the reform in Zhejiang. The team for guide ownership reform was established in each city and county. They summarized and popularized the successful experience of Wenzou and Taizhou for stock cooperation. The principle is: investor possess property right, the person who create benefit could gain the benefit. Mixed economy is established based on distinct property ownership and the social and private capital is allowed to invest stock.

There are 269 cement enterprises in Zhejiang include 129 private own enterprises, 64 limited enterprises and 13 stock-share holding enterprises which occupied 48%, 23.8% and 4.8% respectively.

Table 3 Ownership Reform in Cement Industry

	Number of enterprises	Enterprises to conduct property reform	Enterprises with property reform finished			
			Private owned	Co. Ltd.	Stock-share holding	Others
Number	269	0	129	64	13	63
Percentage	100	0	48	23.8	4.8	23.4

1.4 Character of Development

(1) Severe market situation

The cement industry developed rapidly from 2000. The demand of cement exceeds supply when the price of cement was 500 Yuan/t in 2004. Many cement projects had been started blindly in 2002 to 2004. The excessive expansion increased the demands of raw material and raised the price of raw material. On the other hand, excessive expansion caused drastic competition and price fall. So the average profit of industry falls continually. The demand of cement in architectural industry and real estate industry fell in 2005.The cost raised and profit fell because of markup of raw material and uptight power supply and transport. The cost of coal and electricity occupied more than 60% of the total cost. The price coal and electricity raise 35 Yuan/ton and increased by 15% since last year. The output of cement decreased 24% compare the preceding half year of 2004 and 2005 in Jinhua city. The output of many famous enterprises decreased greatly.

The price of 42.5 grade and 32.5 grade ordinary Portland cement decreased 8.3% and 10.4% respectively from January to September in 2005. The price of cement in Zhejiang is on the bottom of the whole cities. The price is 210 Yuan/t in Zhejiang, but the average price of same type of cement is 230 Yuan/t. The benefit of cement industry is 5 billion Yuan in 2003 to 2004 in Zhejiang. But last year the deficit of cement industry is 150 million Yuan in Zhejiang. So many enterprises must look for resolvent by themselves.

(2) Rapid development of new dry cement

The profound reform of cement industry framework has been taken in Zhejiang. Guidance of the Framework Adjustment in Cement Industry in Zhejiang Province was issued by Zhejiang Economy and Trade Committee on September, 2000. It will be used for adjusting the framework of cement industry and guiding the development of enterprise and industry. The product line of new dry cement developed very well because of the support of advanced technology. At present, the output of new dry cement occupied 85% of the total output. It is the primacy in China. None of the vertical kiln was established and half of vertical kilns were demolished from 2000 to present. 307 outdated vertical kilns were demolished forcibly in 2005, the rate reaches 80%. The rate reaches 93% in Hangzhou city.

The brief introduction of new dry cement is shown in Table 4

Table 4 Production of New Dry Cement

	Unit	2000	2002	2004	2005
Product line with new dry cement		2	24	70	75
Proportion of the new dry cement occupied	%	4	20	70	85

(3) Disseminate power generation in use of low temperature waste heat

New dry cement has the feature of less energy consumption. A great deal of exhaust gas with not high temperature was discharged in this process. One ton material could generate power of 30 kWh if the waste heat is used for power generation. Government propagandizes for power generation in use of the waste heat in present market situation. Some enterprises purchased the equipments for power generation firstly with the support policy. 7 sets of equipments were been put into production in 2005. The annual generation capability reaches 170 million kWh which convert into economy benefit with 80 to 90 million Yuan. Almost 50 production lines of low temperature waste heat will be built up.

2. Cement Industry Management

Zhejiang is a developed and high marketization province in China. The enterprises have long views and acute insight and can search opportunity by themselves. Government dedicate for supporting service to enterprise. Present situation include as follows: Search project from market, accelerate the implementation of policy by project, and promote the development of project by policy.

For example, Zhejiang Shenhe Cement Company is one of the demonstration enterprises in phase II. The new dry cement kiln with 2500 tons daily output were rebuilt for power generation in use of waste heat in this plant. The capability of power generation is 3,000 kW; the total investment is 20 million Yuan. It is the first project for power generation in use of waste heat. It is difficult to connect to municipal grid. The power generated by waste heat has been connected to municipal grid because of coordination and effort of the department. One ton material could generate 30 kWh power. The price of power is 0.6 Yuan/ kwh. So, one ton material could save 15 Yuan because of power generation in use of waste heat. The cost of production could decrease 10 million Yuan per year. The investment for technical innovation will be regained in two years. The generation capability could reach 27 million kwh in one year.

Because of rapid development of new dry cement and the tremendous potential of the generating electricity used the residual heat, Economy and Trade Committee issued

Opinion on Acceleration of Adjusting the Structure of Cement Industry in Zhejiang Province. Governments promote the power generation in use of waste heat in the new dry product line with daily output more than 2000 tons.

The department and institution of Zhejiang cement industry is shown in figure 1.

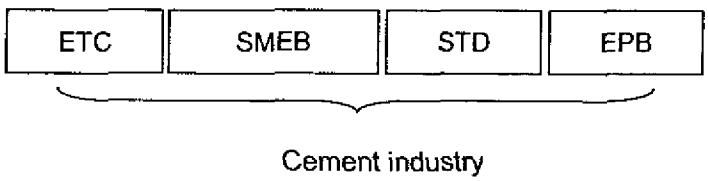

Fig 1 Department and Institution of Zhejiang Cement Industry

Main responsibilities of Economy and Trade Committee (ETC) are to establish and implement the local industrial policy and specific industrial policy for cement, guide the adjustment of industrial structure, etc. Primary responsibilities of Provincial SME Bureau include: to carry out state and provincial policy and regulations for SME development; to establish the development plan and annual plan of the TVEs; to guide the adjustment of industrial and production structure. Provincial Science and Technology Department (STD) should be responsible for conduction of the technical innovation in operation. Provincial EPB should be responsible for guidance on cement industry on environmental protection policies.

It is necessary to establish a cooperative management mechanism among related departments to realize energy conservation and technical innovation in TVEs and their sustainable development.

3. LPIC Building

LPIC was established dependent on provincial SME Bureau for the establishment of efficient coordination mechanism, promotion of energy conservation technology adopted, reduction of the GHG emission and acceleration of SMEs' sustainable development and environmental improvement,

The membership of the LPIC is comprised of six parties including Provincial SME Bureau, Provincial Science and Technology Department, Provincial environmental Protection Bureau, Provincial Financial Department, Provincial Economic and Trade Committee, Test Center of SME Bureau. The LPIC shall have 7 delegates (including one director). The director general of SME Bureau will act as the director of LPIC. The office is located in the Science and Technology Section of SME Bureau.

The Provincial SME Bureau, as the guiding department of reform and technical renovation in TVEs, was familiar with the requirement and status of TVEs' development. It will ensure the LPIC know the industry entirely that LPIC was established dependent on SME Bureau. It is convenient for guidance on the industrial development and work on energy conservation and GHG emission reduction.

4. Policies Related to Cement Industry

4.1 Policy of Value-added Tax Drawback

According to the Notice on Levying Value-added Tax for Utilization of Some Resources and other Products, which was issued by Ministry of Finance and State Administration of Taxation of China on December 1, 2001, some raw material cement which mix into stone coal, coal ash, boiler residue or other waste residue more than 30% shall enjoy the favorable policy for derating value-added tax.

The Opinion for the Approbated Work of Comprehensive Resource Utilization in Cement Industry was issued by Zhejiang Economy and Trade Committee. The prescriptions include: First, enterprise were not be approbated if exist one of he following condition include: the annual output of enterprises with vertical kiln is less than 150 thousands ton; the product line with the diameter of vertical kiln is less than 2.6 meter; the product line with vertical kiln should be eliminated, because enterprise promised to eliminated this product line when they apply the new dry cement product line or the cement milling station; the product line were required to eliminate by governments; enterprise were not be approbated in two years if environmental accident occurred in the plant, or operated accident or the accident in production quality occurred in the plant , or the enterprise were punished by EPB. Secondly, the enterprises were encouraged to develop unpackaged cement. The enterprises which apply for the approbated work of comprehensive resource utilization should meet some standards. The output of unpackaged cement with rotary kiln should occupy more than 50% of the total output, and should be occupy more than 70% in two years. The output of unpackaged cement with vertical kiln should occupy more than 40% except the kiln which is mentioned in the previous clause.

4.2 Protection of Market

Zhejiang Economy and Trade Committee, Construction Department, Traffic Department and Water Resource Department issued Notice of Strengthening the Management of Cement Used in the Construction Project. The prescriptions include: First, the cement used in the construction project must meet the state standard. The rotary kiln cement must be used in the important construction project, building with many floors in uptown, concrete churn station, large and medium dam, bridge, tunnel, culvert and floodgate, high-grade road, the cornerstone and structure of large and medium construction project (including the prefabricated structural member which bears weight). Secondly, implementation agency shouldn't require the design institute and construction agency to choose the type of cement against the principle mentioned above. Thirdly, the design institute shouldn't designate the producing plant and the merchandiser. The project should not be approved if the design doesn't reach the requirement. Fourthly, the construction agency should establish a strict checking system for stocking with cement. The construction agency should not change and use cement which doesn't meet the standard. Fifthly, the supervision agency should check the test report of cement and rectify the action of breach on requirement. The supervision agency should check the warrant of cement trade when they sign in the declaration report of cement. Sixthly, the quality supervision agency should strengthen test on the cement used in construction, and shouldn't supply the examinatorial report of quality if the construction agency breaks the regulation.

4.3 Structure Adjustment

There are three phases in the structure adjustment of cement industry from 1998.

First phase named as washing out. The provincial government funded 23 million Yuan special fund for washing out the outdated product line of cement. The local government also provided adequate fund for the work. 230 vertical kilns and 10 million outdated product capabilities have been washed out in three years. The new dry cement production has adequate market.

Second phase named as development. Guidance of the Structure Adjustment in Cement Industry in Zhejiang Province was issued by Zhejiang Economy and Trade Committee in September, 2000. The contents include: the proportion that the output of new dry cement occupied the total output should rise from 4.5% in ninth-five-year to 15% in tenth-five-year; to dismantle 5 million ton of the outdated product capability; forbid building or expanding the outdated product line with vertical kiln; forbid

expanding the vertical kiln; forbid building or expanding the wet kiln, liboer kiln and hollow kiln; dismantle the production line with the diameter less than 2.2 m of vertical kiln; dismantle the diameter of wet kiln and dry hollow kiln less than 2.5 m except the production line for specific cement. Promote to development of the new dry cement.

Third phase named as upgrading. The Economy and Trade Committee adjusted the industry policies in 2002, and stopped the production line with daily output less than 2,000 tons, and encouraged to establish the production line with daily output more than 4,000 tons. Opinion on Acceleration on the Structure Adjustment in Cement Industry in Zhejiang Province was issued by The Economy and Trade Committee .The content include: Firstly, to carry out the state industrial policy strictly and prevent invest to the cement industry excessively. Only the production line with output more than 4,000 tons will be approved. The new production lines with output more than 4,000 tons should develop on the adequate condition including industrial admittance, location, land use, environmental protection, limestone resource and electric power; to promote the power generation in use of waste heat in the new dry product line with output more than 2,000 tons to mitigate the pressure on power supply. Secondly, effective measures will be taken for acceleration of elimination of the outdated product line.

4.4 Environment Protection

Environment protection administration should carry out environmental impact assessment for new project, rebuild project and expand project strictly, and three simultaneity policies include simultaneous design simultaneous construction and simultaneous operation, and the policy for gross control of discharged pollutant. Environment protection administration should execute strictly the license system for the pollutant discharging. Environment protection administration should forbid the enterprise discharged pollutant if they don't have the license. Government should prescribe the enterprise which don't reach the standard improve within a definite time. In the improved time, the enterprise should reduce the production and discharged on the standard. If the enterprise should not meet the standard at term, this enterprise must be stopped and improved until close business.

5. Brief Introduction of the Replication Enterprises

After the assessment of products, production scale and process, management level and the enthusiasm on energy saving technology upgrading, this project selected 6 goodish management village private enterprises and popularize energy conservation and technical innovation. The basic information of replication enterprises and technology innovation are shown in Table 5.

Table 5 Brief Introduction of the Replication Enterprises

No.	Enterprise	Main product	Annual output	Main equipment		Technical Renovation
				Specification	Product capacity	
1	Zhonglida bloc Zhejiang Kaiyuan cement Ltd.	cement	60	raw material grinder Φ3.5×10m	100t/h	Residual heat generate electricity
				Rotary kilnΦ3.5×50m	1,500t/h	
				Bead grinder Φ3.0×11m(2 seat)	50t/h	
2	Zhonglida bloc Zhejiang Deqing zhongxin cement Ltd.	cement	100	Raw material grinder Φ4.3×10m	200t/h	
				Rotary kilnΦ4×60m	2,500t/h	
				Bead grinder Φ3.8×13m(4seat)	100t/h	
				Rotary kilnΦ4.8×72m	5,000t/d	
				Powder grinder station were built		
3	Zhejiang Sanshi bloc Xingxing Jindingzi build material Ltd	cement	155	Raw material grinder Φ4.6×10m, two sets	190t/h	
				Rotary kilnΦ4.8×72m	5,000t/d	
4	Zhejiang Sanshi bloc Wutong build material Ltd	cement	78	Raw material grinder Φ4.6×10m	190t/h	
				Rotary kilnΦ4×60m	2,500t/h	
5	Zhejiang Changshan Tianma cement Ltd	cement		Cement product line	2,500t/d	
6	Zhejiang Longyou county Qinglongshan cement Ltd	cement		Material product line	2,500t/d	

6. Conclusions and Recommendations

6.1 Conclusions

(1) The implementation of the 3rd phase project will make full use of the local shale resources and reduce the GHG emission;

(2) Great gap exists in technical level and scale between the enterprises;

(3) The experienced technician is too limited;

(4) The financing sources are too limited;

(5) Coal and power become the main factors restricting the development of cement industry.

6.2 Recommendations

(1) Conduct technical training for the technicians to reduce the gap of technical level.

LPIC should enhance the level of technician by visit, lectures of experts and association training regularly, and supply opportunity to enterprises for technical communication to reduce the gap of technical level.

(2) Finance for the large enterprise for technical renovation

LPIC should strengthen the support for the big cement enterprise such as introducing the private investment and civilian loan into cement industry.

——Annex 9.2

Statute of Policy Implementation Committee, Zhejiang Province

General Provisions

Clause 1 Zhejiang Policy Implementation Committee (hereinafter referred to as the LPIC) is an institution under the leadership of Zhejiang Small Enterprise Bureau, which is established to assist the local cement industry in applying high efficient energy saving technology and overcoming various policy, market, technology and financing barriers to the application.

Clause 2 The objective of the LPIC is to establish efficient coordination system and to disseminate energy efficient technology and produce high quality and energy efficient product thereby reducing energy consumption and GHG emissions and promoting the sustainable development of cement industry small and medium enterprises in Zhejiang.

Organization of the LPIC

Clause 3 The membership of the LPIC is comprised of six parties including Provincial SME Bureau, Provincial Science and Technology Department, Provincial environmental Protection Bureau, Provincial Financial Department, Provincial Economic and Trade Committee, Test Center of SME Bureau.

Clause 4 The LPIC shall have 7 delegates (including one director) composed of leaders from Provincial SME Bureau, Provincial Science and Technology Department, Provincial environmental Protection Bureau, Provincial Financial Department, Provincial Economic and Trade Committee, Test Center of SME Bureau.

Clause 5 The delegates to be occupied by leaders from aforesaid member parties shall serve a term of three years. If any member party wishes to renew its delegate to the committee, a written application for the renewal should be submitted to the office of LPIC for approval.

Clause 6 The Director General of Provincial SME Bureau will act as the director of LPIC. In addition to the normal duties and obligations of a delegate of the LPIC, the Director chairs meetings of the LPIC, signs Minutes and formal correspondence on behalf of the LPIC.

Clause 7 Under the LPIC, an office is established to be in charge of handling routine matters, conduct the activities required in the PIC's documentation and conference summary and communications with the PIC and the project management office of the UNDP/GEF Chinese TVEs Project. The office is located in the science and technology section of SME bureau.

Clause 8 The office staff consists of the staff of Science and Technology Section of SME Bureau. The Section Chief of Science and Technology Section will act as the director of the office.

Functions of the LPIC

Clause 9 Main responsibilities of the LPIC are, under the guidance and with the coordination of the national PIC and the national project management office, to facilitate to remove policy, market, technology and financing barriers encountered by the local cement industry to policy enforcement,

to ensure project phase II develop successfully. Detail responsibilities include the following.

1. Develop and implement action plan aimed at promoting regulatory reform related to the monitoring of energy efficiency at cement TVEs, and facilitation of the transform of the project implementation into a market-oriented mechanism.
2. Push forward TVEs to sign the VA with local government authorities.
3. Provide TVEs with domestic and international information on advanced technology and policies on energy conservation and emission reduction.
4. Promote the enforcement of national and local policies, regulations and standards related to energy efficiency, technical renovation and environmental protection in cement industry in Zhejiang
5. *Establish incentive mechanism to promote energy efficient* technologies, and have best practices in energy conservation and emissions reduction replicated throughout the district.
6. Recommend to the national PIC rewards to organization(s) or individual(s) with remarkable performance

Clause 10 Responsibilities of member parties are:

1. Provincial SME Bureau should be responsible for technical support, drafting plan, information sharing, organization of related civilities, summarization and dissemination, and communication with replication TVEs as well as data statistics;
2. Provincial Economy and Trade Committee should be responsible for making and implementing the local industrial policy and special policy for cement, and guiding the technical innovation;
3. Provincial Science and Technology Department should be responsible for technical support for the technical innovation in operation;
4. Provincial Financial Department should be responsible for financing for TVEs in technical renovation;
5. Provincial Environmental Protection Bureau should be responsible for guidance on the cement industry on environmental protection policy;
6. Test Center of Provincial SME Bureau should be responsible for quality control of cement product.

Working Procedures

Clause 11 The LPIC operates by means of meetings, once half a year. The Director, or the executive deputy director at the director's absent, will chair the meetings. A meeting will be considered duly valid if more than 50% of its members are present.

Clause 12 The LPIC Director may call interim meetings as per the request of PIC and the PMO. Minutes of the meeting should be developed if necessary.

Clause 13 Minutes of meetings and progress reports will be submitted, by means of

telephone or e-mail, to the national PIC and the project management office on a regular basis.

Supplementary Articles

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Annex 9.3

Action Plan of the LPLC in Zhejiang Province

1. Project background

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In order to realize the objectives set for the project's third phase, to create a sound environment for the replication enterprises and the cement industry that these enterprises belong to, to promote the implementation of policies, laws and statutes, to establish a mechanism favorable for enterprises to adopt energy efficiency and GHG emission reduction and to extend the experiences accumulated by the demonstration enterprises, the LPIC in Zhejiang province has formulated the action plan.

2. Major Obstacles to Zhejiang Cement Industry Adopting Energy Saving Technologies

(1) Great gap exists in technical level and scale between the enterprises;

(2) The experienced technician is too limited;

(3) The financing sources are too limited;

(4) Coal and power become the main factors restricting the development of cement industry.

3. Objective

3.1 Short-term objective（2006-2008）

(1) The government signs Energy Efficiency Voluntary Agreement with replication enterprises.

(2) The replication enterprises conduct energy saving technology upgrading and to realize the objective of decreasing unit product's energy consumption by 10% (with the data of 2005 as baseline).

3.2 Medium and long term objectives（2009-2010）

(1) In 2010, compared with the data of 2005 (baseline), the ultimate objective of decreasing unit product's energy consumption by 15% will be realized.

(2) To extend the Energy Efficiency Voluntary Agreement in cement industry and to establish enterprises' self-improving mechanism to promote energy efficiency by adopting a market transformation approach.

4. Implementing Plan

4.1 Government signs EE Voluntary Agreement with promoted enterprises.

Time: July 2006-December 2008

Objective: Government signs Energy Efficiency Voluntary Agreement with replication enterprises; technical upgrading shall be finished before December 31, 2008, and unit product's energy consumption be decreased by 10% compared with the data of

2005(baseline). By December 31, 2010 unit product's energy consumption will be decreased by 15%.

Tasks:

(1) Consult with enterprises and formulate energy saving technology upgrading plans that are to be assessed;

(2) Identify barriers to the implementation of the plan;

(3) LPIC consults with local government and formulates incentive policy;

(4) Work out Energy Efficiency Voluntary Agreement together with replication enterprises;

(5) Provide technical and financial support;

(6) Sign Energy Efficiency Voluntary Agreement;

(7) Summarize the experiences accumulated by replication enterprises and get ready for popularizing the experiences in cement industry in whole province.

4.2 Develop Capacity Building of Technicians in Cement Industry

Objective: Strengthen the capacity of cement enterprises thereby raising their technical level, lowering the reject rate and product cost and reducing energy consumption.

Time: December 2006- December 2007

Tasks:

1-2 technicians are selected from separated 50 enterprises to attend the training.

Contents:

a. The development trend of cement industry;

b. The practical technologies of cement industry;

c. Laws, statutes and technical standards related to cement industry;

d. Computation and statistic for energy consumption in cement industry.

4.3Promote enterprise financing

Time: 2007-2009

Objective: Assist enterprise in financing for technical renovation.

Tasks:

(1)Assist enterprise in appealing in the financial management department in accordance with change of bond issuance policy and financing approach. Bond shall be issued early in the appropriate time and when the manage department unlock approval. Increase the long-term operation funds for specific technical innovation.

(2)Coordinate enterprise to operate and strive for credit assurance fund. Coordinate with the deportment and support that the company assurance for SME can extend amount and scope of fund.

4.4 Assist Enterprise to Fulfill Favorable Policy

Time: December 2006- December 2008

Objective: Assist replication enterprise in enjorying favorable policy for financial and revenue

Tasks:

(1)Accelerate depreciation of the equipment in the list of cleaner production, list the cost of energy sources audit and training into the operation cost.

(2)Coordinate with finance revenue department and assist enterprise to acquire the tax-free policy due to resource integration utilization. The derated tax shall be used for technical innovation and energy conservation.

(3)Assist enterprise to fulfill financial support and compensatory interest favorable policy.

4.5 Popularize Energy Efficiency Voluntary Agreement

Time: 2009-2010

Objective: LPLC further popularizes Energy Efficiency Voluntary Agreement

Tasks:

(1) LPLC announces Energy Efficiency Voluntary Agreement to cement industry;

(2) LPLC accepts the application of Energy Efficiency Voluntary Agreement

(3) LPLC assists government in signing the Energy Efficiency Voluntary Agreement with enterprises

4.6 Strengthen the dissemination and extension

Time: December 2009-December 2010

Objective: Disseminate energy conservation and emission reduction, extend Energy Efficiency Voluntary Agreement and realize the target of energy conservation and emission reduction

Tasks:

(1) Print pamphlets on energy efficiency and distribute them to enterprises in cement industry;

(2) Organize on-the-spot meeting and accelerate the technology upgrading for cement enterprises.

5. Follow-up and Report of the Action Plan

According to local realities, LPIC formulates report on the previous year's work every January and works out *Annual Working Plan of LPIC of Zhejiang Province*. The report is to be submitted to national PIC secretariat before January 31. The secretariat is to collect all the submitted reports and reports to MOA's GEF office. All the reports are to be evaluated by the office and each action plan shall be revised according to the evaluation results.

Annex 10.1

Survey Study Report on Energy Conservation & GHG Emissions Reduction in Foundry Industry of Jinzhong City, Shanxi Province

According to the framework and requirement of the subcontract of Phase III of *UNDP/GEF Energy Conservation & GHG Emissions Reduction in Chinese TVEs – Phase II*, a study tour group, led by Ms. Wang Guiling, PMO deputy director, consisting of subcontractor experts went to Jinzhong City, and conducted a five-day tour from May 22 to 26, 2006. The group held workshops and questionnaire answering with Jinzhong SME Bureau, Pingyao Private Economy Development Bureau, Taigu Private Economy Development Bureau, and administrators of Pingyao Nanzheng TVEs. The group conducted field visit in the TVEs. The purpose is to remove the market, policy, technology and financing obstacles that have been identified in the process of producing, marketing and applying energy efficiency technology in Jinzhong city's foundry industry. Another purpose of the tour is to direct the establishment of LPIC in the city and promote its capacity building. The field study results are as follows:

1. Brief Introduction of Foundry Industry in Jinzhong City

Jinzhong is located in the middle of Shanxi Province. Taihang Mountain is on the east of Jinzhong. It lies along the Fen River. Taiyuan City, the capital of Shanxi Province is on the north of Jinzhong. Currently, its industrial economy has been growing fast. Traditional industries are promoted more and more. The effects of large power, coal and coke projects are very obvious. Products with potentials grow fast and the scale of enterprises enlarged rapidly. Furthermore, the industrial parks have larger scales and stronger capacity. There are 388 large scale enterprises in 2006. The industrial value-added increases 16.1% averagely every year. It was 8.36 billion Yuan last year, 2.9 times more than that of 1999. Foreign trade increases continuously, and average increasing rate is 31.7% per year. It was 490 million US dollars last year.

It sets the target that on the base of foundry industry in Pingyao County and Taigu County, a center for casting production and processing industry will be formed in the eleventh five-year in the *Program of Eleventh Five-Year Plan for Economic and Social Development in Jinzhong City*. In the survey, we got to know that most foundry enterprises are located in Pingyao and Taigu. Therefore, the following analysis is based on the statistic of Pingyao and Taigu.

Table 1 shows the statistic and comparison of foundry industries in Pingyao and Taigu in 2005.

Table 1 Foundry Industry in Pingyao and Taigu

	Unit	Pingyao	Taigu
Number of enterprises		120	111
Total output	10,000 tons	25	40
Initial fixed capital	10,000 RMB	50,000	53,333
Staff employed	Persons	10,000	40,000
Tax payment	10,000 RMB	3,000	5,333

We can see that the status of foundry industry in Pingyao includes: the production scale is so small that the average output is just over 2,000 tons; the economic benefit is low for the tax payment covers only 10% of the total financial revenues of the county. The production scale of Taigu is larger, but the output and production value still don't

reach the level of large scale enterprises.

1.1 Property Right Status of Foundry Industry in Jinzhong

The property right reform has been conducted in foundry industry before 2005 in line of the principle of "Cleared ownership, specified rights and responsibilities, divided governmental administration from business operation and scientific management". The reform optimized the resource distribution, broadened the financial channels, perfected the management structure and systems, stimulated the enthusiasm and creativity of the owner, manager and workers and strengthened the enterprise vitality. Furthermore, it enhanced the enterprise's making, product quality, and economic benefit

We found that all the foundry TVEs have finished the property right reform in Jinzhong, including 231 enterprises in Pingyao and Taigu in the survey. However, many enterprises use the production model like courtyard and workshop operated by individuals. For Jinzhong Private Enterprise Bureau can't provide the exact number of enterprises, we can only analyze the result of the survey.

1.2 Technology Status of the Foundry Industry in Jinzhong City

(1) Current technologies

Most foundry enterprises only have simple equipments and adopt lagged technology, which results in the low quality of castings and inadequate environmental protection measures. Only few major enterprises can produce castings with high quality. Products of most enterprises have bad aspect and quality, and the stability of castings is poor. It caused the severe environmental pollution and hard working conditions that the lagged melting measures and shape technology.

(2) Low management level

Most enterprises follow the family management model and the "families" participate daily management haven't accepted professional training generally. For the owners prefer reassurance than competence. Only few enterprises employ cadres retired from government, employees dismissed from national owned enterprises and graduates of colleges as managers.

(3) Low professional level of employees

Most employees of foundry enterprises are from countries and they haven't accepted much education and lack of professional skills. The operators and workers need teaching hand by hand, so it takes them longer time to be qualified and the productive level is very low. The low professional level of employees results in the low level of foundry industry. It becomes the difficulty of foundry enterprises in the city that they have too few skilled workers.

1.3 Brief Introduction of the Replication Enterprises

The 5 replication enterprises in Jinzhong City have finished property right reform. This promotes the technology upgrading in enterprises. They have invested over 50 million RMB in technical renovation. The capital sources include their own capital and other investment. It shows the replication enterprises have strong willing in energy saving renovation and would like to invest in technical renovation.

The selected 5 enterprises include large scale enterprise which has over 10 thousand of annual output and SME which has only several thousand of annual output. However, they have one common status that they all attached importance to energy saving technology upgrading. They will be good demonstration for other enterprises in local areas. It is helpful for the replication of energy saving technology. The basic

conditions of replication enterprises are shown in Table 2.

2. Management Status of Foundry Industry in Jinzhong

Several agencies and departments are related to energy saving tasks in foundry industry. To ensure the healthy development of the industry and improve the effectiveness of industrial supervision, Jinzhong municipal government strengthened coordination and guidance for the foundry industry. Jinzhong Private Economic Bureau is responsible for the macro administration of enterprises, service for them and development plan for foundry industry in the city and counties. Detailed work will be finished by association of foundry industry in every county to realize the commercialization of government responsibilities through association.

There are several features of management in foundry industry in Jinzhong currently as following:

First, government and association associate with each other. Government is responsible for macro management of the enterprises; coordinate work of Private Economic Development Bureau in counties through the Bureau of Jinzhong; the detailed work will be finished by industrial associations in counties. A good self-discipline circle is formed. The enterprises are the main body and the industrial competition is standardized by industrial association promoted by government.

Secondly, associations have positive trend. With the support of municipal government, all association members cooperate closely and support each other to face the development of market, protect the price in different counties. It protects the members' benefits. The enterprises realize that support for association is equal to support for industrial development and this become the basis of association's healthy development.

Table 2 Basic Information of Replication Enterprises in Jinzhong

No.	Enterprise	Annual output (tons)	Main equipments		Intent on Technical renovation
			Name	Model	
1	Pingyao Shuangqing Foundry Co. Ltd.	280,000	cupola	6-ton, 1 set 5-ton, 1 set 3-ton, 5 sets	1. Equip front thermal analyzer; 2. Apply the high-quality insulation work slag-congestion; 3. Set up the heat preservation layer with aluminum silicate funicle.
2	Pingyao Yongjian Zhongxing Foundry Co. Ltd	9,175	cupola	2-ton, 1 set 3-ton, 1 set 5-ton, 3 sets	1. Equip front thermal analyzer; 2. Apply the high-quality insulation work slag-congestion; 3. Set up the heat preservation layer with aluminum silicate funicle.
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5	Taigu Xingli Magang Co. Ltd	3,900	cupola	10-ton, 2 sets 7-ton, 1 set 5-ton, 1 set	1. Equip front thermal analyzer; 2. Apply the high-quality insulation work slag-congestion; 3. Introduce the resin sand molding technique.

3. LPIC Building in Jinzhong City

Jinzhong LPIC is set up depending on Jinzhong Private Economic Development Bureau. The objective is to strengthen supervision and administration on safe production, exploitation and use of resources, product quality, energy consumption and environmental protection; to promote the standardized management and technical renovation; to accelerate the progress of energy conservation and GHG emission reduction in the industry in Jinzhong. The structure of LPIC is shown in Figure 1.

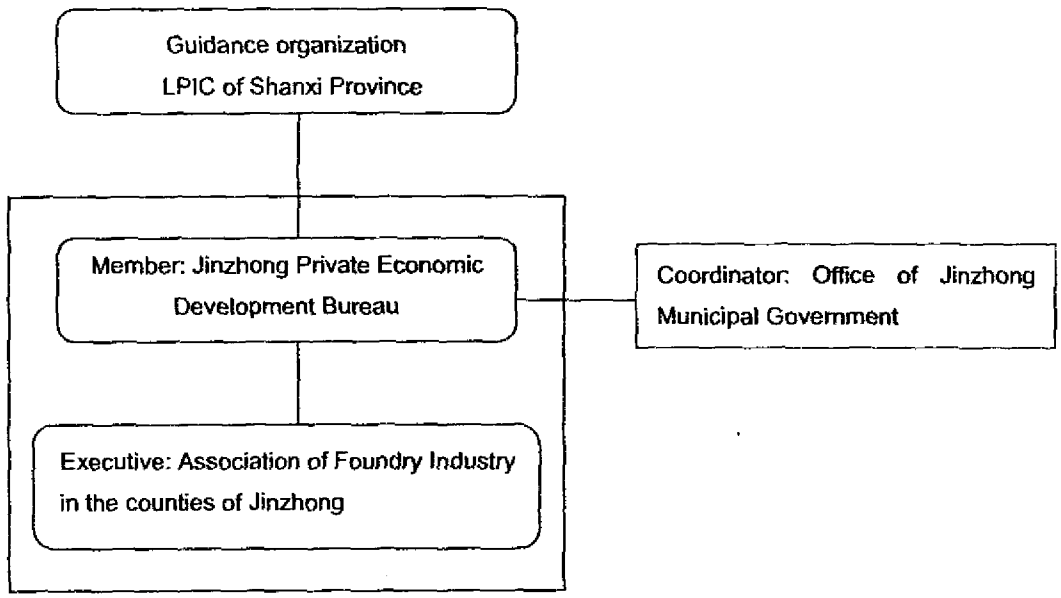

Figure 1 Structure of LPIC in Jinzhong City

LPIC of Shanxi Province is the guidance organization of Jinzhong LPIC and responsible for providing policy and technical support; Office of Jinzhong Municipal Government is the coordinator of LPIC and responsible for coordination with other bureaus to cooperate with Jinzhong Private Economic Development Bureau in energy conservation and GHG reduction in Jinzhong. Jinzhong Private Economic Development Bureau is the member of LPIC and responsible for macro administration of TVE. It has functions like guidance, coordination, supervision and service. Foundry industrial associations in the counties of Jinzhong are guided by Jinzhong Private Economic Development Bureau directly and are executive of LPIC for detailed work.

4. Industrial Policies Related to Foundry Industry in Jinzhong

Jinzhong Municipal Government, Pingyao County Government and Taigu County Government regarded the foundry industry as the important industry to develop and made detailed plan when drafting the "Eleventh Five-Year Plan".

4.1 It was issued in the No. 21 [2006] document of Municipal Government that *Program of Eleventh Five-Year Plan for Economic and Social Development in Jinzhong City.* The program includes the planning for industrial and agricultural development in the next five years and list foundry industry one of the eight advantage industries to promote.

The program prescribes Jinzhong will build a center for casting production and processing industry with important effect in the province or China on the base of Pingyao and Taigu. The production value will reach 15 billion Yuan in 2010. It is necessary to enhance production capacity to realize Increase of production value.

This will bring more energy consumption and GHG emission. Therefore, it meets the local development demand to select foundry industry of Jinzhong.

4.2 It analyzes the status of Pingyao foundry industry in the *Eleventh Five-Year Plan for Mechanical and Foundry Industry in Pingyao*. It also includes the key points and general target for future development and the main necessary measures to reach the target.

The plan includes polices for foundry industry in Pingyao. Admittance System will be implemented in the industry. It forbids new built enterprise with annual output less than 3,000 tons in principle. It forbids new built enterprise with annual output less than 1,000 tons strictly. The built enterprises aren't qualified in scale should reach the scale target by 2010 unless they will be closed. Current enterprises should accelerate technical renovation and more training should be conducted to promote the development of local foundry industry.

4.3 Taigu County issued *Opinions on Promotion on Technical Progress in Foundry Industry*. It requires restriction in repeated construction at low level and promotion energy conservation. It lists six necessary conditions for new built foundry enterprise. New built enterprises should meet the requirement on environmental protection to enhance their level on energy conservation.

5. Environmental Protection Polices

Foundry industry is an important industry in Jinzhong, and the following systems are closely related to it: Environment Impact Assessment System for Constructional Projects; Three Simultaneity System for Constructional Projects; Pollution Discharge Fee System; System for Pollution Reporting and Registration and Pollution Discharge License and System for Time-limited Pollutant Treatment and Treatment of Hazardous Waste by Administrative Bodies.

In June 2003, the Managing Rules on Levying and Using Pollutant Discharge Fees was issued by State Environment Protection Administration and put into force on July 1, 2003. The Provisional Method on Levying Pollution Fees, which was promulgated by the State Council on February 5, 1982, and the Provisional Method on Compensated Using Exclusive Fund for Pollution Source Treatment, which was promulgated by the State Council on July 28, 1988, was abolished at the same time.

According to it, the fee levying ways and scope has been adjusted: the former fee charging for pollution discharge that over a certain standard is changed to charge fee both for within-standard and over-standard pollution discharge. Formerly, fee was charged on the basis of one single over-standard factor. Now, various pollutants are converted into an equivalent pollutant and fee shall be charge according to the converted total pollution. The fee charged is included into government financial budget and managed as exclusive fund for environment protection. The expenses incurred by environment administrations are covered by government finance. In this way, the pollution discharge fee levied become or fair and reasonable.

It requires that dust exempt equipment should be installed in all enterprises in Jinzhong to control air pollution. Environmental protection agencies are responsible for levy of pollution discharge fee. At present, the charge for SO_2 is 0.6 Yuan per kilogram.

6. Barriers for Foundry Industry in Jinzhong

6.1 Difficulty in access to loans become the restriction to the industrial development

The capital for technical renovation is mainly from self-funding among foundry

enterprises in Jinzhong. Bank loan is another source of capital for technical renovation. Self-funding mainly comes from the accumulation of enterprises' development. However, the foundry TVEs have the difficulty in getting loans.

It is found in the survey in that, on one hand, banks have a large number of deposits in Jinzhong, but they can't loan; on the other hand, the SMEs can't get loan from bank although they need loans to realize their development. The main reason for this conflict is that SMEs don't have enough credit for the bank to loan to them. SMEs always survive three to five years and their development is not stable.

Difficult to access to loans is really a bottle-neck which restrict the development of SMEs, especially that of foundry TVEs in Jinzhong. Jinzhong Municipal Government have realized this restriction and issued some preferential policies. The government invested 8 million Yuan to establish Fund for SMEs' Development. Meantime, the government established the SME's credit guarantee system. It's a useful try in applying for loans for foundry enterprises to get capita they needed. If a guarantee company will be established on the base of the Fund for SMEs' Development, and incorporate SME's credit guarantee system. The form of economic entity will help SMEs' access to loans and solve this problem to the most extent.

6.2 The training for employees needs to be strengthened

Jinzhong Private Economic Development Bureau has organized the employees of enterprises to participate in the "Yinhe" Training Project by NDRC for a long time. However, the training focuses on enterprise's management and finance and doesn't include technical training enterprises need most. Therefore, we recommend the Bureau, colleges and scientific institution to enhance the technical level of SMEs, especially the foundry TVEs by visit and lectures.

7. Conclusions

7.1 Practice Shows Establishment of LPIC is the External Demand of Local Government for Energy Saving Upgrading

A few years ago, some areas of China pursued economic development blindly and were unwilling to use advanced technology, even didn't hesitate to destroy environment to realize economic growth. In recent years, local governments have realized that the importance of advanced technology for environmental protection. LPIC in Jinzhong was established on this background. The purpose of LPIC to be established in Jinzhong is to not only help local areas use advanced production technologies, reduce energy consumption and produce good and energy saving products, but also reduce pollutant discharged and protect environment. The purpose is accordant with local government's development plan and the LPIC has good replication and development future.

7.2 Taking Full Advantage of NGO

Association of Foundry Industry in Jinzhong has an extensive network composed by industrial associations in all counties, which will be responsible for detailed work. It is helpful for LPIC to accept the associations as members for they are familiar with local foundry industry and have advantages in communication with enterprises.

8. Suggestions

(1) Organize more dissemination to enhance the awareness on energy conservation

LPIC should organize more dissemination to enhance the awareness on energy conservation and reduction in energy consumption, in combination with "Blue Sky and

Green Water Project" organized by Shanxi Provincial Government.

(2) Increase the source of technical information and conduct technical trainings

LPIC should organize visit and lectures to increase the source of technical information for enterprises. LPIC should conduct effective trainings on technology and energy efficiency management on the basis of the technical status of foundry industry. LPIC should strengthen the capacity in obtaining, discrimination and use of technical information in order to enhance technical management level, decrease rate of unqualified product and energy consumption and save cost.

(3) Broaden financing channels

LPIC should help enterprise to establish diverse financing channels. When enterprises use of civil capital and foreign capital, LPIC should strive for the establishment of SME Loan Guarantee System to support foundry industry. Meanwhile, LPIC should assist Shanxi LPIC in recommendation of enterprises' request for loans and help enterprises to get rolling fund.

(4) Take enough environmental protection measures

For it is difficult to implement environmental protection policies, LPIC should help foundry enterprises in Jinzhong to realize energy conservation and GHG emission reduction, and implement all national and provincial environmental protection policies in the future.

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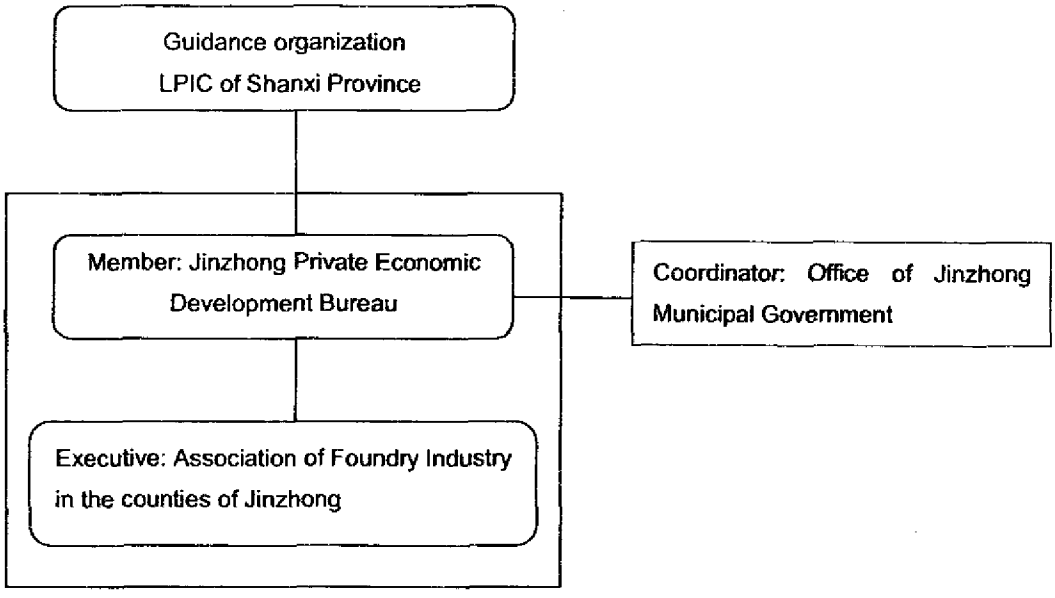

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5. Environmental Protection Polices

Foundry industry is an important industry in Jinzhong, and the following systems are closely related to it: Environment Impact Assessment System for Constructional Projects; Three Simultaneity System for Constructional Projects; Pollution Discharge Fee System; System for Pollution Reporting and Registration and Pollution Discharge License and System for Time-limited Pollutant Treatment and Treatment of Hazardous Waste by Administrative Bodies.

In June 2003, the Managing Rules on Levying and Using Pollutant Discharge Fees was issued by State Environment Protection Administration and put into force on July 1, 2003. The Provisional Method on Levying Pollution Fees, which was promulgated by the State Council on February 5, 1982, and the Provisional Method on Compensated Using Exclusive Fund for Pollution Source Treatment, which was promulgated by the State Council on July 28, 1988, was abolished at the same time.

According to it, the fee levying ways and scope has been adjusted: the former fee charging for pollution discharge that over a certain standard is changed to charge fee both for within-standard and over-standard pollution discharge. Formerly, fee was charged on the basis of one single over-standard factor. Now, various pollutants are converted into an equivalent pollutant and fee shall be charge according to the converted total pollution. The fee charged is included into government financial budget and managed as exclusive fund for environment protection. The expenses incurred by environment administrations are covered by government finance. In this way, the pollution discharge fee levied become or fair and reasonable.

It requires that dust exempt equipment should be installed in all enterprises in Jinzhong to control air pollution. Environmental protection agencies are responsible for levy of pollution discharge fee. At present, the charge for SO_2 is 0.6 Yuan per kilogram.

6. Barriers for Foundry Industry in Jinzhong

6.1 Difficulty in access to loans become the restriction to the industrial development

The capital for technical renovation is mainly from self-funding among foundry

enterprises in Jinzhong. Bank loan is another source of capital for technical renovation. Self-funding mainly comes from the accumulation of enterprises' development. However, the foundry TVEs have the difficulty in getting loans.

It is found in the survey in that, on one hand, banks have a large number of deposits in Jinzhong, but they can't loan; on the other hand, the SMEs can't get loan from bank although they need loans to realize their development. The main reason for this conflict is that SMEs don't have enough credit for the bank to loan to them. SMEs always survive three to five years and their development is not stable.

Difficult to access to loans is really a bottle-neck which restrict the development of SMEs, especially that of foundry TVEs in Jinzhong. Jinzhong Municipal Government have realized this restriction and issued some preferential policies. The government invested 8 million Yuan to establish Fund for SMEs' Development. Meantime, the government established the SME's credit guarantee system. It's a useful try in applying for loans for foundry enterprises to get capita they needed. If a guarantee company will be established on the base of the Fund for SMEs' Development, and incorporate SME's credit guarantee system. The form of economic entity will help SMEs' access to loans and solve this problem to the most extent.

6.2 The training for employees needs to be strengthened

Jinzhong Private Economic Development Bureau has organized the employees of enterprises to participate in the "Yinhe" Training Project by NDRC for a long time. However, the training focuses on enterprise's management and finance and doesn't include technical training enterprises need most. Therefore, we recommend the Bureau, colleges and scientific institution to enhance the technical level of SMEs, especially the foundry TVEs by visit and lectures.

7. Conclusions

7.1 Practice Shows Establishment of LPIC is the External Demand of Local Government for Energy Saving Upgrading

A few years ago, some areas of China pursued economic development blindly and were unwilling to use advanced technology, even didn't hesitate to destroy environment to realize economic growth. In recent years, local governments have realized that the importance of advanced technology for environmental protection. LPIC in Jinzhong was established on this background. The purpose of LPIC to be established in Jinzhong is to not only help local areas use advanced production technologies, reduce energy consumption and produce good and energy saving products, but also reduce pollutant discharged and protect environment. The purpose is accordant with local government's development plan and the LPIC has good replication and development future.

7.2 Taking Full Advantage of NGO

Association of Foundry Industry in Jinzhong has an extensive network composed by industrial associations in all counties, which will be responsible for detailed work. It is helpful for LPIC to accept the associations as members for they are familiar with local foundry industry and have advantages in communication with enterprises.

8. Suggestions

(1) Organize more dissemination to enhance the awareness on energy conservation

LPIC should organize more dissemination to enhance the awareness on energy conservation and reduction in energy consumption, in combination with "Blue Sky and

Green Water Project" organized by Shanxi Provincial Government.

(2) Increase the source of technical information and conduct technical trainings

LPIC should organize visit and lectures to increase the source of technical information for enterprises. LPIC should conduct effective trainings on technology and energy efficiency management on the basis of the technical status of foundry industry. LPIC should strengthen the capacity in obtaining, discrimination and use of technical information in order to enhance technical management level, decrease rate of unqualified product and energy consumption and save cost.

(3) Broaden financing channels

LPIC should help enterprise to establish diverse financing channels. When enterprises use of civil capital and foreign capital, LPIC should strive for the establishment of SME Loan Guarantee System to support foundry industry. Meanwhile, LPIC should assist Shanxi LPIC in recommendation of enterprises' request for loans and help enterprises to get rolling fund.

(4) Take enough environmental protection measures

For it is difficult to implement environmental protection policies, LPIC should help foundry enterprises in Jinzhong to realize energy conservation and GHG emission reduction, and implement all national and provincial environmental protection policies in the future.

Annex 10.2

Statute of Policy Implementation Committee, Jinzhong City

General Provisions

Clause 1 Jinzhong Policy Implementation Committee (hereinafter referred to as LPIC) is an institution led by the Jinzhong municipal government, which is established to help foundry TVEs in the city to remove policy barriers in applying energy saving technologies.

Clause 2 The objective of the LPIC is to establish effective coordination mechanism, disseminate energy efficient technology and introduce high efficient management system at TVEs to produce high quality and energy efficient product thereby reducing energy consumption and GHG emissions and promoting the sustainable development of foundry TVEs in Jinzhong.

Organization of LPIC

Clause 3 LPIC of Shanxi Province is the guidance organization of Jinzhong LPIC; Office of Jinzhong Municipal Government is the coordinator of LPIC; Jinzhong Private Economic Development Bureau is the member of LPIC; Foundry industrial associations in the counties of Jinzhong are executive of LPIC for detailed work.

Clause 4 The LPIC shall have 3 delegates. The Director of Jinzhong Private Economic Development Bureau will act as the director of LPIC; the Deputy Director of Jinzhong Private Economic Development Bureau will act as the deputy director of LPIC. The member of LPIC is the section chief of Jinzhong Private Economic Development Bureau. LPIC in Jinzhong is under the direct guide of LPIC in Shanxi. They will associate with Office of Jinzhong Municipal Government to complete the work in Jinzhong.

Clause 5 LPIC delegates, to be nominated by the local government, shall serve a term of three years. If any member organization wishes to delegate its membership to a delegate from within the same office as the actual member a written application of such delegation should be submitted to the district government for approval.

Clause 6 The LPIC will instate one director and one deputy director. The Director of Jinzhong Private Economic Development Bureau will act as the director of LPIC; the Deputy Director of Jinzhong Private Economic Development Bureau will act as the deputy director of LPIC. The Deputy Director can act as Director in his absence. In addition to the normal duties and obligations of a member of LPIC, the Director (or acting Director) chairs meetings of LPIC, signs Minutes and formal correspondence of LPIC.

Clause 7 Under the LPIC, an office is established to be in charge of handling routine matters, conduct the activities required in the PIC's documentation and conference summary, communications with the PIC and the project management office of the UNDP/GEF Chinese TVEs Project, and communications with guidance organization, coordinator and executive. The office is located in the Industrial Guidance Branch of Jinzhong Private Economic Development Bureau.

Clause 8 The office staff includes local experts and three members of Jinzhong

Private Economic Development Bureau.

Functions of LPIC

Clause 9 Main responsibilities of the LPIC are, under the guidance and with the coordination of the national PIC and the national project management office, to facilitate to remove policy, market, technology and financing barriers encountered by the local foundry TVEs to policy enforcement. Detail responsibilities include the following.

1. Develop and implement action plan aimed at promoting regulatory reform related to the monitoring of energy efficiency at foundry TVEs, and facilitation of the transform of the project implementation into a market-oriented mechanism.
2. Supervise and examine the implementation of VA.
3. Provide TVEs with domestic and international information on advanced technology and policies on energy conservation and emission reduction.
4. Promote the enforcement of national and local policies, regulations and standards related to energy efficiency, technical renovation and environmental protection within foundry industry in Jinzhong.
5. Establish incentive mechanism to promote energy efficient technologies.

Clause 10 Responsibilities of member parties are:

1. Guidance organization: LPIC of Shanxi Province is responsible for provide guidance to Jinzhong LPIC.
2. Member: Jinzhong Private Economic Development Bureau is responsible for coordination and responsible for PIC. It is also responsible for macro administration of TVE. It has functions like guidance, coordination, supervision and service.
3. Coordinator: Office of Jinzhong Municipal Government is responsible for coordination other bureaus with Jinzhong Private Economic Development Bureau in energy conservation and GHG reduction in Jinzhong.
4. Executives: Foundry industrial associations in the counties of Jinzhong are guided by Jinzhong Private Economic Development Bureau directly and are of LPIC for detailed work.

Governance and working procedures

Clause 11 LPIC will operate by means of meetings, once half a year. The Director or the Deputy Director in his absence will chair the meetings. A meeting will be considered duly valid if more than 50% of its members are present.

Clause 12 The LPIC Director may call interim meetings as per the request of PIC, and the PMO.

Clause 13 Minutes of meetings and progress reports will be submitted to the national PIC on a regular basis.

Annex 10.3

Action Plan of the LPLC in Jinzhong City

1. Project background

The project of "UNDP/GEF Energy Conservation & GHG Emission Reduction in Chinese TVEs" has been funded by GEF. The aim of the project is to help Chinese TVEs that engaged in brick-making, cement, casting and coking to adopt energy efficiency technologies and to reduce GHG emission.

During the project's first phase, there are all kinds of obstacles to the adoption of energy efficiency technologies have been identified and evaluated and strategies to remove the obstacles have been formulated. During the second phase, it has been proposed to establish top-down PLC both at central and local level. The LPLC shall be the new mechanism to remove the policy obstacle and to promote energy efficiency in Chinese TVEs by adopting a market transformation approach. During the third phase, 11 replication areas will be selected to develop LPIC building and overcome the market, policy, technology and financing barriers to the adoption of energy efficiency technologies on the base of experiences in Phase I and II.

In order to realize the objectives set for the project's third phase, to create a sound environment for the replication enterprises and the foundry industry that these enterprises belong to, to promote the implementation of policies, laws and statutes, to establish a mechanism favorable for enterprises to adopt energy efficiency and GHG emission reduction and to extend the experiences accumulated by the demonstration enterprises, the LPIC in Jinzhong City has formulated the action plan.

2. Major Obstacles to Jinzhong TVEs' Adoption of Energy Saving Technologies

(1) The technical level is low.

(2) It is difficult for foundry enterprises to get loans from bank.

(3) It is hard to implement the environmental policies in foundry industry in Jinzhong

(4) It should be strengthened that some enterprises' awareness on energy conservation and reduction of energy consumption.

3. Objective

3.1 Short-term objective (2006-2008)

(1) The government signs Energy Efficiency Voluntary Agreement with replication enterprises.

(2) The replication enterprises conduct energy saving technology upgrading and to realize the objective of decreasing unit product's energy consumption by 10% (with the data of 2005 as baseline).

(3) To establish an effective mechanism for foundry industry's sustainable energy efficiency and GHG emission reduction.

3.2 Medium and long term objectives (2008-2010)

(1) In 2010, compared with the data of 2005 (baseline), the ultimate objective of decreasing unit product's energy consumption by 15% will be realized.

(2) To extend the Energy Efficiency Voluntary Agreement in foundry industry and to establish enterprises' self-improving mechanism to promote energy efficiency by adopting a market transformation approach.

4. Implementing Plan

4.1 Government signs EE Voluntary Agreement with promoted enterprises.

Time: October 2006-December 2008

Objective: Government signs Energy Efficiency Voluntary Agreement with replication enterprises; technical upgrading shall be finished before December 31, 2008, and unit product's energy consumption be decreased by 10% compared with the data of 2005(baseline). By December 31, 2010, unit product's energy consumption will be decreased by 15%.

Tasks:

(1) Consult with enterprises and formulate energy saving technology upgrading plans that are to be assessed;

(2) Investigate the obstacles to implementation of the plans above mentioned;

(3) LPIC consults with local government and formulates incentive policy;

(4) Work out Energy Efficiency Voluntary Agreement together with replication enterprises;

(5) Provide technical and financial support;

(6) Sign Energy Efficiency Voluntary Agreement;

(7) According to the stipulations of Energy Efficiency Voluntary Agreement, the implementing progress of the tasks is to be supervised by the third party that has been confirmed by the parties involved in Energy Efficiency Voluntary Agreement;

(8) Summarize the experiences accumulated by replication enterprises and get ready for popularizing the experiences in foundry industry in Jinzhong City.

4.2 Popularize Energy Efficiency Voluntary Agreement

Time: 2007

Objective: LPLC further popularizes Energy Efficiency Voluntary Agreement in foundry industry in Jinzhong City.

Tasks:

(1) Conduct training for foundry industry in Jinzhong City and publicize GEF project;

(2) Conduct survey of foundry TVEs in Jinzhong City and hand out handbooks on technical cases and update energy conservation and technical renovation;

(3) Collect information of TVEs that are willing to conduct energy efficiency technical upgrading, and encourage the TVEs to sign Energy Efficiency Voluntary Agreement;

(4) Sign the Energy Efficiency Voluntary Agreement with willing enterprises;

(5) Try to accept the industrial associations in the counties as members of LPIC.

4.3 Develop Capacity Building of Technicians and Managers in Foundry Industry

Objective: Strengthen the capacity of foundry TVEs in soliciting and identifying information on energy efficiency and new technology thereby raising their technical level, lowering the reject rate and product cost and reducing energy consumption.

Tasks:

(1) 3-5 technicians are selected from different local foundry enterprises to attend the training.

Time: Every August from 2006 to 2008

Contents:

a. The development trend of foundry industry;

b. The practical technologies of foundry industry;

c. Laws, statutes and technical standards related to foundry industry;

d. Practical operation on imports and exports.

(2) Organize visit to provide the enterprises with the chances learning national or international advance technology and experiences.

Time: January 2008-January 2010

4.4 Assist Jinzhong Municipal Government in establishment of Guarantee Fund

Time: October 2006-December 2008

Objective: Help foundry TVEs in Jinzhong to solve the difficulty in access to loans.

Tasks:

(1) Design reasonable and perfect evaluation grade system for credit guarantee, and conduct evaluation according to his system;

(2) Establish Guarantee Company in association with Jinzhong Municipal Government, and provide different guarantee according to the credit grade in order to provide financial support for the enterprises' development and technical renovation.

4.5 Strengthen dissemination

Time: December 2009-December 2010

Objective: Publicize energy conservation and GHG emission reduction and disseminate Energy Efficiency Voluntary Agreement to realize energy conservation and GHG emission reduction.

Tasks:

(1) Print pamphlets on energy saving technology and distribute them to enterprises engaged in foundry, forging and heat treating;

(2) Disseminate energy conservation through local broadcast, TV, newspaper and other media to let public know energy conservation and VA better;

(3) Organize on-the-spot meeting to introduce the successful experiences of those replication enterprises;

(4) Organize seminar for enterprises to discuss the feasibility and obstacles for VA applied in.

5. Follow-up and report of the action plan

According to local realities, LPIC formulates report on the previous year's work every January and works out *Annual Working Plan of LPIC of Jinzhong City*. The report is to be submitted to national PIC secretariat before January 31. The secretariat is to collect all the submitted reports and reports to MOA's GEF office. All the reports are to be evaluated by the office and each action plan shall be revised according to the evaluation results.

Annex 11.1

Field Survey Report on Energy Conservation & GHG Emissions Reduction in Foundry Industry in Linfen City, Shanxi Province

According to the framework and requirement of Phase III of UNDP/GEF Energy Conservation & GHG Emissions Reduction in Chinese TVES – Phase II, a study tour group, led by Ms. Wang Guiling, PMO deputy director, consisting of subcontractor experts and technical professionals, went to Linfen City of Shanxi Province and conducted a four-day tour from May 28 to June 1, 2006. The study tour group held workshops, field study and questionnaire answering for replication enterprises in order to remove the market, policy, technical and financial obstacles that have been identified in the process of producing, marketing and applying energy efficiency technology in Linfen's foundry industry. Another object of the tour is to direct the establishment of LPIC in the city and promote its capacity building. In order to guarantee the quality and effectiveness of the tour, Mr. Wang Xiwu, Senior Adviser of the PIC Secretariat, was invited to participate in the tour. Findings and results are as the following.

1. General Status of Foundry in Linfen

Linfen is located in southwest of Shanxi Province and middle reaches of Yellow River. It covers 20,275 square kilometers, and has 17 counties/districts with total population of four million. Linfen has rich mine resources. Coal resource is an important mine resource in Lifen. There are three big coalfields, including Hedong, Huoxi and Qinshui coalfield. The coaly area is 15,400 square kilometers, which covers 76% of the whole area. Iron ore is the second richest mine resources, and its reserves reach 4200 million tons. Furthermore, the percentage of rich iron ores is very high, occupying over 70 percent of the rich iron ores of Shanxi Province. Linfen has rich colored metal mines and metalloid mines. It becomes the advantage for the development of foundry industry in Linfen that the rich coal, coke and iron resources.

1.1 Status of Foundry Industry

Linfen's foundry industry has long history. From 1940's to 1980's, most enterprises were state owned enterprises, but their production capacity was not very strong. The main products included curving axis, fittings of cars and tractors, valve, cylinder cover, cast iron tube, axletree and miscellaneous iron parts. From 1980's to date, a set of non-state owned enterprises has developed and the foundry industry of Linfen become large scaled. In recent years, the industry develops very fast because government has stronger awareness on industry structure adjustment and the industry becomes the leading industry of economic adjustment in Linfen. Some leading enterprises have arisen, which have good administration, large scale and advanced technical level in domestic even in the world. These enterprises lead the whole industry to the new phase, the nature of which is high technical level and adding value. The products are more and more competitive and the domestic and international market share is larger and larger.

Annex 12.1

Survey Report on Energy Conservation and GHG Emissions Reduction in Cement Industry of Guangdong Province

According to the framework and requirement of *UNDP/GEF Energy Conservation & GHG Emissions Reduction in Chinese TVES – Phase II*, a study tour group, led by Ms. Wang Guiling, PMO deputy director, consisting of subcontractor experts and technical professionals, went to Guangdong province and conducted a five-day tour from Aug 20 to 24, 2006. Workshops, field study and questionnaire answering had been held in order to remove the market, policy, technical and financial obstacles that have been identified in the process of producing, marketing and applying energy efficiency technology in Guangdong Cement industry. Another object of the tour is to direct the establishment of LPIC in Guangdong and to promote its capacity building. The field study results are as follows:

1. Brief Introduction of the Cement Industry in Guangdong

Guangdong is a province with large cement output in China. In 2005, the output of cement clinker ranked the second in China and the output of cement ranked the fifth in China. For Guangdong is near Hongkong and Macao, the cement consumption in these three regions always ranks the first in China. The actual consumption of cement occupies more than 10% of national total consumption every year. Besides over 90 million tons of cement is produced in Guangdong, there are more than 12 million tons produced in Guangxi and 2 million tons produced in Hunan in the market. Guangdong cement industry has entered a fastest development period from 2003. Much fund is invested into new dry cement in Guangdong up to now. According to the provincial statistic, there were 425 large-scale cement enterprises in 2004; the total output was 8.056 million tons which occupied the 7.78% of the total national output. Actually, there were 510 cement enterprises in Guangdong by the end of 2005. The total output was 92.56 million tons and the average output was 181.5 thousand tons. 73% of the output was produced by vertical kiln and 27% are produced by rotary kiln (including 21.6% produced by the new dry rotary kiln). The main productive regions are in the middle of Guangdong, which occupies 29% of total cement production capacity; the east occupies 21% of the total capacity; 23% in west, and17% in north of Guangdong.

In 2005, the sales value of industry in cement industry reached 22.043 billion Yuan, the profit was 409 million Yuan and the taxation was 1,161 million Yuan.

From 2005 to present, Guangdong is the province with most investment in new dry production line, and most production line built and most output of cement clinker. According to the incomplete statistic, the total investment of cement project reached 6 billion Yuan in 2005. The capital of proposed project was nearly 10 billion Yuan. There were 8 production lines which have capacity of 2,000 tons per day and 5,000 tons per day new built in the first six months of 2006. It means that the production capacity of new dry cement increased by 1.162 million tons from the January to June in 2006. The proportion of new dry cement will increase by 10 percent.

2. Main Problems to be solved in Cement Industry of Guangdong

(1) The technical structure is lagged.

Guangdong is one of the provinces which have the most percentage of cement produced by vertical kiln. In 2004, the proportion of vertical kiln is 24.96%, only 12.06% produced by new dry spin kiln, the average level occupied 30% of that of China. In 2005, the

production capacity was about 100 million tons, only 21% produced by new dry rotary kiln. In 2006, production lines with capacity of 15 million tons on new dry cement will put into production and the proportion of new dry cement will increase by 35%. The national policy is to promote the adjustment of structure in the surplus industry and accelerate the update of industry structure optimization. There is great gap between current conditions and the objectives that the percentage of new dry cement will increase 70% in 2010.

(2) The pillar enterprises have not enough capacity to control the market for there are so many cement enterprises.

The equipments are unbalanced in ten largest cement enterprises in Guangdong and they all have not large scale. The output of new dry cement increase rapidly. The price of cement drop greatly because of the competition of vertical kiln cement and new dry cement. The profit of cement enterprises decreased 51% in 2005. The price of cement drops greatly in past six months of 2006. The maximum of lessen-price meet 50 Yuan/ton. Most cement enterprises run into deficit.

(3) Resource distribution is not consistent with market demand.

Zhujiang delta consumed 3/4 of cement consumption in the province. Most enterprises have to buy ore material from other places, which increased the cost of production. It is necessary to accelerate the transfer of cement industry to mountainous area with abounding resources.

3. Strategic target of Cement Industry

The principle is total quantity control, structure adjustment, quality improvement, environment protection and logical utilization of resource. Enhance the investment of new dry rotary kiln. Promote the SME to execute the standard of environment and keep the cement enterprise to standardization management in safe production, to ensure the output increase continuously in premise of total quantity control.

Table 1Total Investment Index

Index	2010
Accumulative investment (hundred million Yuan)	100
Production capacity of new dry spin kiln (ten thousand ton)	3930

Table 2 Industrial Distribution Index

Location		2010
Production capacity distribution (%)	East of Guangdong	25
	West of Guangdong	30
	North of Guangdong	25
	Middle of Guangdong	20

Table 3 Cement Gross Index

		2010
Total production capacity (ten thousand tons of clinkers)		11,000
Rotary kiln occupied (%)		60%
Vertical kiln occupied (%)		40%
Market Occupied (%)	all country	10%
	Guangdong	90%
Total production capacity of three base (ten thousand tons of clinkers)	East of Guangdong	2,500 (Longmen: 1,000)
	West of Guangdong	3,000 (Yunfu: 2,000)
	North of Guangdong	3,000 (Yingde: 2,000)

Table4 Technical Improvement and Product Quality

Index	2010
New dry spin kiln occupied (%)	60
Large dry spin kiln which made in China occupied (%)	95
Provincial and national research center	2
First-rate production occupied (%)	80

Table 5 Energy Consumption

		2010
Cement standard coal wastage (Kg/ton)	New dry spin kiln	105
	Vertical kiln	120
Cement cost electric energy (kWh/ton)	New dry spin kiln	98
	Vertical kiln	70

Table 6 Environmental Protection

	2010
Dust ≤(mg/m^3)	30
SO_2 ≤(mg/m^3)	50
NO_x ≤(mg/m^3)	200
Value of other indices are better than	National standard

4. LPIC Building

Guangdong government attaches importance to the development of cement industry. The market of cement is more perfect in Guangdong because Guangdong is located the southeast inshore area of China where is the pioneer area of the market economy, therefore the Cement Industrial Association develop fast.

Guangdong Cement Industrial Association was founded in 1989, is organized voluntarily by productive enterprises, some relevant enterprises, management agencies, scientific research institution, design institute, educational departments, and so on. The objective of Association is: to serve government and members actively, coordinate with the government and enterprises and guide for cement industry. Main tasks include: to carry out the guideline and policy of the government; undertake the affair entrusted by government; cooperate with government to implement the policy, compile the development plan, establish the service standard and quality technical standard; research, investigate and analyze the trend of industrial economy and requirement of the market; put forward suggestion to government; coordinate the relevant industry, communicate with international industry and organize the trade with foreign enterprises; mediate the dispute in trade and law; establish the guiding regulations in accordance with market rule and normalize the action of member enterprise to promote fair competition, industry self-discipline and stick up for the legal right; support consulting service and technical training for the enterprise to increase the level of management; collect the international and domestic information about technology and market; organize the technical and experience communion; extend the new production, new technology and new equipment to promote the industry development.

Guangdong Policy Coordination and Consulting Committee (hereafter referred as LPIC) is established dependent on Guangdong Cement Industrial Association. The director of LPIC is the administrative vice chairman of the Association. Other delegates come from Resource Comprehensive Use Section of Provincial Economic and Trade Committee, Industry Section of Development and Reform Committee, Provincial Design Academy of Architectural Material, Environmental Protection Industrial Association, Material College of South China University of Technology, Guangdong Yuede Management Consulting Co. Ltd and Provincial Center of Energy Conservation. LPIC are responsible for coordination of the tasks on energy conservation and GHG emission reduction, facilitating to remove policy, market, technology and financing barriers encountered by the local cement industry to policy enforcement.

5. Main Policy Measures to Improve the Competence of Cement Industry

(1) Accelerate the technical innovation and talent training

① Government increase the fund of technical renovation to support the enterprise to develop new products, and upgrade the product technology.

② Encourage the academy, scientific research institute, industry institute and other organization to devote to technical training. The trainings combine systematic and short phase training, general knowledge and special knowledge, theory training and operation training to satisfy the need of new dry cement enterprises.

③ Government supply the preferential policy for the advanced technician introduced from elsewhere.

④ Enterprise should emphasis on the training of the advanced technician.

(2) Carry out the key project to promote to invest

① Choose some key projects from the proposed project for new dry predecomposition cement to arrange firstly and simplify the procedure.

② The key-supporting enterprise enjoy the supporting policy once approved by national and provincial government;

③ Bond and stock should be issued and came into the market priority;

④ Bank supply the credit firstly;

⑤ Priority try out the policy including state enterprise share and hold stock, and foreign capital buy a share;

⑥ Acquire the trading right of the emission permits;

⑦ Take advantage of the industry institute and other agency to choose the key project and implement the project, and issue the industry information and forewarn information.

(3) Enhance to construct the production base and industrial aggregation

① Three key areas of cement development include Yuanfu and Zhaoqing in the west of Guangdong, Meizhou and Huizhou in the east of Guangdong, Qingyuan and Shaoguan in the north of Guangdong. The new dry cement projects are fit for implement in these three areas and meet the total index respectively. Government should support the project which meet the total index, and supply the favourable condition, and simplify the approved procedure.

② Optimize the framework of the industry and encourage the leading enterprise to found multisection or multiregional group enterprise with capital recombination or uniting or joint stock. Promote the enterprise to collectivization and production specialization and management modernization

③ Encourage the enterprises in different regions, provinces, cities to recombine and collectivize. It will enhance the centralization of cement enterprise and increase the economical benefit and competition capacity.

(4) Establish relevant measure and expedite the adjustment of framework of cement industry

① Implement according to the standard on pollutant discharge. Local governments require the enterprises which don't meet the standard for treatment in time limit. In the time of treatment, the enterprises were required to reduce the production to meet the standard. If the enterprises don't meet the standard on time, they should be stopped production.

② Manage land and mineral resources strictly and approve the mining permit of the limestone strictly. Sternly treat with the mining unlawfully and irrationally. Complete the policy for environmental protection, field renew and zoology restoration.

③ Complete the actual tax policy, and ensure that the enterprises which the percentage of recycle industrial residue meet 30% in the new dry cement will enjoy value-added tax preferential policies except the vertical kiln and other low-grade cement technology.

Annex 12.2

Statute of Policy Coordination and Consulting Committee, Guangdong

General Provisions

Clause 1 Statute of Policy Coordination and Consulting Committee in Cement Industry of Guangdong (hereinafter referred to as the LPIC) is an institution under the leadership of Guangdong Cement Industrial Association, which is established to assist the local cement industry in applying high efficient energy saving technology and overcoming various policy, market, technology and financing barriers to the application.

Clause 2 The objective of the LPIC is to establish efficient coordination system and to disseminate energy efficient technology and produce high quality and energy efficient product thereby reducing energy consumption and GHG emissions and promoting the sustainable development of cement industry small and medium enterprises in Guangdong.

Organization of the LPIC

Clause 3 The membership of the LPIC is comprised of eight parties including Guangdong Cement Industrial Association, Resource Comprehensive Use Section of Provincial Economic and Trade Committee, Industry Section of Development and Reform Committee, Provincial Design Academy of Architectural Material, Environmental Protection Industrial Association, Material College of South China University of Technology, Guangdong Yuede Management Consulting Co. Ltd.

Clause 4 The LPIC shall have 9 delegates. The administrative vice chairman of Guangdong Cement Industrial Association will act as the director. The secretary-general of Guangdong Cement Industrial Association will act as the deputy director. Other delegates come from Resource Comprehensive Use Section of Provincial Economic and Trade Committee and other agencies.

Clause 5 The delegates, to be commended by leaders from aforesaid member parties, shall serve a term of three years. If any member party wishes to renew its delegate to the committee, a written application for the renewal should be submitted to the office of LPIC for approval.

Clause 6 The LPIC shall have one director and one deputy director. The administrative vice chairman of Guangdong Cement Industrial Association will act as the director. The secretary-general of Guangdong Cement Industrial Association will act as the deputy director. The Deputy Director can take care of routine matters as Director in his absence. In addition to the normal duties and obligations of a delegate of the LPIC, the Director (or Deputy Director) chair meetings of the LPIC, signs Minutes and formal correspondence on behalf of the LPIC.

Clause 7 Under the LPIC, an office is established to be in charge of handling routine matters, conduct the activities required in the PIC's documentation and conference summary and communications with the PIC and the project management office of the UNDP/GEF Chinese TVEs Project. The office is located in the secretariat of Guangdong Cement Industrial Association. The director of the office is undertaken by the director of the office in secretariat.

Clause 8 The office staff consists of local policy issue expert, secretary-general and one worker of secretariat.

Functions of the LPIC

Clause 9 Main responsibilities of the LPIC are, under the guidance and with the coordination of the national PIC and the national project management office, to facilitate to remove policy, market, technology and financing barriers encountered by the local cement industry to policy enforcement.

1. Develop and implement action plan aimed at promoting regulatory reform related to the monitoring of energy efficiency at cement TVEs, and facilitation of the transform of the project implementation into a market-oriented mechanism;
2. Push forward and check TVEs to fulfil the VA;
3. Protect the legal right and common economic benefit of industry and members, serve the member, organize the development of market, issue the information of market, and conduct the training, workshop, consulting and exhibition;
4. Assist the government in industrial survey, decision-making consultancy and policy making;
5. Assist the government in establishment and revision of industrial standard;
6. Assist the related departments of government in coordination, participate in consultation for legislative demonstration, and protect the legal right of industry and members;
7. Standardize the production management action of the industry and members, establish related regulations, and carry out the standardization operation;
8. Strengthen the self-discipline of price, hold out the market monopolization, and maintain the fair competition and public benefit;
9. Strengthen the self-discipline of product and service, assist the government in supervision;
10. Organize the domestic and international trade and communication.

Working Procedures

Clause 10 The LPIC operates by means of meetings, once half a year. The Director, will chair the meetings. The minute of meeting will be completed after the meeting. A meeting will be considered duly valid if more than 50% of its members are present.

Clause 11 The LPIC Director may call interim meetings as per the request of PIC and the PMO. Minutes of the meeting should be developed if necessary.

Clause 12 Minutes of meetings and progress reports will be submitted, by means of telephone or e-mail, to the national PIC and the project management office on a regular basis.

Supplementary Articles

Clause 13 This statute will become effective on the date after it is discussed and approved by all LPIC members. The Office of LPIC reserves the right for the explanation of this statute.

Annex 12.3

Action Plan of the LPLC in Guangdong Province

1. Project Background

The project of "UNDP/GEF Energy Conservation & GHG Emission Reduction in Chinese TVEs" has been funded by GEF. The aim of the project is to help Chinese TVEs that engaged in brick-making, cement, casting and coking to adopt energy efficiency technologies and to reduce GHG emission.

During the project's first phase, the market, policy, technical and financial obstacles to the adoption of energy efficiency technologies have been identified and evaluated and strategies to remove the obstacles have been formulated. During the second phase, it has been proposed to establish top-down LPLC both at central and local level. The LPLC shall be the new mechanism to remove the policy obstacle and to promote energy efficiency in Chinese TVEs by adopting a market transformation approach.

In order to realize the objectives set for the project's second phase, to create a sound environment for the replication enterprises and the cement industry that these enterprises belong to, to promote the implementation of policies, laws and statutes, to establish a mechanism favorable for enterprises to adopt energy efficiency and GHG emission reduction and to extend the experiences accumulated by the demonstration enterprises, LPIC has formulated the action plan.

2. Major Obstacles to Guangdong Cement Industry in Adoption of Energy Efficiency Technologies

(1) The technical structure is lagged;

(2) The pillar enterprises have not enough capacity to control the market for there are so many cement enterprises;

(3) Resource distribution is not consistent with market demand;

(4) The development of new dry cement is slow for lack of effective policy.

3. Objective

(1) Objectives in the near future（2006-2008）

①The government signs Energy Efficiency Voluntary Agreement with replication enterprises.

②To establish the system of voluntary energy conservation and GHG reduction, and popularize the VA.

③To eliminate the hollow kiln and wet kiln, and reduce the production capacity of vertical kiln, and eliminate vertical kiln mostly, and close the small enterprises with production capacity less than 200 thousand tons.

(2) Medium and long term objectives（2009-2010）

①The new dry cement will occupy much than 60% by 2010. The technical economic index will meet the 95KWH/ton and heat consumption will be less than 740 kilo-cal per kg in the dry cement production line which has capacity more than 4,000 tons per day.

②To popularize the VA mode to cement industry and establish the voluntary system

for energy conservation and GHG reduction.

4. Implementing Plan

4.1 Government Signs Energy Efficiency Voluntary Agreement with Replication Enterprises.

Time: Jan 2006—Dec 2006

Objective: Government signs energy efficiency Voluntary Agreement with replication enterprises.

Activity:

(1) Consult with enterprises and formulate energy efficiency technology upgrading plans that are to be assessed;

(2) Survey the obstacle in the implication of the plans;

(3) LPIC consults with local government and formulates incentive policy;

(4) Work out energy efficiency Voluntary Agreement together with replication enterprises;

(5) Consult with PTPMC and provide technical and financial support;

(6) Sign Energy Efficiency Voluntary Agreement;

(7) According to the stipulations of Energy Efficiency Voluntary Agreement, the implementing progress of the tasks is to be supervised by the third party that has been confirmed by the parties involved in Energy Efficiency Voluntary Agreement;

(8)Summarize the experiences accumulated by demonstration enterprises

4.2 Assist the government in Coordination for Large Projects

Time: Jan 2007—Dec 2010

Objective: Promote the development of the important base for cement production and industrial group.

Activity:

(1) Study the direction of the technical renovation and the proposed project;

(2) Find out the obstacle of the technical renovation and the proposed project;

(3) Coordinate with the policy expert for the requirement;

(4) Coordinate with the relevant department in the large projects.

4.3 Hold the Consultation Meeting on Financing for Guangdong Cement Industry

Time: Oct 2007

Objective: Support the financial service for the enterprise and optimize the framework of industry.

Activity:

(1)Contact with the Guangdong Bank Association, Securities Association and Insurance Association to select the finance enterprises to invest for cement industry. It will broaden the platform of financing and investment.

(2) Hold the consultation meeting of financing and show project of financing and investment in the focal area;

(3) Introduce the national and local industry policy;

(4) Introduce the national and provincial which support SME in financing;

(5) Finance enterprises which have intentional investment sign the financing and investment agreement with the cement enterprise.

4.4 Conduct Training for the Technicians in the New Dry Cement Enterprise

Time: Jan 2006—Dec 2009

Objective: Meet the requirement of the new dry cement enterprise.

Activity:

(1) Site visit in the new dry cement enterprise and analyzed the requirement of the training;

(2) Contact with the university, academy and scientific research institute to transmit the requirement of the training;

(3) The trainings combine full-scale education and short-term training, common knowledge and special knowledge, theory training and practical training;

(4) Assist the enterprise in human resource.

4.5 Assist the Relevant Provincial Department in Environmental Protection and Safety Examination in the Cement Enterprises

Time: Jan 2007—Dec 2010

Objective: Strengthen the power of executing the law on environment protection and safety.

Activity:

(1) Assist the relevant department in survey on the implementation of the policy and standard for environment protection and safety;

(2) Conduct trainings for the industry on environment protection and safety policy and standard;

(3) Assist the relevant department in Environmental Protection and Safety Examination in the Cement Enterprises.

4.6 Strengthen the Geological Prospecting and Exploitation Plan for Resources

Time: Sep 2007—Oct 2008

Objective: Strengthen the prospecting and comprehensive use of limestone.

Activity:

(1) Conduct survey on the prospecting and comprehensive use of limestone in Guangdong;

(2) Submit the survey report to the government;

(3) Promote the government to establish the plan for the prospecting and synthetical

using of limestone.

4.7 Prepare for Replacement of Cement Permit

Time: Jan 2007—Dec 2007

Objective: Promote the enterprise to adjust the structure and encourage the advanced enterprises.

Activity:

(1) Conduct training for replacement of cement permit;

(2) Set up the consulting expert team for replacement of cement permit.

Annex 13.1

Plan for the Training Workshop on Capacity Building of LPIC

According to contract, the subcontractor will organize the training workshop on the capacity building of LPIC on Sept 11, 2005. The trainees will learn more information of domestic and international energy situation, energy conservation policy and advanced energy conservation mechanism, deeply understand the objective, significance, mode and procedure, and exchange the experience of LPIC establishment and pilot enterprises establishment for the participants from replication area through this training. The detailed schedule is as follows.

1. Date

September 11, 2005

2. Venue

Kaiyuan zhijiang Hotel in Hangzhou City

3. Trainee

Principals of LPICs in demonstration and replication regions, managers of pilot enterprises and representatives of replication enterprises

4. Agenda

Time	Activity	Topic	Speaker
8:30-9:10	Training	Current Status of LPIC Establishment	Mr. Wang Xiwu, Senior Administrator of PIC Secretariat
9:10-10:10	Training	Project Review and Prospect	Ms. Wang Guiling, Deputy Director of PMO
10:20-11:00	Training	Domestic and International Energy Situation	Mr. Dai Yande, Deputy Director General of Energy Research Institute of NDRC
11:00-11:40	Training	Energy Conservation and Management in Industrial Enterprises	Prof. Meng Zhaoli of Tsinghua University
12:00-13:00	Lunch		
13:00-16:00	Visit		
16:00-17:00	Training	Policies on Energy Conservation and Implementation in China and VA Dissemination in TVEs	Mr. Tian Yishui, Senior Engineer of CAAE
17:00-17:40	Training	LPIC Action Plan Design Achievements and Problems Needed to be Noted	Ms. Zhou Hong, the Deputy Division Director of TEDC
18:00-19:00	Dinner		
19:00-20:30	Discussion	Capacity Building of LPIC	

Annex 13.2

Report on the Current Status of LPIC Establishment

1

1.Objective and Requirement of LPIC

—As the main component of barrier removal mechanism, the objective of LPIC establishment is as follows:

- assist the pilot TVEs in completing the technical upgrading
- facilitate the TVEs to sign the VA with local government
- formulate the action plan and disseminate the experiences and mechanism of pilot project.

—The requirement is 20 LPIC will be established in the 8 pilot areas and other replication areas when the project is completed.

2

2. Progress of LPIC establishment

- The LPIC establishment consists with the pace of pilot and replication TVE' construction
- The subcontractor selected through the bidding will assist the local government in completing the establishment.

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2. Progress of LPIC Establishment-Phase I

Implemented by Township Enterprise Development Center of MOA (July, 2003 to June, 2004)

	Pilot area	Time of establishment	Member parties	Survey report	Action plan	Monitoring and evaluation report
Phase I	Xinjin County of Sichuan Province	March 25,2002	Office of County Government, Information Office, SME Bureau, Environmental Protection Bureau, Land Resource Bureau, Construction and Planning Bureau	done	done	done
	Dalian City of Liaoning Province	Sep. 8, 2003	Dalian TVE Bureau, Science and Technology Bureau, Environmental Protection Bureau, Finance Office	done	done	done
	Huangshi City of Hubei Province	Sep. 10, 2003	Office of District Government, Statistic and Price Bureau, Economic Development Bureau, Science and Technology Bureau, Environmental Protection Bureau, Agric-forest Bureau, Laohushan Community Committee, ABC Taishan Office	done	done	done
	Nanjing Jiangning District of Jiangsu Province	Aug.27, 2002	Office of District Government, Finance Bureau, Science and Technology Bureau, Environmental Protection Bureau, Agricultural Bank, Planning and Economy Bureau, Moling Foundry Factory	done	done	done

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2. Progress of LPIC Establishment-Phase II

Implemented by Township Enterprise Development Center of MOA (June, 2004 to March 2005)

	Pilot area	Time of establishment	Member parties	Survey report	Action plan	Monitoring and evaluation report
Phase II	Tongxiang City of Zhejiang	Oct. 8, 2004	Finance Bureau, Science and Technology Bureau, Environmental Protection Bureau, Tongxiang Branch of ABC, Hezhuo Township Government, Zhejiang Shenhe Cement Ltd.	done	done	uncompleted
	Yingde City of Guangdong	Jan. 13, 2004	Economic and Trade Bureau, EPB, Government office, Local Branch of Agriculture Bank, Financial Bureau of Yingde City	done	done	uncompleted
	Baqiao District of Xi'an of Shanxi Province	June 14, 2004	Economic and Trade Bureau, Science and Technology Bureau, Construction Bureau, Land Resource Bureau, Agriculture Bank of Baqiao District	done	done	uncompleted
	Shanxi Province	Feb. 28, 2005	Financial Bureau, SME Bureau of Shanxi Province, Economic Committee, Science and Tech Office of Shanxi Province	done	done	uncompleted

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3. Progress of LPIC establishment-Phase III

- LPIC establishment in replication areas in Phase III (Aug. 2005 to April. 2006)
- Implemented by Township Enterprise Development Center of MOA
- The adjustment of supporting unit and the scope of LPIC has been done

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3. Progress of LPIC establishment Phase III

Replication area	Sector	LPIC supported Unit	Number of replication enterprises
1. Shuangliu County of Chengdu City	Brick	TVE Bureau of Shuangliu County	6
2. Liaoning Province	Brick	Wall Materials Reform Office of Liaoning Province	19
3. Xinyang City of Shanxi Province	Brick	Wall Materials Reform Office of Xinyang of Shanxi Province	11
4. Xi'an of Shanxi Province	Brick	Association of Wall Materials Industry of Xi'an of Shanxi Province	13
5. Guangdong Province	Cement	Cement Association of Guangdong Province	8
6. Zhejiang Province	Cement	TVE Bureau of Zhejiang Province	6
7. Nanjing City of Jiangsu Province	Foundry	Foundry Association of Nanjing of Jiangsu Province	10
8. Jincheng City of Shanxi Province	Foundry and coking	TVE Bureau of Jincheng City	5
9. Linfen City of Shanxi Province	Foundry and coking	SME Bureau of Linfen	9
10. Jinnan District of Tianjin City	Coking	SME Bureau of Jinnan District of Tianjin	7
11. Jinzhou District of Dalian	Coking	Economic and Trade Bureau of Jinzhou District of Dalian	8

4. Main Contents of LPIC Establishment

4.1 Main tasks have been done in the 8 pilot areas

–survey in the four sectors and analysis on the barriers for technical upgrading

–established the LPIC and drafted the statute

–drafted the VA for pilot TVEs and signed the VA

–formulated action plan

4.2 Monitoring and evaluation of four LPIC established in phase I

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5. Output of LPIC (1)

5.1 Facilitate the technical upgrading in the pilot TVEs. Technical upgrading in 7 among 9 pilot TVEs has been completed.

- Drafted and signed the VA
- Assisted the TVEs in financing for technical upgrading which amounted to 500,000 Yuan.

  LPIC of Xinjin County recommended Yongxing Shale Brick Factory as demonstration TVE on financing among SMEs; LPIC in Jiangbing District help Nanjing Moling Casting Factory get 200,000 Yuan for technical upgrading.
- Pushed the implementation of taxation and administrative policy

  Policy on Forbidden of Solid Clay Bricks

  Policy on Exempt Added-Value Tax
- Policy recommendation

  LPIC of Shanxi Province promoted the technical standard for "clean" heat recovery oven, and recommended that the same standard should be used for both large-scale mechanical coking ovens and clean ovens.

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5. Output of LPIC (2)

5.2 Facilitate the replication of pilot experiences

- Selection of the replication TVEs in Xinjin and Shuangliu County of Sichuan Province.
- Selection of replication TVEs with assistance from TVE Bureau of Shanxi Province
- In the current selected 118 replication TVEs, 60 brick making TVEs, 31 foundry TVEs, 7 coking TVEs were selected with the assistance from LPIC and they have been listed in the action plan.

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5. Output of LPIC (3)

5. 3 Play the role of NGOs

- Guangdong Cement Association played role in the project
- Establishment of Self discipline Association was facilitated by LPIC in Xinjin Country of Sichuan Province

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6. Conclusions

1) It is feasible and necessary to establish LPIC, but it should be integrated in to tasks of local government
   -- LPIC of Shanxi Province cooperated with Provincial Government to implement the adjustment to coking industry
   -- LPIC in Yingde City supported the development of pillar industry
2) Diversity of LPIC
   --Diversity of supporting agencies (TVE Bureau, SME Bureau, Wall Materials Reform Office, NGOs)
   --Diversity of space levels (county, city and province)
3) Unbalance of development
   A few LPICs didn't conducted the activities drafted in the Action Plan. Communication between PIC and LPIC should be strengthened.
4) Tasks in the next phase
   -- improvement of the established LPIC
   -- establishment of 11 LPICs in replication area
   -- monitoring and evaluation of LPIC in the pilot area

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Global Environmental Facility (GEF)
United Nations Development Programme (UNDP)
United Nations Industrial Development Organization (UNIDO)
Ministry of Agriculture, China (MOA)

Energy Conservation and GHG Emissions Reduction in Chinese TVEs – Phase II

Project Review and Prospect

PMO
September, 2005

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Contents

1 Introduction
2 Project Progress
3 Project Impacts to Macro-Policies and Market Development
4 Project Experiences
5 Discussion
6 Next Step

14

1 Introduction

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1.1 Project Background

- Importance of TVEs in China's Economic and Social Development
  - Number of TVEs: 21,850,000
  - GDP: 30.6% of the nation's total
  - Job Created: 135,700,000
- Main Issues
  - Small in size, outdated technologies, underdeveloped labor, low energy efficiency, and severe pollution
- Features of Brick-Making, Foundry, Cement, and Coking Sub-Sectors
  - 10% of total TVE output
  - 56% of total TVE energy consumption
  - 1/6 of China's total CO_2 emissions

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1.2 Project Preparation

- The first Phase of the project was approved and started in 1998.
- Main Outputs:
  - Surveys among the four sub-sectors, identification of barriers, and recommendation for energy conservation and GHG emissions reduction.
  - Training materials for the four TVE sub-sectors' energy efficient technical renovation.
  - Project document for phase II.

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1.3 Project Outline

- Start time:
  - 2000
- Institutional Arrangement
  - Funded by: GEF/UNDP
  - Executed by: UNIDO
  - Implemented by: MOA
- Total Investment
  - GEF: US$ 7,992,000
  - Chinese government and others: US$ 10,550,000
- Project Duration
  - June 2001—Dec 2005

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1.4 Project Objectives

This project is to reduce GHG emissions in China from the TVE sector by increasing the utilization of energy efficient technologies and products in brick-making, metal casting, coking, and cement sectors. The project removes key market, policy, technological, and financial barriers to the production, marketing and utilization of energy efficient technologies and products in these industries.

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1.4 Designed Outputs

- Institutional Mechanisms
  - Policy Implementation Committee (PIC) and Local Policy Implementation Committees (LPICs)
  - Production Technology and Product Market Consortium (PTPMC), i.e., Hongyuan Company
  - Revolving Capital Fund (RCF): US$ 6 million inception fund, which will be expanded to US$ 10 million or develop new alternative funding vehicles by the end of the project.
- Construction of Pilot Projects and Demonstration Regions
  - 8 pilot projects and 8 demonstration regions
  - CO_2 emissions reduction from the 8 pilot TVEs: 85,000 tons
- Post-pilot pipeline projects and Replication Regions
  - Over 100 post-pilot projects and 20 replication regions

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2 Project Progress

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2.1 Summary

- Project Implementation Featured by Four Stages :
  - Jun.2001-Aug.2002: preparation and fundamental construction
  - Aug.2002-Aug.2003: breakthrough in institutions and mechanisms development
  - Aug.2003-Aug.2004: substantial progress in project implementation
  - Aug.2004-Dec.2006: fully accomplish the project objectives

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2.2 Major Implemented Activities

2.2.1 Fundamental Construction
2.2.2 Sectors Survey
2.2.3 Construction of Pilot Projects
2.2.4 Construction of Post-Pilot Pipeline Projects
2.2.5 Institutional and Capacity Building
- LPIC
- RCF
- Hongyuan Co. (PTPMC)

2.2.6 Trainings
2.2.7 Public Dissemination

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2.2.1 Fundamental Construction

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2.2.1 Fundamental Construction

- Establishment of PIC and its secretariat
- Appoint national project director (NPD)
- Set-up Project Management Office (PMO)
- Organize PTPMC secretariat
- Establishment of RCF secretariat

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2.2.2 Sectors Survey

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2.2.2 Sectors Survey

Through the survey among the four sub-sectors, information about technical status, industrial policies, and businesses' needs were collected and analyzed, laid solid foundation for implementing follow-up project activities.

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2.2.2.1 Findings of Cement Sector Survey

- National total output is 863 million tons, among which 24% from rotary kilns and the rest from shaft kilns.
- New dry-process circular kilns over 2,000 t/d are encouraged by national policies, while new shaft kilns and rotary kilns without heat-exchange equipment are strictly forbidden.
- There are 1314 rotary kiln production lines; among which 400 lines are larger than 2,000 t/d in capacity; only 30 lines have adopted waste heat power generation technology.
- There are 5118 shaft kiln production lines, which accounts for 81.7% of the total number of cement kilns. Shaft kilns will exist for a long time in the future, esp. in Mid-West China.

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2.2.2.2 Findings of Brick Making Sector Survey

- There are 100,000 brick mills; produce 800 billion pieces per year; use 100 million tec of energy; exist big potential for energy savings.
- It is encouraged by national policies to produce building materials with perforate rate over 25%, and bricks made of industrial slag; it is strictly forbidden to use clay bricks in coastal areas and the places where in short of clay resources.
- The mills using Hoffman kiln account for 99% of national total; and the mills using nature air-drying process account for 90% of the total. These are the major targets of energy saving in the sector.

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2.2.2.3 Findings of Coking Sector Survey

- Total 700 coking plants in China; about 1900 ovens of various types; annual output of 178 million tons of coke. The annual output in Shanxi Province takes 55% of the national total, which put it an important region in the project.
- GOC encourages building mechanical ovens with a coking chamber higher than 4.3m, and eliminate indigenous, improved and small-scaled mechanical ones.
- Clean type heat recovery oven is a new technology in China, recommended as a "Two-high and one new" technology by former State Economics and Trade Commission. Shanxi provincial government has recognized it, together with the large-scaled mechanical oven, as encouraged coking technologies.

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2.2.2.4 Findings of Metal Casting Sector Survey

- National annual output of castings is 14,880,000 tons, ranking the first in the world, among which gray cast iron castings accounts for 60.47%, ductile iron for 13.16%, cast steel 10.68%, and non-ferrous metal 5.9%. Almost half of foundries are TVEs, which also share half of the total output.
- Generally TVE foundry plants are outdated in process and equipment; low in energy efficiency and high in reject rate. Energy consumption of each ton of cast iron and cast steel are 0.55-0.77 tce and 0.800-1 tce, respectively, which is 20% higher than those in the developed countries.

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2.2.3 Construction of Pilot Projects

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2.2.3 Construction of Pilot Projects

- # of Pilot Projects: 9

-only 8 in project document

- Total Investment: over US$ 40 million

-among which, project direct investment US$ 750,000

- Anticipated Energy Savings: 132,981 tce/a; CO_2 Emissions Reduction 331,523 tons/a

-only 32,000 tce/a and 80,000 t (CO_2)/a in project document

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2.2.3 Construction of Pilot Projects

Principles of Pilot Projects Selection

- Clear ownership
- Strong comprehensive capacities of management (business, environmental awareness, and entrepreneurship)
- Solid business and financial credit; good market prospect
- Enthusiasm to participate GEF project (business, local government)
- Technologically in line with the national industrial policies after renovation
- Geological advantage for demonstration

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2.2.3 Construction of Pilot Projects

Cement	(3 projects)	Zhejiang Shenhe Cement Company Baojiang Cement Material Co. Ltd. Huangshi Lufeng Cement Co. Ltd.
Coking	(2 projects)	Taiyuan Gangyuan Coke Company Xinggao Coking Group
Brick-making (2 projects)		Yongxing Shale Brick Company Xi'an Lincun Hollow Brick Plant
Metal Casting (2 projects)		Nanjing Moling Foundry Dalian Jinmei Cast Pipe Co. Ltd

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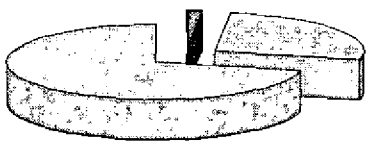
2.2.3 Establishment of Pilot TVEs

(10,000 US$)

Pilot TVE	Time	Total investment	Funded by project	Loan	Self-financing	Estimated Loans	Energy savings (tce)	CO2 emission reduction (tCO2)
Zhejiang Shenhe Cement Company	2005.03	215	10	185	0	20	8,319	20,242
Huangshi Lufeng Cement Co. Ltd.	2005.10	50	7	20	23	-	9335	23373
Baojiang Cement Material Co. Ltd.	2005.10	2180	10	400	1770	(20)	24265	60493
Taiyuan Gangyuan Coke Company	2006.06	725	10	100	615	-	41364	103120
Xinggao Coking Group	2005.05	810	10	400	400	(20)	45960	114578
Nanjing Moling Foundry	2005.12	120	10	-	110		1597	3981
Dalian Jinmei Cast Pipe Co. Ltd	2005.8	64	6	20	24	20	152	381
Yongxing Shale Brick Company	2005.04	31	6		25	-	1476	3681
Xi'an Lincun Hollow Brick Plant	2005.06	37	6	-	31	(10)	669	1670
Total							132981	331523

2.2.3 Construction of Pilot Projects

Investments



■Project fund □Loans □Self-financing

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2.2.3 Construction of Pilot TVEs *

*Adjustment of pilot technology for EE Reasons:
Technical development in TVE sector, plus significant adjustment of industrial policy in China Adjustment:

Sector	Initial pilot technology	Renewed pilot technology	Detail reasons and significance of adjustment
Coking	Power generation with waste heat from 89 Type coking oven	Power generation with waste heat from "Clean Type Coking Oven"	Forbidden by industrial policy in China
Cement	Renovation for EE on 88,000 t/a shaft cement kilns	Renovation for EE on 88,000 t/a shaft cement kilns	Shaft kilns are still widely used in many regions, and will exist for a long time in the Midwest regions in China.
		Replacement of shaft kilns with rotary kilns	*Provide technical demonstration to replace outdated* process - shaft kiln.
		Power generation with waste heat from rotary kilns	Provide technical demonstrations of energy efficient technology on rotary kilns that have been developed initially in a certain scale.

2.2.3 Construction of Pilot TVEs *

Significance of the adjustments

Make prominently the identified pilot technologies be more advanced for a better demonstration thereby place a solid foundation of the sustainability of the project.

- **Both in line with the current industrial policy and the *development trend in future***
- **Expanded areas for technical replication**
  - **cement: expanded pilot technology for not only shaft kilns but also rotary kilns**
- **Increased target of energy conservation and GHG emissions reduction.**

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2.2.4 Establishment of Post-Pilot TVEs

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2.2.4 Establishment of Post-Pilot TVEs

- Anticipated post-pilot TVEs: over 115
  - Post-pilot TVEs designed in the Project document:100
- Tasks of SC of replication projects in foundry and brick-*making sectors expanded from only feasibility study to* project implementation
  - Tasks designed in the project document: to conduct feasibility study for all replication projects in the 4 sub-sectors

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2.2.4 Establishment of Post-Pilot TVEs

- General Guidelines:
  - *To select post-pilot TVEs and replication regions on the basis of* project results and technical support, so as to conduct replication activities in energy efficiency, in line with the national industrial policies and the industrial characters, while cooperating with the local governments for energy efficiency.

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2.2.4 Establishment of Post-Pilot TVEs

Principles of Post-Pilot TVEs and Replication Regions' Selection

- Replication Regions:
  - Emphasis on energy efficiency by local government
  - Geological centralized
- Post-Pilot TVEs:
  - TVE scale and equipment satisfying the national industrial policies
  - Clear thoughts for technical renovation
  - Capital

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2.2.4 Establishment of Post-Pilot TVEs –Brick-Making Sub-Sector

Subcontractor	Contract Date	Duration (Months)	Expected CO_2 emi. red.(tCO_2)	Project Investment (US$)	Number of Non-TVEs	Contents/Objectives
Shanxi (#1)	Mar.2005	6	15,000	120,000	15	Feasibility study and execution
Xianyang (#2)	Mar.2005	6	14,000	168,000	14	Feasibility study and execution
Shenyang (#3)	Mar.2005	6	16,000	192,000	16	Feasibility study and execution
Chengdu (#4)	May 2005	6	15,000	180,000	15	Feasibility study and execution
	Total		*60,000*	*720,000*	*60*	

- Project investment: $12,000 spares; the consulting services and engineering services comprise 30 percent of the total budget, while 70 percent reserved for equipment purchase and construction.
- Ratio of TVE's co-financing is at least 4:1.

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2.2.4 Establishment of Post-Pilot TVEs – Cement Sub-Sector

Subcontractor	Contract Date	Duration (Months)	Expected CO_2 emi. red.(tCO_2)	Project Investment (US$)	Number of Non-TVEs	Contents/Objectives
#1	Supposed to be May 2005	5	205,000	200,000	10	Feasibility study on waste heat power generation
#2	Supposed to be May 2005	5	205,000	200,000	10	Feasibility study on waste heat power generation and change from shaft kiln to circular kiln
	Total		*410,000*	*400,000*	*20*	

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2.2.4 Establishment of Post-Pilot TVEs -- Metal Casting Sub-Sector

Subcontractor	Contract status	Duration (Months)	Expected CO_2 emi. red.(tCO_2)	Project Investment (US$)	Number of Non-TVEs	Contents/Objectives
Tianjin (#1)	For bidding	6	3,500	105,000	7	Feasibility study and execution
Dalian (#2)	TOR	6	3,500	105,000	7	Feasibility study and execution
Nanjing (#3)	TOR	6	5,000	150,000	6	Feasibility study and execution
Shanxi (#4)	TOR	6	5,000	150,000	6	Feasibility study and execution
Total			*17,000*	*510,000*	*26*	

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2.2.4 Establishment of Post-Pilot TVEs – Coking Sub-Sector

Subcontractor	Contract status	Duration (Months)	Expected CO_2 emi. red.(tCO_2)	Project Investment (US$)	Number of Non-TVEs	Contents/Objectives
Coking application	for bidding	6	756,000	210,000	7	Feasibility study on waste heat power generation
Total			*756,000*	*210,000*	*7*	

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2.2.4 Establishment of Post-Pilot TVEs

Sector	Number of Post-Pilot TVEs	Expected CO_2 emi. red.(tCO_2)	Project Investment (US$)	Location
Brick making	60	60,000	720,000	Xi'an,Xianyang, Shenyang, Chengdu
Cement	20	410,000	400,000	Hebei, Jiangsu, Zhejiang, Jiangxi, Henan, Fujian, Guangdong, Chongqing
Metal Casting	34	17,000	510,000	South district of Tianjin, Jinzhong city, Fenhe city, Jinzhou district of Dalian city, Nanjing
Coking	7	756,000	210,000	Shanxi
Total	*121*	1,243,000	1,840,000	

-To over-fulfilled the task defined in project document, renovation in brick and foundry sectors changes to be feasibility study and execution, from merely feasibility study.

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Table 1 Basic Data of Foundry Industry in Linfen, 2004

No. of enterprises			Staff employed /10,000 persons	Production capacity/ 10,000 tons	Main products
200			2	72	20 series and over 50 varieties including (car fittings, cast iron tube, equipment for exercising, radiators and daily castings)
Less than 1,000 tons per year	1,000 -10000 tons per year	Over 10,000 tons per year			
160	20	20			

Table 1 shows the status of foundry industry in Linfen. Among the enterprises, there are over 20 enterprises with more than 100 staff. There are 20 foundry enterprises in the 428 enterprises with more than 5 million of sale income, which is equal to 1/21.

(1) Energy consumption

The total product of the enterprises in 2005 is about 840 thousand tons while the energy consumption of the foundry industry was 390 thousand tce in 2005 in Linfen, the energy consumption per unit was 0.464 tce per ton. During the field visit to Linfen, we felt that most of the enterprises have ignored the energy audit and management and few enterprises conducted the energy balance. Therefore the establishment of the energy management system will be played very important role in improving the local environment quality and technology innovation.

(2) Technical level

The technical level of foundry enterprises is quite different for there are not only modern enterprises but also small enterprises like handmade workshop. The miscellaneous techniques and process result in various foundry products.

Table 2 Basic Technical Status of Foundry Enterprises in Linfen

Foundry Technique	Wet casting, dissolved model, colophony sand
Meting Technique	Cupola single-melting, induction furnace single-melting, cupola —induction furnace duplex melting
Operation *Method*	Handwork, simple equipments, auto production line
Materials	Grey cast iron, alloy grey cast iron, ductile cast iron, cast iron for forging, cast steel
Degree of finish machining	Castings—deep processing, finished product

Table 3 shows that the main technical information sources of foundry industry in Linfen include network, association, colleges, scientific institutes, and foreign countries, which cover the 77% of all information sources. So it has high marketing level of the technical information. The industry has the basis and capacity for adopt and transfer the technology from market.

Table 3 Technical Information Sources of Foundry Enterprises in Linfen

Sources	Number of enterprises	Percentage %
Network	23	11.5
Associations	45	22.5
Colleges, universities and scientific institutes	61	30.5
Domestic enterprise	12	6
Foreign countries	25	12.5
Government agencies	9	4.5
Market	10	5
Friends	15	7.5
Total	200	100

It can be learnt from Table 4 that 9.4% of employees have got primary professional title. It reflects that it is necessary for the employees of foundry industry in Linfen to enhance their technical and educational level.

Table 4 Statistics of the Staff in Foundry Industry in Linfen

	Number	Percentage (%)
Total number of staff employed	22,600	100
High professional title	280	1.2
Medium professional title	719	3.2
Preliminary professional title	1,120	5
Junior or senior high school	15,200	67.3
Others	5,281	23.4

(3) Market

Shanxi has rich coal and iron resources, and is one of the largest casting production areas. Regarding the international market, after China entered WTO, surrounding countries like South Korea, Japan increase the importation of castings and materials from China. On the other hand, the export quantity of east Europe, Russia and Ukraine is not very large. It is advantaged situation for castings' export of China. Concerning the domestic market demand, it includes car industry, radiator industry, mine machine, engineering machines industry, etc which have large demand of castings. These industries consume 62% of the total output of castings. The demand for castings will be larger and larger because of the acceleration of western development and construction of small cities and villages.

Foundry industry has close relationship with iron meting industry and coking industry. At present, the pig iron and coke of Linfen are transported out of the city; the benefit is very small and affected by transportation conditions. It will not only lead the development of coking and foundry industry but also mitigate the trend of limited transportation capacity if the pig iron is processed into castings. Furthermore, the economic benefit will increase obviously. From the comparison of the price and benefit of coking and foundry, we can see that: the iron consumption of per ton castings is from 0.7 to 1.3 ton; the coke consumption of per ton castings is from 0.2 to 0.3 ton; the cost per ton castings is 1,700 to 3,000 Yuan; the benefit of per ton

castings is 400 to 2,300 Yuan, which is 4 times to 20 times more than that of pig iron. That is to say the benefit will be 100 million Yuan if the 1 million tons of pig irons are sold; the benefit will be 400 million Yuan to 2,000 million Yuan. After China entered WTO, the price will be consistent with international rules. Therefore if the cost will not change basically, more benefit will be got.

Table 5 Comparison of Price/Benefit of Iron Melting, Coking and Foundry

	Pig Iron	Coke	Foundry
Price (Yuan)	1,100-1,200	600-900	2,100-5,300
Benefit (Yuan)	100-120	80-100	400-2,300

The coke output of Linfen in 2005 was 18.44 million tons, increasing by 9.4% than last year. The total output of pig irons was 10.04 million tons, increasing 28.4% than last year. These provide good resource advantages for the development of foundry industry. However, for the castings are limited in middle and low level, the market competence is not strong.

(4) Financial source

Among all sources of capital of foundry enterprises in Linfen City, loans from bank and government investment cover 45.8%. The conclusion is that Lifen uses public resource of government to guide bank helping foundry industry. With the development of market economic of China, 50% of capital for technical renovation is from self-funding of enterprises currently, in which civil financing only occupies 4.17% (see Table 6).

Table 6 Capital Source for Technical Upgrading in Foundry Industry in Linfen

	Total investment	Self-funding	Bank loan	Government demonstration fund	Civil financing
Investment on technology renovation (10,000 Yuan)	1,200	600	450	100	50
Percentage%	100	50	37.5	8.3	4.17

It is found that banks prefer the large scale enterprises than SMEs regarding loans. Therefore, it is difficult for most foundry enterprises in access to loans.

1.2 Main Features of Foundry Industry of Linfen

(1) Private economic occupy most percentage. Among foundry enterprises in Linfen, over 90% of them are individual owned enterprises. Except several are state owned enterprises with ownership reformed and recomposed state owned assets, 50% of them are private enterprises with sole investment; 50% of them have the forms of private enterprises with Joint Venture, partnership and company limited. Some enterprises, like Shanxi Huaxiang Tongchuang Foundry Co. Ltd, are enterprises with three- part investment. For private economic occupy most percentage, the development mechanism is very flexible, but it is limited in financing, imports and exports.

(2) Pig irons are the only raw materials for castings. The types of castings include grey cast iron, cast steel, and ductile cast iron, etc.100% of these are made from pig iron. Some castings made from light metal, which has smaller density and higher added value and is more suitable for cutting, nearly don't emerge in Linfen. The

project on magnesium alloy die-casting of Yicheng Baoye is just in the phase of trial production. This project is the first one in China and advanced in the world.

(3) Products are mainly composed of four series including auto-parts, water-heating pipes, sport equipment and other castings. Among the castings in Linfen, the four series occupy 44.3%, 22.9%, 5.7% and 27.1% respectively. Shanxi Huaxiang Tongchuang Foundry Co. Ltd is the largest enterprise producing auto-parts. Its annual production capacity is 50 thousand tons. Quwo Qiaoshan Foundry Company is the largest enterprise producing water- heating pipes and its annual production capacity is 50 thousand tons. Linfen Huasheng Company is the largest enterprise producing equipments for exercising and its annual production capacity is 30 thousand tons.

(4) Sale networks for products are relatively fixed. Currently, most foundry enterprises have fixed sale networks. Domestic sale is the major part. Some enterprises with large scale and stable product quality have fixed contracts with national large enterprises.

(5) Export enterprises reach certain scale. Among the foundry enterprises, the market for some deep processing products with higher level is relatively stable and these products have entered international market. For example, products of Shanxi Huaxiang Tongchuang Foundry Co. Ltd and Shanxi Tangrong Auto-parts Co. Ltd have entered international market. The two companies have direct client on abroad and more products are exported. There are 10 enterprises like this, which covers 4%. There were nearly 50 thousand tons of castings exported in Linfen in 2002, which occupied almost 10% of the total amount.

1.3 Existing Problems in Foundry Industry of Linfen

Linfen Foundry Industry Association conducted a survey among the over 200 foundry enterprises. They found that the enterprises' scale was small and the locations were dispersive. There were a lot of problems existing in production equipments, technical level, product quality, productive efficiency, consumption of energy and resource, and environmental protection in the industry. A gap existed between current status and new industrialization. The main problems are shown as following:

(1) Difficulty in financing

Not only the national industrial policy, but also the financing support plays important role in an enterprise's development. But currently the bank system is mainly composed of four state-owned commercial banks. SMEs are short of financial agencies serving for them. Furthermore, for SMEs credit is not enough and they have relatively short life, the banks are reluctant to loan to them. It results that it is difficult for foundry enterprises to make financing and the development of enterprises is affected severely.

Although Linfen Municipal Government invested to establish a guarantee company for SMEs, for the credit evaluation grade policy of SMEs is not in accordance with that of banks, enterprises' financing is still difficult.

(2) Lack of professional technicians and low research level

Most foundry enterprises in Linfen face the problem of lack of professional staff, especially the managers and enterprisers with high level. According to the survey among the important enterprises, the technicians with preliminary professional title only occupy 5% of all employees in the industry; the technicians with senior professional title has the smaller percentage, that is 1.2% only. Workers in most enterprises aren't skilled enough, which results in low productive efficiency and qualified rate. The qualified rate is only 80% to 90%, some is just over 70%. The

absence of professional staff has results in the slow technical progress, slow production renovation rate, slow original capital accumulation and low efficiency.

(3) Low grade of product and low price

Although the foundry industry of Linfen develops to higher grade, there are few castings with high technical level and value added. For the low grade, the price of castings is only 2,100 to 5,300 Yuan per ton. The average price of exported castings was 651 US$ in China in 1999, while the average price of imported castings was 1,548 Yuan per ton. The price of export is just 42% of that of imported. Currently, only two enterprises in Jincheng, Shanxi Huaxiang Tongchuang Foundry Co. Ltd and Yicheng Huaer Foundry Co.Ltd, whose products' price can reach the average price of China. The price is so low that the profit is low and capital accumulation is slow.

1.4 The Plan for Establishment of Linfen Foundry Technical Research and Development Center

Foundry industry of Linfen has become the important pillar of equipments foundry industry of Shanxi for Linfen has the unique foundry resource and cost advantage. However, due to lack of technicians, low research level, etc, the industrial development is restricted. It is found in the survey that many foundry enterprises lose the opportunities for association with international famous enterprise for their low research level and products' quality.

In order to strengthen the capacity in technical research, development and creation of foundry industry of Linfen, Shanxi Tangrong Auto-Parts Company, Shanxi Huaxiang Tongchuang Foundry Co. Ltd and other enterprises are preparing to establish Linfen Foundry Technical Research and Development Center in association with other agencies. The center will be operated through market operation mechanism. The cooperation model includes enterprises' association and the combination of industry, colleges and research institutions. The purpose is to enhance the whole industrial technical level, promote the regional industrial integration and make the foundry industry and its forward and backward industries. A regional technical creative system will form for they share technology, use each other's advantage and develop together. This plan is accepted by other foundry enterprises and Shanxi Institute of Technology. The government's coordination and force is necessary to realize the idea for the basic condition is the association with different agency, different region and different industry.

2. LPIC Building in Linfen City

2.1 Establishment and Feature of LPIC in Linfen

For Linfen SME Bureau is the direct administration of foundry industry of Linfen, considering the actual status and demand of the industry, Linfen SME Bureau will establish LPIC and cooperate with Linfen Financial Bureau, Linfen Environmental Protection Bureau, Lifen Foundry Industrial Association, Shanxi Institute of Technology, and some pillar enterprises to form an effective coordination mechanism. It is helpful for the enterprises to implement the governments' work and replicate energy saving technology, organize cleaner production, and remove the market, technical, financing and information obstacle. Moreover, it is helpful for the establishment and operation of Linfen Foundry Technical Research and Development Center. The structure of LPIC is shown in Figure 1.

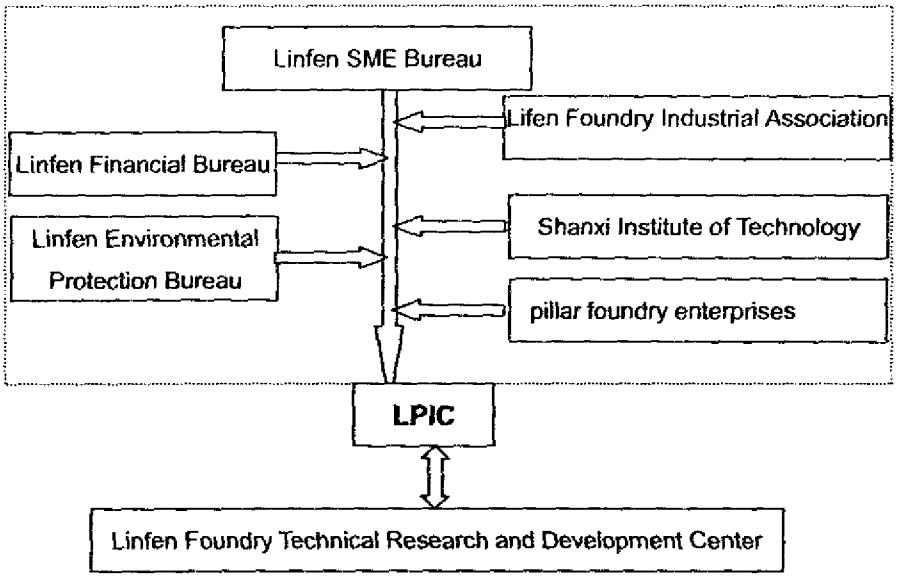

Figure 1 Structure of LPIC of Linfen

(1) Administration of Linfen SME Bureau

Linfen SME Bureau has the function of planning, guidance, supervision, coordination and service for SMEs of the city. It is responsible for making strategy of SMEs' development and the reform and structure optimization of SMEs, guidance on the technical progress, creation and renovation, establishment and standardization of supporting system for the SMEs' technical renovation. It is helpful for LPIC to work and replicate the energy saving technology. Furthermore, SME Bureau is responsible for the administration and use of Linfen SME and TVE development Fund, establishment and standardization of SME credit guarantee and financing system. It will promote foundry enterprises to remove financing obstacles. SME Bureau is in charge of personnel training and communication, technical information service for SME. It is helpful for foundry enterprises to remove technical and information obstacles, and driving the establishment of the Center. The conclusion is that Linfen SME Bureau, the administration of foundry industry, will play positive and important role in LPIC.

(2) Coordination of members of LPIC for establishment of Linfen Foundry Technical Research and Development Center

The objective of establishment of Linfen Foundry Technical Research and Development Center includes solving the technical problems existing in the production process of foundry enterprises, research and development of on common and key technical issues, acceleration of the commercialization of research output for the enterprises' benefit from technical renovation, and providing technical and consulting service to enterprises adjusting product structure. LPIC and its members should coordinate the establishment of Linfen Foundry Technical Research and Development Center and drive it for operation to become a research institution with high-level capacity in technical research and development and technical consulting and information capacity. It will enhance the scientific research level of foundry industry of Linfen for enterprises are the main body and its operation is guided by market.

(3) Promotion of government's work using technology as key point

The members of LPIC Linfen Financial Bureau, Linfen Environmental Protection Bureau and other government agencies and Linfen Foundry Industrial Association,

will strengthen the communication between government and enterprise. With the strong technical support of Linfen Foundry Technical Research and Development Center, LPIC will accelerate industrial policy making, promote technology through policy and form a positive circle. It will promote the technical progress, enhancement of product quality, and standardization of market.

(4) Enhancement of products' grade with combination of technology and policy

Products in low grade need small investment, but cause severe pollution and the profit are quite small. It is a kind of simple machining. Therefore, this kind of metal casting should be forbidden through policy for it is just like selling resources. Policy should guide and encourage the enterprises with production scale over 50 thousand tons, and enhance the technical level of products by technical support. The key point is to develop precision castings with advanced technique, high technical level and value-added, and to enhance the castings' grade.

2.2 Key Points of LPIC's Work

(1) Coordinate all government agencies, pillar foundry enterprises and colleges to promote the establishment and operation of Linfen Foundry Technical Research and Development Center;

(2) Cultivate and train foundry technicians for enterprises to form the positive circle and solve the personnel problem;

(3) Organize foundry experts, colleges and pillar enterprises to establish a consulting team, identify the problems existing in production, technology, equipment, management, energy consumption, and make technical renovation scheme according to the actual conditions;

(4) Help enterprises to establish energy management system, and improve the energy balance calculation and energy consumption statistic;

(5) Coordinate government to make preferential polices which encourage enterprises' development, create a good financing environment for enterprises and apply for national investment;

(6) Organize foundry enterprises to conduct credit evaluation and registration, and help enterprises to solve financing problems;

(7) Conduct trainings for entrepreneurs, technicians and information-based development, and technical visit on abroad, and strengthen technical communication and cooperation;

(8) Disseminate new castings with high technical level and value added.

3. Policies Related to Foundry Industry in Linfen City

The Eleventh Five-Year Plan for Economic and Social Development of Linfen issued on April 26, 2006 requires developing equipment manufacturing industry on the basis of foundry industry and the key point is machine processing and manufacturing. The direction is to realize the new development of traditional industry and large scale of new industry. The industry will accelerate washing out the lagged production capacity according to the principle is "total amount control, closing smaller and building larger, good quality and low consumption". The Plan also requires establishing and improving incentive mechanism for self-creation, encouraging technical renovation and invention, and extending the manufacturing industrial chain as "casting-machining-assembling- unit assembling of machinery". The key points are precision casting and assembling fittings. The industrial chain includes automobile, equipments for fire fighting, agriculture machines, family electric apparatus, mining

machines and construction machines, etc. The plan sets the target by the end of the Eleventh Five-year that the output of castings should reach 2 million tons, in which the precision castings reach 1 million tons and processing rate by machines reach 50%, and establishment of a national production and sale base for auto parts and equipments for fire fighting. The plan provides policy base for foundry industry in Linfen.

3.1 Policy on Reduction and Drawback of Value-added Tax for Foundry Enterprises

According to Notice on Reduction and Drawback of Value-added Tax for Castings and Forgings of MOF and National Administration of Taxation (FR No.2002-141), the value-added tax applied on castings and forgings produced for commercial purpose and sold by foundry enterprises to be used for machine production will be levied in accordance with the relevant regulation first and returned by 35% of the actual tax paid. The returned value-added tax will be used for the research and development of casting and forge products specially.

3.2 Credit Service System for SMEs in Linfen

Linfen established Credit Service System for SMEs in Linfen to implement the *Several Opinions on Encouragement, Support and Guidance for the development of Individual Economic and Other Non-state Owned Economic* issued by State Council [No. 3, 2005], *Several Opinions on Strengthening Administration in SMEs' Credit* issued by ten ministries according to *Notice on Promotion of SME Credit Reporting System in Economic Administration* issued by Provincial SME Bureau [No. 73, 2004] and *Opinions on Acceleration of Establishment of SME Credit Service System* issued by Linfen SME Bureau [No. 63, 2005]. It is helpful for improvement of the financing environment for SMEs and enhancement of awareness on credit radically. It is also a solid base for establishment of "Credit Linfen".

Guarantee agencies in the city and counties will be developed with the policy encouragement and financial support. The agencies will be guided to provide SMEs with credit guarantee service. 15 guarantee agencies with some scale, standardized management, perfect system, high professional level and good finance and credit condition. The guarantee capital of the city should reach 800-1,000 thousand Yuan by 2010; the guarantee loans provided to SMEs reach 3-5 billion Yuan by 2010. Linfen SME Service Center will apply for Linfen TVE Development Fund to invest guarantee capital 10 million Yuan to guarantee agency.

3.3 Special Fund for SMEs' Development and Fund for TVEs' Development in Linfen

On May 16 2005, Linfen Municipal Government issued *Executive Opinions on the Acceleration of the Development of Non-state Owned Economic* [No. 11, 2005]. According to *Chinese SME Promotion Law*, a special fund for non-state owned SMEs' development will be established. From 2005, Municipal Government will arrange 5 million Yuan in the financial budget as Special Fund for Non-state Owned SMEs' Development every year; Pingchuan County's investment will not be less than 3 million Yuan every year, Xiangning, Pu County, Gu County, Fen County and Fushan County arrange 1to 2 million every year, and other counties should not arrange less than 0.5-1 million Yuan. The fund will be used by SME Bureau for guidance and service for SMEs, technical renovation and personnel training. The Fund should increase every year based on the economic development and actual needs in the city and counties.

Meanwhile, Linfen Private Economic Development Bureau issued *Measures for Management of TVEs' Development Fund in Linfen* [No. 47, 2003]. According to TVE

Law of China, governments in counties, cities, provinces should establish TVE's Development Fund. The Fund will support the TVEs which adjust their product structure and industrial structure according to national industrial policy, support enterprises on technical renovation, development of new products, and development of new products with new and high technology.

3.4 Environmental Protection Polices

Linfen is an important industrial region in Shanxi Province. Linfen implements national and provincial environmental protection plan and projects when developing industry. The "Blue Sky and Green Water Project" in the "Eleventh Five-Year Plan" requires that all industries should conduct technical renovation, especially the coal, coking and foundry industry. Moreover, the cleaner production audit, environmental labeling and environmental certificate systems should be implemented in industrial enterprises according to the target of "increasing efficiency, reducing consumption, saving energy and controlling pollution".

Environmental problem is an important problem which Linfen is trying to solve for a long time. At the end of "Tenth Five-Year", Linfen regarded the environmental pollution control a fight and issued Executive Opinion on Implementation of Scientific Development View and Promotion of Sustainable Development. Linfen completed drafting the "Eleventh Five-Year Plan" first in the province and closed 1,906 small enterprises. Linfen Municipal Government incorporated the environmental protection indices into political performance evaluation system and required that the integrated index of environmental pollution of Linfen every year should have the biggest decrease in the province in the future; pollutants discharged per GDP should decrease 35%. Linfen will try to become provincial environmental protection demonstration city in "Eleventh Five-Year". Linfen Municipal Government made a working schedule for these tasks to accelerate the environmental pollution control, wash out and close enterprises which cause severe environmental pollution and waste resources, and oblige promotion of cleaner production standard for enterprises.

4. Brief Introduction of Replication Enterprises

After the assessment of products, production scale and process, management level and the enthusiasm on energy saving technology upgrading, this project selected 5 enterprises in Linfen City for the replication project. The average annual output value of 5 enterprises is over 10 million Yuan and their production processes are representative to some degree. Furthermore, these enterprises have strong willing to develop technology upgrading on energy conservation and emission reduction he basic information of replication enterprises are shown in Table 7.

Table 7 Basic information on Replication Enterprises

No.	Enterprise	Annual Output (ton/year)	Main Products	Main Equipments		Intent on Technology Renovation
				Name	Specification	
1	Shanxi Sanlian Foundry Co. Ltd.	5,000	cylinder block and head, engine body	Medium-frequency furnace	5-ton, 1 set	1. Equip front thermal analyzer; 2. Apply the high-quality insulation work slag-congestion
2	Shanxi Fengkun Foundry Co. Ltd	5,000	brake disc for car	Medium-frequency furnace	5-ton, 1 set 3-ton, 1 set	1. Equip front thermal analyzer; 2. Apply the high-quality insulation work slag-congestion; 3. Set up the heat preservation layer with aluminum silicate funicle.
3	Shanxi Huaxiang Tongchuang Foundry Co. Ltd	32,479	Castings for compressor of air condition, auto-parts	Cupola	5-ton, 1 set	1. Equip front thermal analyzer; 2. Apply the high-quality insulation work slag-congestion
4	Shanxi Tangrong Auto-parts Co. Ltd.	3,400	auto components as brake drum, wheel hub and spoke wheel sheave	Medium-frequency furnace	10-ton, 1 set 2-ton, 4sets 1-ton, 5 sets	1. Equip front thermal analyzer; 2. Apply the high-quality insulation work slag-congestion; 3. Set up the heat preservation layer with aluminum silicate funicle.
5	Yicheng Hua'er Foundry Co. Ltd.	30,000	cylinder body, lathe-parts, auto-parts	Cupola	5-ton, 3 sets 3-ton, 2sets 1 set of medium-frequency furnace	Equip front thermal analyzer; Apply the high-quality insulation work slag-congestion; Improve the lost foam pattern casting line.

5. Recommendations on LPIC

(1) LPIC should assist government agencies in strengthening supervision and administration on foundry industry.

For Linfen Municipal Government is in implementation of "Blue Sky and Green Water Project", LPIC may assist government agencies in strengthening administration on environmental protection and energy conservation in foundry industry of Linfen, and be responsible for service and guidance to strengthen the awareness on energy conservation and environmental protection in the industry. Moreover, regarding the low grade of current castings, LPIC may assist government agencies in optimizing the products' structure, encouraging the development of precision castings with high technical level and value added. LPIC should push the self discipline in the industry, and ensure the standardization of market through policy making to standardize the market and good conditions for enterprises.

(2) LPIC should guide foundry enterprises to expand financing resources to solve financing problems.

LPIC may guide foundry enterprises to establish many financing sources and realize the multi-subject of investment. LPIC will help and guide foundry industry in use of Special Fund of Linfen TVEs' development besides the civil capital and foreign investment. LPIC will organize the foundry enterprises to conduct evaluation and registration of credit grade to solve their financing problems.

(3) LPIC should instruct the technical renovation, technique innovation and technical training in enterprises and help enterprises develop capacity building.

Most foundry enterprises in Linfen only have low technical level and lagged techniques. LPIC will use Linfen Foundry Technical Research and Development as technical support agency to use the advanced technology and quality management. It will help enterprises with technical renovation, promote the innovation and disseminate the new products to promote industrial technical progress and improve the products' quality. LPIC will organize the technical training for the industry to enhance the capacity of foundry enterprises in obtaining and identifying technical information. It will reduce the unqualified rate and energy consumption, and save cost. LPIC may organize the enterprises go abroad for visits and communication, which will help enterprises to know the status on industrial development.

(4) LPIC should assist foundry enterprises in establishment of the energy management system, conducting of energy conservation and GHG emission reduction well and implementation of all environmental protection policies.

For Linfen Municipal Government is in implementation of "Blue Sky and Green Water Project", LPIC should help Linfen foundry enterprises in establishment of energy management system and implement national and provincial all environmental protection policies.

Annex 11.2

Statute of Policy Implementation Committee, Linfen City

General Provisions

Clause 1 the Policy Consultation and Coordination Committee of TVE project(hereinafter referred to as LPIC) in Linfen is an institution led by the Linfen mid and small enterprise bureau which is established to help foundry TVEs in Linfen to remove policy, technical, market and financing barriers in applying energy saving technologies.

Clause 2 The objective of the LPIC is to establish effective coordination mechanism, disseminate energy efficient technology, introduce high efficient management system at TVEs to produce high quality and energy efficient product thereby reducing energy consumption and GHG emissions and promoting the sustainable development of foundry TVEs in Linfen.

Organization of LPIC

Clause 3 The membership of the LPIC is comprised of seven parties including Linfen Financial Bureau, Linfen Environmental Protection Bureau, Lifen Foundry Industrial Association, Shanxi Institute of Technology, Shanxi Houma Tangrong Auto-parts Company and Shanxin Huaxiang Tongchuang Foundry Co.Ltd.

Clause 4 The LPIC have 8 delegates including one director and two deputy directors. The director of Linfen SME Bureau will act as the director of LPIC. one of the deputy directors is director of Lifen Foundry Industrial Association and the other is deputy director of Linfen SME Bureau. Other members are the leaders from Linfen Financial Bureau, Linfen Environmental Protection Bureau, Shanxi Institute of Technology, Shanxi Houma Tangrong Auto-parts Company and Shanxin Huaxiang Tongchuang Foundry Co.Ltd.

Clause 5 LPIC delegates, to be nominated by the director of the member Unit consulted and decided internally, the member shall serve a term of three years. If any member organization wishes to delegate its membership to a delegate from within the same office as the actual member a written application of such delegation should be submitted to the LPIC for approval.

Clause 6 The LPIC will instate one director and two deputy directors. The director of Linfen SME Bureau will act as the director of LPIC. one of the deputy directors is director of Lifen Foundry Industrial Association and the other is deputy director of Linfen SME Bureau. The deputy director can act as director in his absence. In addition to the normal duties and obligations of a member of LPIC, the director (or acting director) chairs meetings of LPIC, signs Minutes and formal correspondence of LPIC.

Clause 7 Under the LPIC, an office is established to be in charge of handling routine matters, conduct the activities required in the PIC's documentation and conference summary and communications with the PIC and the project management office of the UNDP/GEF Chinese TVEs Project. The office is located in the Linfen SME Bureau and the deputy director will act as the office director.

Clause 8 The three office staff includes the members of operation instruction branch of SME Bureau and three works of Linfen Foundry Industrial Association.

Functions of LPIC

Clause 9 Main responsibilities of the LPIC are, under the guidance and with the coordination of the national PIC and the national project management office, to facilitate to remove policy, market, technology and financing barriers encountered by the local foundry TVEs to policy enforcement. Detail responsibilities include the following.

1. Develop and implement action plan aimed at promoting regulatory reform related to the monitoring of energy efficiency at foundry TVEs, and facilitation of the transform of the project implementation into a market-oriented mechanism.
2. Facilitate the enterprise to adopt the VA and sign VA with SME Bureau.
3. Assist the enterprises in establishing the energy management system and implementing the technical renovation which meet the local conditions through the expert team.
4. Coordinate to establish Linfen Foundry Technical Research and Development Center. Take advantage of its strong technical ground to provide information on advanced national and international energy saving technology; conduct research and development of on common and key technical issues; accelerate the commercialization of research output for the enterprises' benefit from technical renovation, and strengthen the technical innovation in TVEs; form the cooperation among TVEs and combination of industry, colleges and research institutions.
5. Assist the enterprises in solving the financing problems through credit appraisal, registration and establishment of the credit grantee system for SME and the bridge of bank and enterprises.
6. Disseminate the newly foundry product with high technical level and value added, assist the government in formulating the preferential policy which encourage the standardized production.
7. Promote the enforcement of national and local policies, regulations and standards related to energy efficiency, technical renovation and environmental protection within foundry industry in Linfen.
8. Establish incentive mechanism to promote energy efficient technologies.

Clause 10 Responsibilities of member parties are:

1. Linfen SME Bureau shall be responsible for strengthening the support of other government agencies, organizing the united action of LPIC in Linfen, and integration of the LPIC's tasks into the work plan of the government.
2. Linfen Foundry Industrial Association shall provide the technical and information consulting service in Linfen during the process of product

structure adjustment, disseminate the new product and technology for the enterprise.

3. Linfen Financial Bureau will be responsible for macro management for the foundry industry and financial support.
4. Linfen Environmental Protection Bureau will be responsible for supervision on enforcement of the environmental protection law, putting forward the specific requirement for the technology upgrading and pollutant discharge and making the replication enterprises' discharge meet related standard.

Governance and working procedures

Clause 11 LPIC will operate by means of meetings, once half a year. The Director, or the Deputy Director in his absence will chair the meetings. A meeting will be considered duly valid if more than 50% of its members are present.

Clause 12 The LPIC Director may call temporary meetings as per the request of PIC, and the PMO. MOU will be formulated if needed.

Clause 13 Minutes of meetings and progress reports will be submitted to the national PIC on a regular basis.

Supplementary Articles

Clause 14 This statute will become effective after it is discussed and approved by all LPIC members. LPIC reserves the right for the explanation of this statute.

Annex 11.3

Action Plan of the LPLC in Linfen

1. Project background

The project of "UNDP/GEF Energy Conservation & GHG Emission Reduction in Chinese TVEs" has been funded by GEF. The aim of the project is to help Chinese TVEs that engaged in brick-making, cement, casting and coking to adopt energy efficiency technologies and to reduce GHG emission.

During the project's first phase, there are all kinds of obstacles to the adoption of energy efficiency technologies have been identified and evaluated and strategies to remove the obstacles have been formulated. During the second phase, it has been proposed to establish top-down PLC both at central and local level. The LPLC shall be the new mechanism to remove the policy obstacle and to promote energy efficiency in Chinese TVEs by adopting a market transformation approach. During the third phase, 11 replication areas will be selected to develop LPIC building and overcome the market, policy, technology and financing barriers to the adoption of energy efficiency technologies on the base of experiences in Phase I and II.

In order to achieve the objectives set for the project's third phase, to create a sound environment for the replication enterprises and the foundry industry that these enterprises belong to, to promote the implementation of policies, laws and statutes, to establish a mechanism favorable for enterprises to adopt energy efficiency and GHG emission reduction and to extend the experiences accumulated by the demonstration enterprises, the LPIC in Linfen has formulated the action plan.

2. Major Obstacles to Linfen TVEs' Adoption of Energy Saving Technologies

(1) The foundry enterprises have not paid more attention to the energy consumption. Few enterprises conduct energy balance calculation during the process.

(2) Most foundry enterprises in Linfen face the problem of lack of professional staff, especially the managers and enterprisers with high level.

(3)The technical innovation progress is very due to the lack of human resource and scientific and technology research. There are less foundry products with high tech with less competition.

(4) Due to the instability of SMEs development and lack of credit, the enterprises have the difficulties to get the financing support with influence the development.

(5) The enterprise credit grantee system is not consistent to banking policy, so the financing problems can not be solved ultimately.

(6) There is no such a department which should be responsible for solving the technical problems.

(7) There is no such an organization which should be responsible for providing technical service in energy conservation; there lack policies which encourage the new technology and energy conservation product.

3. Objective

3.1 *Short-term objective (2006-2008)*

(1) The government signs Energy Efficiency Voluntary Agreement with replication enterprises.

(2) The replication enterprises conduct energy saving technology upgrading and to

realize the objective of decreasing unit product's energy consumption by 10% (with the data of 2005 as baseline).

(3) To establish an effective mechanism for foundry industry's sustainable energy efficiency and GHG emission reduction.

3.2 Medium and long term objectives（2009-2010）

(1) In 2010, compared with the data of 2005 (baseline), the ultimate objective of decreasing unit product's energy consumption by 15% will be realized.

(2) To extend the Energy Efficiency Voluntary Agreement in foundry industry and to establish enterprises' self-improving mechanism to promote energy efficiency by adopting a market transformation approach.

4. Implementing Plan

4.1 Government signs EE Voluntary Agreement with promoted enterprises.

Time: October 2006-December 2008

Objective: Government signs Energy Efficiency Voluntary Agreement with replication enterprises; technical upgrading shall be finished before December 31, 2008, and unit product's energy consumption be decreased by 10% compared with the data of 2005(baseline). By December 31, 2010 unit product's energy consumption will be decreased by 15%.

Tasks:

(1) Identify the problems in process, technology, equipment and management and energy consumption based on the diagnosis for the enterprise by the experts organized by LPIC

(2) Consult with enterprises and formulate energy saving technology upgrading plans that are to be assessed;

(3) Conduct the survey to find out the barrier during the above-mentioned plan implementation.

(4) LPIC consults with local government and formulates incentive policy;

(5) Work out Energy Efficiency Voluntary Agreement together with replication enterprises;

(6) Provide technical and financial support;

(7) Sign Energy Efficiency Voluntary Agreement;

(8) According to the stipulations of Energy Efficiency Voluntary Agreement, the implementing progress of the tasks is to be supervised by the third party that has been confirmed by the parties involved in Energy Efficiency Voluntary Agreement;

(9) Summarize the experiences accumulated by replication enterprises and get ready for popularizing the experiences in foundry industry in Linfen.

4.2 Popularize Energy Efficiency Voluntary Agreement

Time: 2007

Objective: LPLC further popularizes Energy Efficiency Voluntary Agreement in foundry industry in Linfen.

Tasks:

(1) Conduct training for foundry industry in Linfen and publicize GEF project;

(2) Conduct survey of foundry TVEs in Linfen, disseminate the materials on energy conservation case and latest energy conservation;

(3) Collect information of TVEs that are willing to conduct energy efficiency technical upgrading. Encourage the enterprises to sign the VA;

(4) Sign the Energy Efficiency Voluntary Agreement with willing enterprises.

4.3 Set up the Expert Team who are from Universities, Pillar Enterprises and *Foundry Expert.*

Time: September 2006-January 2007

Objective: Set up an expert team, and conduct field visit, training, problems identifying, technical consulting timely in foundry industry. Find out the problems existing in production, technology, equipments, and management level and energy consumption through survey. Put forward technical renovation plan and conduct trainings according to the actual condition.

Tasks:

(1) Organize foundry experts from famous national universities, colleges in Shanxi Province, and technicians of important foundry enterprises.

(2) Conduct field visit to the Linfen foundry enterprises every 3 months from January, 2007, and technical innovation plan should be drafted.

(3) Conduct the technical training in foundry industry.

Time: May, 2007

Location: Linfen SME Bureau

Contents: technology of process, operation, management and improvement of the skill of operators, improvement of the energy conservation management system.

(4) Hold a technical consulting workshop every half year for the foundry industry.

Time: Feb, 2007

Location: Linfen SME Bureau

Contents: solving the technical problems existing in production together.

4.4 Establish Linfen Foundry Technical Research and Development Center

Time: September 2006-December 2007

Objective:

To become a scientific research institution with combination of industry, colleges and institutions; solve the technical problems existing in the production process of foundry enterprises, research and development of on common and key technical issues, acceleration of the commercialization of research output for the enterprises' benefit from technical renovation. It will enhance the scientific research level of foundry industry of Linfen for enterprises are the main body and its operation is guided by market.

4.5 Strengthen the Capacity Building of LPIC

Time: September, 2006 – July, 2007

Objective:

To strengthen the capacity building of Linfen LPIC which can let the Center play more important role in improving the energy conservation GHG emission reduction technology and develop the capacity of the staff in the foundry industry.

Tasks:

(1) Capacity building in process of establishment of Linfen Foundry Technical Research and Development Center.

(2) Establish the technical innovation and training departments with focus on the technical research and training.

4.6 Hold Workshop between Bank and Enterprises Timely

Time: every May, from 2007 to 2010

Objective: Building the good financing environment and assisting the enterprises in getting the financial support

Tasks:

(1)Organize credit appraisal and registration for the foundry industry;

(2)Coordination with credit guan tee institutions to formulate the relate policy;

(3) Coordinate financial enterprises including the four biggest state owned bank to participate in the meeting;

(4)Invite the foundry enterprise in Linfen to attend the workshop.

4.7 Disseminate Foundry Products with High Technical level and Value Added

Time: January, 2007 – July, 2008

Objective:

To encourage the enterprises to produce the precision castings with technical level and value added to improve the market competitiveness.

Tasks:

(1)Develop the precision castings with technical level and value added;

(2)Assist the government in formulating the privileged policy to encourage the enterprise to produce the precision foundry products, to realize the standard production.

4.8 Conduct the Training and Experience Exchange

Time: July, 2007—Dec. 2010

Objective: Capacity building for the enterprise to improve the capacity for the competition, disseminate the new technology and new product to achieve the objective of energy conservation and green house gas emission reduction.

Tasks:

(1)Conduct the training on the entrepreneurs in foundry industry timely;

Contents:

a. dynamic situation in foundry industry and market predication and current status analysis should be done by experts team.

b. new process, new technology and technical standard in foundry industry.

c. energy conservation management in foundry industry

(2)Hold the annual meeting of Linfen foundry industry

Time: every February

Contents:

a. introduction of the national and provincial the policy related the foundry industry development.

b. Foundry industry development planning in Linfen.

c. reward the best management practice enterprise and personnel.

d. experience exchange among the advanced enterprises.

e. Publish the barouche of energy conservation case study and dissemination.

(3) Conduct the field visit to pilot projects in Nanjing and Dalian

Time: October, 2007

Contents: learn the technology innovation and design in Nanjing Moling Foundry Co. Ltd, conduct the experience exchange of energy conservation and greenhouse emission reduction.

Time: October, 2008

Contents: learn the technology innovation in dalian Jinmei Foundry Company conduct the experience exchange of energy conservation and greenhouse emission reduction.

(4) On sit demonstration and dissemination workshop for replication enterprises will be organized in July, 2008 to disseminate the experience of VA

(5) The replication enterprises will be organized to visit the foreign foundry enterprises, conduct the international experience exchange, participate the exhibition if foundry product to expand the international market.

4.9 Improving the Dissemination

Objective: publicize the energy conservation and green house gas emission reduction, promote the awareness of energy conservation technology for the enterprises and public, strengthen the technology innovation in the area of energy conservation in process and improved the product quality in order to achieve the objective of CO2 emission reduction.

Time: Dec. 2006 to Dec. 2010

Tasks:

(1) Disseminate the policy and regulation on the energy conservation in foundry industry through the local newspaper, broadcasting, TV and internet.

(2) Publicize the information related to foundry industry development through the internet.

(3) Publicize the new process and product by use of board sample.

5. Follow-up and report of the action plan

According to local realities, LPIC formulates report on the previous year's work every January and works out *Annual Working Plan of LPIC of Linfen*. The report is to be submitted to national PIC secretariat before January 31. The secretariat is to collect all the submitted reports and reports to MOA's GEF office. All the reports are to be evaluated by the office and each action plan shall be revised according to the evaluation results.

2.2.5 Institutional Establishment and Capacity Building

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2.2.5 Institutional Establishment and Capacity Building

- To improve capacity of barriers removal through institutional establishment
  - 2.2.5.1 Establishment and operation of PIC
  - 2.2.5.2 Establishment and operation of LPIC
  - 2.2.5.3 Establishment and operation of RCF
  - 2.2.5.4 Establishment and operation of Hongyuan/PTPMC

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2.2.5.1 Establishment and Operation of PIC

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2.2.5.1 Establishment and Operation of PIC

- Consisted of:
  - representatives from the Ministry of Agriculture, the Ministry of Finance, the State Environmental Protection Administration, the Agricultural Bank of China, the State Development Planning Commission, the State Economic and Trade Commission, and the Ministry of Science and Technology.
- Establishment:
  - Compose the statute
  - Establish the secretariat

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2.2.5.1 Establishment and Operation of PIC

- Responsibilities:
  - Coordinating and making major decisions during project implementation;
  - Guiding and evaluating the work of the LPICs
  - Guiding and evaluating the work of Hongyuan
- Operations:
  - Hold project meetings in a timely manner
  - Conduct trainings to LPIC members and local government officials on relative policies and project implementation
  - Evaluate and monitor LPIC and VA
  - Check the Entrustment Loan operations

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2.2.5.2 Establishment and Operation of LPIC

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2.2.5.2 Establishment and Operation of LPIC

- Establishment :
  - Devise the statute
  - Devise the Action Plan
  - Design a monitoring and evaluation system
  - Capacity building

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2.2.5.2 Establishment and Operation of LPIC

	Pilot Regions	Host institute of the LPIC	Pilot TVEs	Status
1	Tongxiang, Zhejiang Province	Economic & Trade Bureau, Tongxiang Municipal	Zhejiang Sanshi Cement Co. Ltd	Completed
2	Yingde, Guangdong Province	Economic & Trade Bureau, Yingde Municipal	Guangdong Yingde Cement Material Co. Ltd	Completed
3	Tieshan District, Huangshi, Hubei Province	District Government, Tieshan	Huangshi Lifeng Cement Co. Ltd.	Completed
4	Shanxi Province	Provincial TVE Bureau, Shanxi	Taiyuan Gangyuan Coking Co. Ltd	Completed
			Gaoping Xinggao Coking Co. Ltd.	Completed
5	Xinjin County, Sichuan	Xinjin TVE Bureau	Xinjin Yongxing Shale Hollow Brick Plant	Completed
6	Baqiao District, Xi'an, Shaanxi Province	Baqiao TVE Bureau	Baqiao Lianhu Brick Plant	Completed
7	Jiangning District, Nanjing, Jiangsu Province	Jiangning TVE Bureau	Nanjing Meiling Foundry	Completed
8	Dalian, Liaoning Province	Dalian TVE Bureau	Dalian Jinzhou Pipe Casting Co. Ltd.	Completed

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2.2.5.2 Establishment and Operation of LPIC

- Operation:
  - Promote the application of the VA system
  - Assist in identifying post-pilot TVEs in the pilot regions
  - Facilitate the establishment of industrial self-discipline association
  - Facilitate the development and implementation of an incentive and penalizing mechanism
  - Exploit new financial channel (Xinjin SME security fund)
  - Provide guidance and support to the implementation of the technical renovation project in the pilot TVE

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2.2.5.2 Establishment and Operation of LPIC

Replicating regions	Sector	Host institute of the LPIC	No. of post-pilot TVEs
1.Shuangliu, Chengdu	brick	Shuangliu TVE Bureau	6
2.Liaoning	brick	Liaoning Provincial Wall Reform Office	19
3.Xianyang, Shaanxi	brick	Xianyang Municipal Wall Material Reform Office	11
4. Xi'an, Shaanxi	brick	Xi'an Wall Material Association	15
5. Guangdong	Cement	Guangdong Provincial Cement Industrial Association	3
6.Zhejiang	Cement	Zhejiang TVE Cement Association	6
7.Nanjing, Jiangsu	Foundry	Nanjing Foundry Association	10
8. Jinzhong, Shanxi	foundry/coking	Jinzhong SME Bureau	5
9. Linfen, Shanxi	foundry/coking	Linfen SME Bureau	5
10.Jinnan, Tianjin	foundry	Jinnan SME Bureau	7
11. Jinzhou, Dalian	foundry	Jinzhou Trade and Economic Bureau	6

2.2.5.2 Establishment and Operation of LPIC

- Reasons
  - Along with the reform of national macro-administration, the form of TVE administration becomes multiplying.
  - TVE administration is transiting from sole administration to governmental administration and industrial self-discipline.
  - To improve work efficiency, adjustment measures will vary according to the different situations of the replication regions.

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2.2.5.2 Establishment and Operation of LPIC

- Adjustments
  - Multiply the host institute of LPIC (e.g. Economic & Trade Bureau, TVE Bureau, SME Bureau, Industrial associations and Wall Material reform Office)
  - Multiply the level of replication regions: Levels of the project replication regions adjusted from the initial 20 counties to 2 at provincial level, 5 at deistic level and 2 at county level.

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2.2.5.2 Establishment and Operation of LPIC

- Results
  - Coordination capability and working efficiency of LPIC improved
    - Multi-level impacts of the project
  - Best practices and successful experiences of the project disseminated further
    - Coking and cement

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2. 2. 5. 3 Establishment and Operation of RCF

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2.2.5.3 Establishment and Operation of RCF

The implementation of the initial RCF design faced an insurmountable barrier due to the significant adjustment of China's macro-financial policy, thus making it the most outstanding task to explore and establish a new RCF form.

- The significant adjustment of China's financial policy (To establish any new Fund is strictly limited by the government)
- Reform of the national financial structure (To transform the ABC from an administrative bank into a commercial bank)
- Too small the amount of the initial investment

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2.2.5.3 Establishment and Operation of RCF

- Study of RCF form (1)

  8 Workshops were held between the MOA, ABC, PMO, PIC, subcontractors and international financial experts successively. 3 potential designs were identified through the workshops, including
  - A mechanism consisting of Entrustment Loan Facility, Commercial Loan Facility and Capacity Building Funds supported by Chinese Government （ELF for short）
  - Security Fund (Very limited amount can be secured due to too small amount of the fund)
  - Fund of TVE's capacity building for financing (fund cannot be revolved)

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2.2.5.3 Establishment and Operation of RCF

- Study of RCF form (2)

  Over 30 financial and legal experts from institutes of ADB, PBC, ICBC, ABC, EMC and Environmental Protection Fund were invited by the MOA for a workshop to deliberate the 3 proposed RCF designs. Most of the participants considered that the proposed mechanism of "Entrustment Loan Facility" is an innovative and best RCF form for the project implementation.

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2.2.5.3 Establishment and Operation of RCF

- Study of RCF form (3)

  In SARS time, a tele-conference was held between MOA,UNDP,UNIDO HQs, and ABC, in which the subcontractor introduced the thoughts, models, and foundation of the Entrustment Loan Facility design, and won all parties reorganization.

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2.2.5.3 Establishment and Operation of RCF

- Key points in Entrustment Loan Facility:
  - Funded and established cooperatively by GEF,ABC, and MOA
  - Hongyuan will entrust the GEF funds to ABC to make loans to the qualified TVEs.
  - ABC will make two million US dollars (in Chinese RMB equivalent) commercial loans to TVEs.
  - The Entrustment Loans will be bounded with the commercial loans to TVEs in support of technical improvement for the purpose of energy conservation and GHG emissions reduction.
  - One million US dollars (in Chinese RMB equivalent) from the Chinese MOA in support of project relative activities.

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2.2.5.3 Establishment and Operation of RCF

- Establishment
  - MOU signed between MOA, UNDP,UNIDO and ABC regarding the structure of the RCF
  - MOU signed between MOA, ABC and Hongyuan Company on the "Entrustment Loan Facility"
  - "Entrustment Loan Management Committee" established
  - Working procedures and management rules of the facility developed
  - ABC Notice about the Entrustment Loan Facility issued to ABC branches
  - Capacity building

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2.2.5.3 Establishment and Operation of RCF

- Operation:
  - Investigate financial needs of pilot TVEs
  - Publicize and train on the Entrustment Loan Facility
  - Take up and assess applications; make and monitor loans
    - Jinmei Pipe Casting Co. Ltd., $200,000, April 2005

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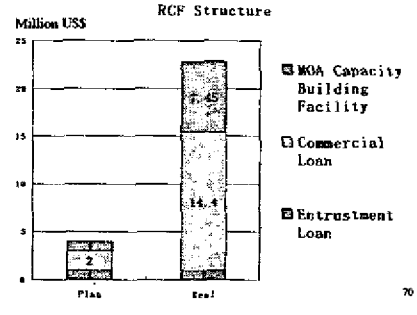
2.2.5.3 Establishment and Operation of RCF



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2.2.5.3 Establishment and Operation of RCF

- Exploit new financial channels
  - ESCO：Energy Service Company
  - ADB: Environment Fund, 2000
  - Sichuan Xinjin SME Security Fund

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2.2.5.4 Establishment and Operation of Hongyuan Company (the former PTPMC)

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2.2.5.4 Establishment and Operation of Hongyuan Company (the former PTPMC)

- Establishment
  - Development of Business Plan
  - Formulate statute
  - Fulfill the legal proceeding
  - Capacity building

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2.2.5.4 Establishment and Operation of Hongyuan Company (the former PTPMC)

- Expert team set up initially
  - Staffing:13
  - Expert team members: 40
  - Business partners: 40
- Portal website and internal Cooperative Platform established
  - http://www.jnip.com
  - Cooperative Platform
    - http://work.ptpmc.net
    - http://www.ptpmc.net

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2.2.5.4 Establishment and Operation of Hongyuan Company (the former PTPMC)

- Provide support to the sub-contract of Hongyuan's sustainable development
  - Manage the "Entrustment Loan Facility"
  - Manage SCs of the project
  - Assist in identifying post-pilot TVEs
  - Conduct technical training for energy efficiency and management in the 4 sub-sectors
  - Monitor the implementation of the VAs
  - Build up and maintain the project website

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2.2.5.4 Establishment and Operation of Hongyuan Company (the former PTPMC)

- Market exploration
  - Consult services
    - Feasibility study of 3 TVEs' projects to explore and use bio-energy
    - Technical consultation on industrial energy efficiency and build up a self-provide power plant for an agro-product processing TVE
  - Information system development
    - Developed 3 sets of information system for departments of MOA
      - Webgz.ptpmc.com
      - www.chome.gov.cn
      - An information system of Providing Scientific and technical information for rural household (to be put into operation)
  - CDM project

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2.2.5.4 Establishment and Operation of Hongyuan Company (the former PTPMC)

- Established close relationship with governmental authorities, associations, R&D institutes and EE product and service providers concerned. Initially built up a platform for providing EE services and management.
- By participating in the project implementation, improved its capability of project development, built up its business image on the market, accumulated experiences in providing service for energy efficiency and developed potential clients for its own.

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2.2.6 Trainings

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2.2.6 Trainings

- Special topics:
  - Policy and management
  - Project management
  - Energy efficiency technology and management
- Trainees
  - Representatives from PIC and LPIC, officials of various level of local governments, plant management, key technical staff of TVEs, Project staff, and EE product and technology providers.
- Scale
  - 1200 person-time

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2.2.6 Trainings

Trainings for Energy Efficiency

- 13 training activities conducted
- 670 TVEs benefited
- 900 people trained
- 370 questionnaires feedback
- 110 post-pilot TVEs identified

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2.2.6 Trainings

- Other trainings
  - 3 trainings on LPIC establish and its capacity building (incl. VA), 120 person-time participated;
  - Trainings on UNIDO's rules and regulations regarding RFP, over 100 person-time from 60 institutes and organizations participated;
  - Various types of trainings on project management, over 110 person-time participated (domestic/international)

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2.2.7 Project Publicizing

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2.2.7 Project Publicizing

- Objectives
  - Disseminate knowledge of energy efficiency and environmental protection
  - Raise EE awareness of local governmental officials
  - Publicize International Organizations' objectives and targets to support EE projects
  - Provide information to project stakeholders
  - Disseminate EE technology and successful practices of the pilot TVEs
  - Promote the progress of EE industrialization
  - Accelerate the project progress by mains of publicizing activities

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2.2.7 Project Publicizing

- Organize PIC meeting annually to publicize the project to governmental authorities and industries
- Publicize the project to local governmental officials and TVEs through trainings
- Publicize the project abroad through study tours (2 times)
- Making a video program to publicize new EE wall materials on the market and disseminate the project achievements
- Newsletter of the project
- Take part in local and international technical workshops to publicize the project

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3 Project Impacts to Macro-Policies and Market Development

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3. Project Impacts to Macro-Policies and Market Development

3.1 Impacts to Macro-Policies (1)

- Since1984, it is the first TVE energy-use surveys in the 4 sub-sectors at national level. It provides a solid foundation for drawing the 10-year national TVE energy resources development planning
- PIC and LPIC play a promoting role on the enforcement of industrial policy related to EE and environmental control by local governmental authoritative and TVEs.
- Through the project trainings and activities, policy-makers improve their environment awareness which will have direct influence in *policy-making at all levels.*

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3. Project Impacts to Macro-Policies and Market Development

3.1 Impacts to Macro-Policies (2)

- Cement:
  - The renovation project is the first power plant using waste heat (without fuel additives) from a cement kiln in China.
  - Accomplishment of the above renovation creates preferential policies to waste heat power generation in Zhejiang province (including free internet charge and simplified approval process)
  - In 2005, the technology is also listed as a key technology in the "National Medium-long-term Development Program for Energy Efficiency". Under the national project, about 50 power plants will be built up with this new technology annually.

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3. Project Impacts to Macro-Policies and Market Development

3.1 Impacts to Macro-Policies (3)

- *Brick sector:* promoted the enforcement of the national poly to forbidden the use of solid clay bricks.
- Coking sector: the identified pilot technologies of "Clean type coking oven" and waste heat power generation have been listed as focal points of the national "Shuang-gao-yi-xin" program, and one of the key technologies for dissemination by Shanxi Provincial Government.

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3. Project Impacts to Macro-Policies and Market Development

3.2 Impacts to the market

- Hollow bricks
  - Promoted the publicizing of the use of hollow bricks, improved market competitiveness of hollow brick producers.
- Cement
  - By supporting the transfer of shaft kiln to rotary kiln and disseminating the technology of waste heat power generation, the project promoted technical upgrading of the cement industry and accelerated cement product restructuring.
    (e.g. shaft kiln normally produces P.325/425 cement, while rotary kiln can produces P. 435/535 cement or even higher grade products. The market for low grade cement is

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4. Project Experiences

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4. Project Experiences (1)

Accumulated experiences (1)

- Effective communication and close cooperation (between MOF, UNDP, UNIDO, and MOA…)
- Capacity building in all levels—Learning by doing
- The established mechanism and institutes under the project have played a significant role. (LPIC、Hongyuan Company)
- To be in line with the general framework and the objective, make necessary adjustment thereby making the project progressing with the time.

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4. Project Experiences (2)

- Enthusiasm of local governmental authorities and TVEs to participate the project has been raised greatly. The project gets significant support and close collaboration from them.
- UNIDO's wise choice to appoint a CTA with rich project related knowledge and experiences as familiar with Chinese real situations.
- Communicate and cooperate actively with other similar projects to learn and draw lessons from their best practices. (e.g. Green Light, VA for EE in China, Energy Conservation on Industrial Boiler, etc.)

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5. Discussion

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5.1 Project Innovations and Adjustments in the Project

"Given its innovative nature, the barrier removal framework will be subjected to constant monitoring and, if necessary, modification."

extracted from the Project Document

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5.1 Project Innovations and Adjustments in the Project

Principles:

- To be in line with the project general objective, ensure the sustainability and typicality
- Adapt to the development of the national industrial policy
- Adapt to the strengthening demand of the government on energy efficiency and environmental control
- Adapt to the development of market economy

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5.2 Postpone of the Project **

- Reasons:
  - SARS
  - Adjustments and innovations
    eg: RCF, identification of the demonstration technology in coking sub-sector, and etc.

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5.2 Postpone of the Project **

- Positive Effects:
  - Good for systematical summary of project experiences and to promote project replication in depth
    - Pilot and post-pilot TVEs
    - Innovative mechanism
  - Good for the technical renovation in post-pilot TVEs and sustainability of the project.
    - Financing
    - Policies
  - Good for enlarging the project impacts to market, society, and policies, by providing information for national policy-making and similar international projects development.

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5.2 Postpone of the Project **

- Postponed closing time:
  - Dec. 2006
- Financing:
  - ?

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6. Next Step

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Work Plan for the Next Step

-Accomplish the construction of the project pilot TVEs

-Enhance project's sustainability:

- Summarize the project implementation, esp. on the social, industrial and policy impacts.
- Raise further the capacity of institutes supported by the project. The Hongyuan Company operates commercially; explore more investment channels for the RCF.
- Organize on-site workshops to disseminate best practices of project in the 4 sub-sectors.
- Strengthen the project publicizing to expand the project impact. (by means of newsletters, VCDs, newspapers, websites, etc.)

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Thank you!

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Policies on Energy Conservation and Implementation in China

Tian Yishui
Chinese Academy of Agricultural Engineering
September, 2005

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Concept: Energy Conservation means to improve energy consumption management in use of technologically feasible, economically rational, and environmentally and socially acceptable measures, to reduce losses and waste in all chains from energy production to consumption, and to use energy resources more efficiently and more rationally

Significance: Energy conservation is one of the important in energy industry and economic development in China

- In 1981, the 4th Conference of the 5th People's Congress confirmed that "the guideline for solving energy problems is to pay equal attention to energy development and conservation, and to give priority to energy conservation in the near future"
- In 1996, the 4th Conference of the 8th People's Congress approved the 9th Five-Year-Plan and the Outline of Perspective Target for 2010, which pointed out that the energy industry should "persist to the general policy of *paying equal attention to energy conservation and development and putting conservation to the primacy*"
- The Outline of 10th Five-Year-Plan for China Economic and Social Development again stated that "*persist to paying equal attention to energy conservation and development and putting conservation to the primacy, protecting and rationally utilizing resources according to the laws, improving resource efficiency, and achieving the eternal utilization*"

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Large population and relatively short energy resources

		Time	World average	China	USA	OECD
Populating (million)		mid 2000	6,057.0	1,275.31	281.42	1,120.04
Exploitable fossil fuel	Coal (ton/person)	End 2000	162.5	89.8	876.4	399.2
	Oil (ton/person)	End 2000	23.5	2.6	13.1	10.0
	Natural Gas (ton/person)	End 2000	24,796	1,074	16,843	11,991

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Low energy consumption per capita and irrational structure

Energy Consumption	Year	World Average	China	USA	OECD
Primary Energy (kgce/p)	2000	2,064	843	1,1567	6,598
Coal (kgce/p)	2000	515.6	537.8	2,863.7	1,411.3
Oil (kg/人)	2000	578.4	177.9	3,188.8	1,950.6
Natural gas (m^3/p)	2000	397	19	2,325	1,178

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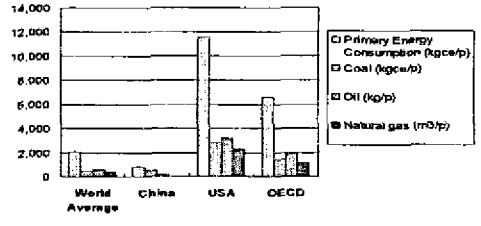
Low energy consumption per capita and irrational structure



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International Comparison of Energy Efficiency

		China	ECE Region		
		1997	Early 70s	Practical possible in early 1990s	Maximum possible in early 1990s
1	Mining	33.0	46	59	71
2	Transmission	68.8	76	67	75
3	End Use				
	Agriculture	30.5	30	33	36
	Industry	46.3	50	65	65
	Transportation	28.9	23	25	30
	Household and commercial	54.8	45	50-55	60-65
	Total	45.3	42	51	55
4	Energy Efficiency(2×3)	31.2	32	34	41
5	General efficiency (1×4)	10.3	15	20	30

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International Comparison of Energy Consumption of Energy-Intensive Products in 1999-2000

(Journal of Energy Association, 2001, Vol 7, Japan)

	1999	2000
Coal power plant (gce/kWh)		
China	427	392
Japan	332	316
Steel industry (kgce/t)		
China (large and medium factory)	997	766
Japan	629	646
Cement (kgce/t)		
China (large and medium factory)	201.1	193.8 (1997)
Japan	122.6	125.7
Ammonia synthesis (kgce/t)		
China (large, natural gas)	1343	1200
China (small, coal or charcoal)	2263	1801
USA (large, natural gas)	1000	970

109

Energy conservation in China has made great achievement

- Energy conservation has achieved remarkable economic and social benefit, during the 9th Five-year-Plan:
  - Energy consumption per 10k RMB Yuan of GDP (1990 price) dropped to 2.77 tce in 2000 from 3.97 tce in 1995
  - Energy consumption of major energy-intensive products decreased
  - Conserved energy resources valued 66 billion RMB Yuan, reduced emission of SO_2 of 8 million tons and CO_2 (C) of 180 million tons

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- Energy conservation and resources comprehensive utilization technologies have made progress, during the 9th Five-year-Plan:
  - As emphases of technological development and improvement, support to energy conservation and consumption reduction and resources comprehensive utilization technology were strengthened in enterprise technological innovation, new product development, special project of "2 high and 1 good" technological innovation, and special project of technological innovation using national debt
  - The key technologies on resources comprehensive utilization includes: heat-storage-style furnace, heat-storage-style stove, large-scale aluminum electro bath, 130 t/h and 220 t/h cycling fluidized bed boil, sulfur acid from phosphorus gypsum with co-production of cement, etc.

111

Prediction of Energy Development

With the rapid economic development and incessant improvement of people's living standard, energy demand per capita in China will increase, accordingly, the total amount of energy consumption will increase rapidly. It is predicted that energy consumption per capita will be 2.38 tce in 2040, equaling to the current world average and much lower than the level of industrialized countries (even so, the total energy consumption will reach 3.57 billion tce, more than the total amount of USA, which means that China will be the largest country in energy consumption in the world and that energy consumption in China will account for 25% of the world energy consumption, compared with 10% for now). Shortage of conventional energy resources per capita is a barrier for the sustainable development of China economy and society.

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Major Problems

Energy conservation and resources comprehensive utilization in China exist the following major problems:

- People do not have enough recognition to the importance and stringency of Energy conservation and resources comprehensive utilization
- Laws and regulations are not perfect, and incentive policies for promoting enterprises to conserve energy resources lack, and preferential policies on resources comprehensive utilization are difficult to be put into effect in some areas.
- Prices of some energy products distort, enterprises do not have enough competition pressure, therefore, the internal motive of the enterprises for energy conservation and resources comprehensive utilization lacks.
- Technologies and equipment are old, the general level is 10~15 years behind the industrialized countries.
- Most enterprises face financing problems, and the support for energy conservation from the government is not adequate.

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Existing laws, regulations, and standards on energy conservation (1)

- From 1979 to March 2000, China enacted 127 regulations related to energy conservation, of which 56 are still in effect. There are 164 national standards on energy conservation.
- "Temporary Regulations on Energy Conservation Management", enacted by the State Council in 1986.
- "Outline of Energy Conservation Technology Policies", formulated in 1984. In 1996, based on "Law of Energy Conservation of People's Republic of China", the Outline was modified and named "Outline of China Energy Conservation Technology Policies".
- "Law of Energy Conservation", enacted on January 1, 1998.

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Existing laws, regulations, and standards on energy conservation (2)

- Relevant regulations. To assist the implementation of "Law of Energy Conservation, several relevant regulations have been formulated, such as "Measures for Energy Conservation Management in Key Energy Consumption Sectors", "Measures for Energy-Conservation Product Certification in China", "Measures for Electricity Conservation Management", "Regulations on Development of Cogeneration of Heat and Electricity", "Regulations on Compiling and Evaluation of 'Energy-Conservation Chapters" in Feasibility Study Report of Capital Assets Investment Projects", and "Notices for Further Promoting the Green Lighting Project in China".
- Standards on Energy Conservation. China has formulated more than 600 National Energy Standards as well as many industry energy standards, local energy standards, and enterprise energy standards. Under the administration of the National Energy Basic and Management Standardization Technology Committee only, there are about 90 basic standards, management standards, and measures standards.

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Law of Clean Production Promotion

- On June 29, 2002, the Law was approved by the 28th Conference of the Standing Committee of the 9th National People's Congress and put in effect since January 1,2003.
- Article 2: Clean Production referred in the Law means: through measures such as applying improved design, using cleaning energy resources and materials, applying advanced techniques and equipment, improving management, and adopting comprehensive utilization, to reduce pollution from the source, improve efficiency of energy utilization, reduce or avoid the production and emission of pollutant during the production and utilization of products, and therefore mitigate or eliminate the harm to human health and environment.
- Article 3: Within the territory of People's Republic of China, any unit engaged in production and service activities and related administration shall organize and implement clean production based on the Law.

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- The government encourages and supports the development of advanced technology on energy conservation. The government require all industries to formulate technological standards on energy conservation, encourage them to adopt or import international advanced energy conservation technologies, to disseminate new technologies and techniques on energy conservation, and to limit or eliminate high-energy-consumption technologies and techniques.
- Government at county level or above should organize relative departments to promote the scientific and rational specialized production in accord with energy conservation requirement based on the national industry policies and energy conservation policies.
- For widely used high-energy-consumption products, the government setup limitation of maximum energy consumption and the standards on energy consumption grade, and implement the energy conservation product certification.

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Economic Policies on Energy Conservation

- To promote the technological progress, the central government established special fund for energy conservation, and provided preferential interest and interest subsidy
- Energy conservation projects has been key supporting National debt projects. Importation tax can be reduced or exempted.
- Foreign companies who invest on energy conservation project such as clean coal technology can take preferential policy on tax .
- The government formulated preferential policies to support and disseminate demonstration project on energy conservation. Importation tax of equipment and testing instrument can be reduced or exempted.
- Some local government established fund on energy conservation to support relative projects

118

Fund on Technological Innovation for Medium & Small Science-Technology Enterprises

The central government provides 1 billion RMB Yuan to establish the Fund on Technological Innovation for Medium & Small Science-Technology Enterprises, which focuses on supporting high-tech projects on electronic consultation, biological medicine, new material, environmental protection, new energy resources, efficient energy conservation. The fund is provided in three types: grant, low-interest loan, and capital investment.

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Organizations on Energy Conservation Administration

To enhance the monitoring and technical service of energy conservation activities, the National Energy Conservation Monitoring Center and the National Energy Conservation Test and Technical Service Center were established, and at the provincial and municipal level, there are more than 180 local and departmental such centers, with a team of about 3,200 staff. Other organizations related to energy conservation includes China Energy Conservation Association, China Energy Research Association, Energy Conservation Committee of China Science and Technology Association, and their local corresponding associations. The National Energy Technology and Management Standardization Technology Committee is responsible for formulating the standards on energy conservation. Besides, the former State Economy and Trade Commission established a energy Conservation Information Extension Center and China Energy Conservation Product Certification Center.

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Dissemination of VA in the TVEs

CAAE

September 11,2005

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I Source of VA

II Experience of VA practice in China

III Significance of VA in TVEs

IV How to conduct VA

122

I Source of VA

123

Voluntary Agreement: Definition

- Voluntary Energy Efficiency Agreement with the purpose of energy conservation and GHG emission reduction is an agreement between industrial organizations or enterprises and government on a voluntary basis, promising to reach a certain target about energy conservation and GHG emission reduction in a certain period of time. The government will provide honor and preferential policies in the agreement.
  - Discussion for a specific energy saving target and signature of VA
  - Long term planning within 5 to 10 years
  - Supportive policy assisting enterprises in achieving the target
  - The implementation plan included.
  - The annual monitoring procedure

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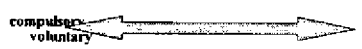
VA: Basic Concept

- The energy conservation started from the oil crisis in 1970s
- Climate change has attached the great attention of the world on energy and environment.
- Administrative measures have been behind times.
- Innovation of VA

125

VA: Basic Concept

Law, regulation		Information dissemination
Standard	VA	Pilot
Taxation		Training



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VA: Type

- **Unilateral commitment**: with no government involvement in the VA, enterprises set target voluntarily by themselves. This is only in Japanese economic union plans.
- **Public involvement**: enterprises can choose what and how to have their own VA from a list provided by government. Denmark is using this way for industrial VAs, and its CO2 emissions reduced 20% in 2005 than that in 1999.
- **Negotiation mode**: the agreement is signed after a negotiation about duties and obligations, schedule and target, between industry and government. This mode is widely used, like the long-term VA in Netherlands.

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International VA Projects

Completely Voluntary

Australia: Greenhouse Challenge

Canada: Industry Program for Energy Conservation (CIPEC)

Finland: Agreements on Industrial Energy Conservation Measures

France: Voluntary Agreements on CO2 Reductions (before 2002)

Japan: Keidanren Voluntary Action Plan on the Environment

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International VA Projects

Completely Voluntary

Korea (Republic of): Voluntary Agreement System For Energy Conservation and Reduction of Greenhouse Gas Emissions

Norway: Norwegian Industrial Energy Efficiency Network

Sweden: EKO-Energy

U.S.: Climate VISION

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International VA Projects

Threatened Regulations or Taxes or Strong Incentives

France: Voluntary Agreements on CO2 Reductions (after 2002)

Germany: Declaration of German Industry on Global Warming Prevention

Netherlands: Long-Term Agreements on Energy Efficiency, Benchmarking Covenants

Norway: Norwegian Industrial Energy Efficiency Network

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International VA Projects

tax levying

Canada: Large Final Emitters Program

Denmark: Agreements on Industrial Energy Efficiency

Ireland: Negotiated Energy Agreements Pilot Project

New Zealand: Negotiated Greenhouse Agreements

Switzerland: CO_2 Law

U.K.: Climate Change Levy and Agreements

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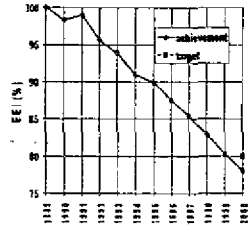
Effect of VA

- Netherlands Long-Term Agreements
  - 90% of VAs were signed by industrial sections, the target is the increase of energy efficiency by 20% from 1990 to 2000.
  - The rate of target achieved is 22.3%.



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II Experiences of VA in China

133

- Existing law and policy framework is a good basis of energy conservation
  - Energy Conservation Law put into force from Jan 1,1998 plays active and important role in promotion energy saving in industries.
  - Cleaner Production Promotion Law put into force from Jan 1, 2003 introduces new mechanism for energy conservation.

134

- National Special Plan for Energy Conservation in Medium and Long Term
  - Facilitate the new mechanism market oriented for energy conservation: Dissemination of VA
- Notice on Key Work in the Near Future on Building Resource Saving Society of State Council
  - Persist in the guideline of equal attention on exploitation and conservation of resources and regard saving premier.

135

Some Projects in Implementation in China

- Shandong Economic and Trade Commission/ US National Energy Foundation: VA in Steel Industry of Shandong Province
- GEF/UNIDO/UNDP/MOA: Energy Conservation and GHG Emission Reductions in Chinese TVEs
- NDRC/GEF/UNDP: China End Use Energy Efficiency Project
- (EUEEP)
- US National Energy Foundation/Chinese Iron and Steel Association: Voluntary Energy Efficiency Agreements for Chinese Iron & Steel Plants
- US National Energy Foundation/Environment Science College of Beijing University: Policy Methodology for Energy Conservation and Pollution Emission Reduction VA
- Qingdao Economy Committee signed VA with 15 enterprises
- WWF:"Power Switch" – Voluntary Emission Reduction Competition

136

VA in Steel Industry of Shandong Province

- It facilitated directly Shandong Government, Jinan Steel and Iron Corporation Group and Laiwu Steel and Iron Group Corporation to sign the voluntary agreement on April 22 , 2003.
- The two enterprises promise to save the energy of 1Mtce in three years, 0.145Mtce more than the goal set before.
- It indicated the initial implementation of voluntary agreement pilot project in China.

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Energy Conservation and GHG Emission Reductions in Chinese TVEs

- It is founded by Global Environment Facility (GEF) and implemented by the United Nations Development Program (UNDP). The project is executed by the United Nations Industrial Development Organization (UNIDO) and the Chinese Ministry of Agriculture (MOA).
- The project aims at reducing GHG emissions in Chinese TVEs in brick making, foundry, cement and coking industry by improving energy efficiency through removing technology, market, financial and policy barriers .

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Energy Conservation and GHG Emission Reductions in Chinese TVEs

- July 2003—March 2005, Township Enterprise Development Center and Center for Development of Energy & Environment Protection Technology of MOA conducted the LPIC Establishment and Building Phase I and Phase II as the subcontractors
- Assisted all stakeholders (pilot enterprises, local government and PIC) in drafting VA and signature of VA.
- Developed monitoring and evaluation plan to supervise the implementation of VA effectively.

139

Sector	Pilot enterprise	Effect Estimated	
		Total Consumption (ton per year)	CO_2 Reduction (ton per year)
Brick making	Sichuan Xinjin Yongxing Shale Brick Ltd.	792.09	1974.69
	Shaanxi Xi'an Liuxia Hollow Brick Plant	1298.12	3236.18
Foundry	Dalian Jinmei Foundry Pipe Ltd.	157.94	381.27
	Jiangsu Nanjing Meiling Foundry Plant	2037.41	5066.79
Cement	Hubei Ladang Cement Group	8720.54	21740.29
	Guangdong Yingde Baojiang Cement Ltd.	11865.53	29580.76
	Zhejiang Shanbe Cement Ltd.	8020.02	19993.91
Coking	Taiyuan Gangyuan Coking Ltd.	41364.00	103120.45
	Gaoping Xinggao Coking Ltd.	91920.00	229156.56
Total		166165.63	414250.91

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III Significance of VA in TVE

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Significance of VA in TVE

- The large amount of TVEs locate in quite different areas and engaging in all kinds of industries, so the energy saving management system developed in the planning economy system of China have lagged new trend.
- At present, the new energy saving mechanism fit for market economy system is not built. The strength is too weak to statistic energy information, conduct scientific management, monitoring and evaluation.
- VA, as a policy instrument, reflects the equal position of the two parties, enhances the enthusiasm for energy conservation. Enterprises will get benefit, preferential policies of local government and government and public will enjoy the environmental benefit.

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IV How to Implement the VA

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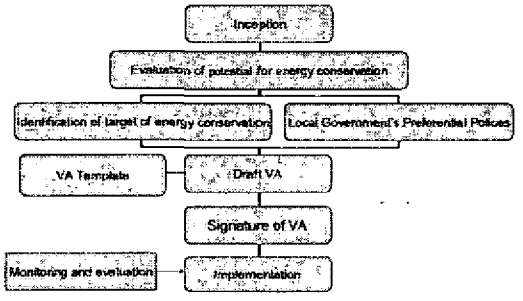

144

1. Self-evaluation of potential for energy conservation of pilot enterprises

- *Contents: Pilot enterprises conduct self-evaluation of potential for energy conservation.*
- Evaluation contents
  - Energy audit
  - Technical evaluation
  - Energy consumption baseline of enterprises
  - Integration of above measures

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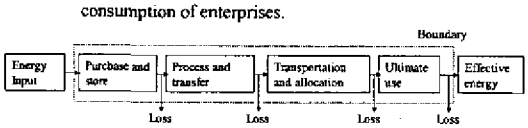
Energy Audit in Enterprises

- *Collect data on main energy-use process and* equipments and analyze the current energy consumption of enterprises.



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Evaluation of potential for energy conservation

- Evaluate the potential of pilot enterprises for energy conservation by the comparison between the energy consumption of actual production process and that of domestic and international advanced enterprises, consider the technical measures for increasing energy efficiency.

147

2. Local Government's Preferential Polices

- Contents: Local government formulates the preferential policies and measures for incentive and punishment to help the enterprises to achieve the target of energy conservation.
- Preferential polices:
  - Exemption of income tax
  - Local financial support
  - Loan discounting for energy saving upgrading
  - Honor
  - Information express

148

3. Identification of target of energy conservation

- Pilot enterprises should identify the feasible and challenging target of energy conservation on the basis of the status of itself by evaluation of potential for energy conservation, equipments, technology and capital.
- To achieve the target better, it's better to make the five-year term.

149

4. VA Document draft

- The subcontractors will draft the VA template according to the characteristics of VA, status of Chinese TVEs, survey report in pilot areas and specific conditions of pilot enterprises.
- Local government and enterprises can discuss the contents of VA with reference to VA template.

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VA Template Design for TVEs

- The two parties of VA signature
  - Local government
  - Replication enterprises or industrial association
- Framework Structure
  - Preface
  - Targets of Energy Conservation
  - Energy saving measures
  - Preferential policies
  - Monitoring and evaluation
  - Modifications and Termination

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5. Signature of VA

- Local government will evaluate the feasibility of the targets of energy conservation of pilot enterprises and whether it is in accordance with national polices and regulations on energy and environmental protection.
- Enterprises will confirm the field for energy efficiency enhancement, get a series of suggestions on energy efficiency by the targets of energy conservation and draft the energy saving plan.

152

6. Monitoring and Evaluation of VA

- Adopt the annual monitoring report submitted by pilot enterprises in the previous year.
- Scope of monitoring
  - Production data (including the types of main products, output and value of output)
  - Energy consumption
  - Implementation of energy saving plan
  - Factors influencing the energy conservation
  - Energy saving plan for next year and adjustment measures
  - Feedback

153

- Monitoring agency: the independent third party
- Conclusion: Establish the criterion for evaluation (excellent, passing or failed)

154

V Key Work in Next Phase

- Solicit comments of all replication areas;
- Revise the templates for VA in the four industries further;
- Implement in replication areas and facilitate the signature of VA.

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Thank You!

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UNDP/GEF Energy Conservation & GHG Emissions Reduction in Chinese TVES – Phase II

LPIC Action plan design achievements and problems needed to be noted

September 2005, Hang Zhou

157

Abstract

- Action Plan design background
- Action Plan design achievements
- Problems needed to be noted in action plan design

158

1.Action plan design background

1.Working basis
2. Working procedure
3. Working emphasis

159

1.Action plan design background

1-1 Working basis

- Basis

-PIC overall arrangement
-Terms of Reference requirements
-Characteristics of LPIC
-Local social and economic development plan
- Conditions of demonstration TVEs

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1.Action plan design background

1-1 Working basis

Output:
-Survey reports
-Action Plans

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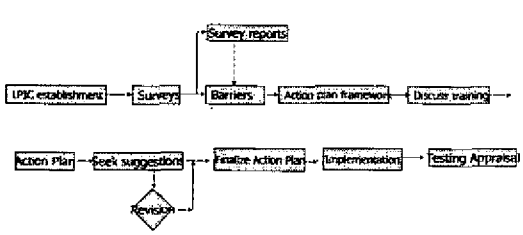
1.Action plan design background

1-2 Working procedures



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1.Action plan design background

1-3 Working emphasis

- LPIC Establishment
- Surveys
- Action Plan design and implementation
- Testing appraisal

163

2. Action Plan design achievements

1. LPIC has been materialized from a concept to realization
2. LPIC model has been revised and improved in practice
3. LPIC system is being formed

164

2-1 Materialize LPIC from a concept to realization

- The necessity of LPIC has been proved by practice
- Materialize LPIC from a concept to realization

-Establish LPIC

-Formulate constitution framework

-Formulate action plan sample

-Formulate plan for assessment system

165

2-2 LPIC model has been revised and improved in practice

- Reasons for revision
- Revision model

166

2-2 LPIC model has been revised and improved in practice

- Reasons for revision
  - Reform of government administrations
  - Changes of government function
  - Changes of industrial policy

167

2-2 LPIC model has been revised and improved in practice

- Revision model

-Establish LPIC at provincial, city and county levels

-LPIC standing body is transferred from TVE administrations to industrial administrations and associations

168

2-3 LPIC system is being formed

- Establish working mechanism
- Specify working model
- Establish LPIC at provincial, city and county levels

169

3. Problems needed to be noted

1. Conduct deep survey with diversified forms
2. Market oriented
3. Good interaction with local government
4. Stress local characteristics
5. Pay attention to the role of associations and industrial administrations
6. Consult foreign relevant industrial development history
7. Refer to the achievements of other project subcontractors

170

3. Problems needed to be noted

3-1 Conduct deep survey with diversified forms

- workshop
- interview
- questionnaire
- others

171

3. Problems needed to be noted

3-2 Market oriented

- Fully reflect the principle of voluntary
- Change the way of thinking

172

3. Problems needed to be noted

3-3 Good interaction with local government

- Incorporate local economic and development plan
- Incorporate work plan of local government

173

3. Problems needed to be noted

3-4 Stress local characteristics

174

3. Problems needed to be noted

- 3-5 Pay attention to the role of associations and industrial administrations

175

3. Problems needed to be noted

3-6 Consult foreign relevant industrial development history

176

3. Problems needed to be noted

3-7 Refer to the achievements of other project subcontractors

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Thank You!

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Establishment of LPIC
In Baqiao District,
Xi'an City

2005.09 Hang Zhou

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I Brief Introduction of Brick Industry In Baqiao District

- Building Materials Industry Base in Xi'an
- 1/3 of the total output of Xi'an building materials market
- The annual output is 8~9 hundred million pieces
- 57 brick making enterprises

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II Membership of LPIC in Xi'an Baqiao District

- The deputy director of the District Government is the director of LPIC
- Economy and Trade Bureau
- Township and Village Enterprise Bureau
- Construction Bureau
- Land Bureau
- Environment Protection Bureau
- Science and Technology Bureau
- Rural Credit Union

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III Responsibilities of Member Parties

- The deputy director of the District Government is the director of LPIC

184

III Responsibilities of Member Parties

- Economy and Trade Bureau
- Villages and Towns Enterprise Bureau

185

III Responsibilities of Member Parties

- Construction Bureau
- Land Bureau

186

III Responsibilities of Member Parties

- Environment Protection Bureau
- Science and Technology Bureau
- Rural Credit Union

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IV Working Flow Chart of LPIC in Xi'an Baqiao District

Joining project → training to depending parties →

preparation meeting for all parties willing to join the LPIC →

survey → establishment → issuance of official notice →

drafting survey report, statute and action plan of LPIC with subcontractor →

implementation of action plan → signature VA with TVE →

submission working reports to PIC\PMO at the end of year →

modification of action plan → implementation of action plan

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V Outline for Design of Action Plan for LPIC in Xi'an Baqiao District

- Based on "more water and more green program"
- Promoting energy conservation and greenhouse gas emissions reduction through related government departments
- Reducing cost from energy saving technique depending on experts, attracting TVEs to participate
- Understand more techniques and policies through training
- Government providing corresponding service to TVEs in use of technique of energy saving and GHG emissions reduction

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VI Experience for Establishment of LPIC in Xi'an Baqiao District

- Participating in training to understand project further
- Sufficient communication with subcontractor on technique and policy
- Depending on subcontractor and understand all tasks
- Showing characteristic based on local realities

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Thanks

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Summary of Achievements and Experiences of LPIC in Xinjin County

Deputy Director of SME Bureau of Xinjin County, Chengdu City, Sichuan Province

193

Brief Introduction of Brick Industry in Xinjin County

- There are 11 shale brick factories now, and the annual output reaches 2 or 3 hundred million pieces.
- By the end of year 2005, 20 clay brick factories will have been closed.

194

LPIC Building

- Participation in this GEF Project in 2002
- Xinjin LPIC is comprised of representatives from the County TVE Bureau, the County Bureau of Environmental Protection, the County Bureau of Building Planning, the County Office of Wall Materials Reform and the County Bureau State Land Resources.
- The deputy county governor in charge of industries is the Director of LPIC.

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LPIC Building

- Establishment of LPIC changed the realities. Now there is a governmental administration in the county that specifically engaged in helping TVEs to adopt technologies for energy efficiency and GHG emission reduction. It will help TVEs to overcome the policy obstacles to the adoption of these technologies.
- Coordination among the related Bureaus in the county promoted the sustainable development of the brick industry in the county.

196

Introduction of the Demonstration TVE

- Yongxing Shale Brick Factory was founded in 1985. The factory covers area about 100 mud and has introduced T Rotary Kiln in a creative way. It annually produces shale brick of various kinds 80 million pieces.
- Comparison before and after technical renovation

	Before renovation	After renovation
Products	Solid brick	Perforated brick, hollow brick and ornamental brick
Price	Common perforated brick 0.17Yuan/piece	0.45Yuan/piece of XPI ornamental brick
Production Processes	Rotary kiln	Tunnel kiln

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Achievements

- 1、500 thousand Yuan of credibility surety fund were got by those medium and small scale enterprises that signed Energy Efficiency Voluntary Agreement.

198

Achievements

- 2. Based on Sichuan Wall Material Scientific and Technical Information Net, brick industry Energy Efficiency website was established and made full use of the advantages of internet to exchange the new mechanism, new information, new methods and new technology that can be utilized to remove the obstacles. Those high energy consumption and heavy pollution enterprises were organized by Internet to conduct activities of energy efficiency and CO2 emission reduction and increase the enterprises' overall competitiveness.

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Achievements

- 3. Skilled technicians were selected from brick factories in Xinjin county for training. Then the local expert team was be formed for technical renovation with energy efficiency in TVEs and providing technical support to remove market, policy, technical and financial obstacles. Energy Efficiency supervisor system was established in brick factories.

200

Experiences

- With the influence of GEF project, TVEs have good impression in consumers and the reliability was promoted.
- The design of Action Plan should be done on the base of the working plan of government at present and in the mid-long term, which will promote the implementation of both of Action Plan and governmental working plan.

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Experiences

- Building of LPIC and design of Action Plan should be incorporated with the current local institutional arrangement and work of local government. It will stimulate the enthusiasm of local government. Then the government will really attach importance to the project.

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Work in the Future

- Pay more attention to the marketization and commercialization to ensure the sustainable development of the project.
- Strengthen the dissemination of project achievements and outputs by all means to make more people know this project.

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Thank You!

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Energy Conservation and Management in Industrial Enterprises (outline)

Tsinghua University Meng Zhaoli September 2005

I Materials for the presentation

Energy Conservation and Sustainable Development

1. Energy situations in China

(1) Characteristics of the energy system

①Total reserves are huge but reserves per capita are short;

②Coal is the predominant energy source and considerable transportation involved;

③Low energy efficiency and heavy pollutions means heavy task for energy conservation;

④Rapid economic development requires more energy;

⑤High-level oil import dependence means great risks.

(2) Energy conservation

①Energy conservation is important to ensure economy double twice with doubled energy input;

②Energy conservation can relieve energy risks and guarantee national energy security;

③Energy conservation and environment protection can ensure economic sustainability;

④Energy conservation can increase industrial competitiveness and improve living standards;

⑤It is proposed to list energy and resource conservation as a basic national policy in order to promote human, resource and environment work.

2. Energy conservation in China

(1) Energy conservation achievements

①Industrial restructuring has achieved notable energy conservation results;

- The vigorous development of the tertiary industry
- The closing-up of the Five-Small industrial enterprises

②Technical progress contributes to energy conservation;

③Strengthens macro management

- Energy conservation laws, regulations and standards
- The practice of energy conservation certification system
- The extension of typical experiences
- Strengthen public awareness, education and training

④Deepens reform and promote energy conservation

- Open up energy price and practice price hearing
- Strengthen energy conservation, reduces cost and improve industrial competitiveness

⑤Actively practice cleaner production and implements Cleaner Production Promotion Law.

(2) Major problems

①Inadequate awareness of the significance and urgency of energy conservation

②Incomplete complementing laws and regulations, poor monitoring system and lack of supervision and management

③Inadequate energy conservation incentive policies that suit to market economic mechanism rules

④Under-finance for energy conservation and backward productive processing, technology and equipment

(3) Strengthen energy conservation management

①Strengthen government energy conservation management

- Highlight the leading role that government should play in energy conservation management
- Reinforce energy conservation administration, increase its authorized size and win more public fund support
- Emphasis of government management: formulation of policies, laws and regulations and improvement of macro monitoring and supervision
- Strengthen the demonstration role of government efforts
- Principles: regulated by laws, oriented by policies, guided by plans, innovated mechanism, promoted by demonstration, information services, public awareness campaign and training, international cooperation, financial support. In this way, an energy conservation management system and mechanism shall be established.

② Energy conservation laws, regulations and standards formulation

③ Highlight energy conservation of end equipment

④ Energy conservation focuses on:

- Industrial energy conservation (steel, chemical industry, building materials and power generation……)
- Building energy conservation
- Transportation energy conservation

⑤Establish intermediary organizations and practice commercialized operation

- The extension of Contract Energy Management Method
- Practice public bidding for government purchase or other purchase of large amount of energy conservation products
- The extension of new process, new technologies, new products and new equipment and strengthen industrial energy conservation technical upgrading

⑥Adopt Energy Efficiency Voluntary Agreements

⑦Practice demand side management (DSM) and promote power conservation

⑧Establish energy conservation incentive system

- Restrict resource over-consumption and formulate energy conservation tax system
- Deepen energy price reform and establish energy price forecast system
- Establish public support system for energy conservation and set energy conservation fund
- Formulate preferential policies for establishing energy conservation funding and loaning system
- Establish heavy tax and phase-out system for energy-intensive and heavy pollution products

⑨Conduct international cooperation and exchanges

⑩Strengthen public awareness campaign and training on energy conservation

Annex 13.3

Minutes of Training Workshop on Capacity Building of LPIC

Date:	September 11, 2005
Venue:	Hangzhou Kaiyuanzhijiang Holiday Hotel
Subjects:	National energy conservation and environmental policies, international energy conservation policies and mechanisms, advanced management and experience in promoting energy conservation and GHG emission reduction of developed countries, Circular economy, as well as the project objective, target, strategy, plan, the role of LPIC and demonstration enterprises in the project, progress of the project.
Activities:	Lectures of experts, field visit and discussions
Participants:	GEF-China Secretariat; Department of S & T and Education, MOA; Township and Village Enterprise Bureau, MOA; Energy Research Institute of National Development and Reform Commission (NDRC); State Environmental Protection Administration; Principals of LPIC in demonstration and replication regions; Managers of demonstration enterprises.

1. Background

According to contract, the subcontractors organized the training workshop on the capacity building of LPIC. The training will help all replication regions learn more information of domestic and international energy situation, energy conservation policy and advanced energy conservation mechanism, deeply understand the objective, significance, mode and procedure, and exchange the experience of LPIC establishment and demonstration enterprises establishment.

2. Preparation

- Workshop was organized for training and development of the training program;
- The revision of workshop plan drafted by subcontractor according to the training program;
- Coordination with subcontractor to conduct all preparation activities for the training workshop together, especially the review and approval on the training materials.

3. Contents

The training workshop lasted one day. The training included lectures in the morning, field visit in the afternoon and discussions in the evening.

Mr. Wang Xiwu, Senior Administrator of PIC Secretariat and Ms. Wang Guiling, Deputy Director of PMO gave the lecture on *Current Status of LPIC Establishment* in which they summarized the achievements in Phase I and Phase II and introduced tasks in Phase III in the morning.

Thereafter, Mr. Meng Zhaoli, Professor of Tsinghua University gave a lecture on *Energy Conservation and Management in Industrial Enterprises*, which focused on the necessity of energy conservation and how to strengthen energy saving

management in enterprises.

Mr. Tian Yishui, Senior Engineer of CAAE introduced the *Policies on Energy Conservation and Implementation in China* and *VA Dissemination in TVEs* after the field visit in the afternoon. He also explained the problems should be paid attention to in use of the VA template in Phase III on the basis of the existing problems.

Ms. Zhou Hong, the Deputy Division Director of TEDC, briefed the *LPIC Action Plan Design Achievements and Problems Needed to be Noted*, which included three parts on the background, outputs and noticeable issues on the design of Action Plan. The objective was to make the Action Plan developed in Phase III more reasonable and perfect.

The discussion was held in the evening. It was chaired by Mr. Wang Xiwu, senior administrator of PIC Secretariat. The subcontractor of Phase III, Mr. Cao Guangming and Mr. Liu Xin introduced the work in Phase I and II, the progress of Phase III and work in next step first. Thereafter, it was the discussion on experiences on LPIC establishment and capacity building.

Principals of LPIC in Baqiao District of Xi'an City introduced that, Baqiao District is the Building Materials Industry Base in Xi'an. There are 57 brick making enterprises. The annual output is 8~9 hundred million pieces, which shares 1/3 of the total output of Xi'an building materials market. Baqiao District took part in this project in 2002. For this project consisted with the "more water and more green program" in Xi'an, District Government attached much importance in this project and established the LPIC. The member parties of LPIC include Economy and Trade Bureau, Township and Village Enterprise Bureau, Construction Bureau, Land Bureau, Environment Protection Bureau, Science and Technology Bureau and Rural Credit Union. Through the GEF project, we have 5 pieces of experiences: 1. TVEs have chances to get more and higher-quality information; 2. TVEs would know more professional specialists and the ideas have changed; 3. TVEs would learn more experiences of other related organizations; 4. TVEs would learn more experiences on national projects; 5. TVEs would learn experiences on promotion regional economic development. At present, the energy conservation is sustainable for brick making enterprises so they have much enthusiasm. The work in next step includes: first, to get the PIC's support, related agencies in the District will help the 14 replication TVEs remove some obstacles and support the technical renovation in the TVEs; second, to strengthen the coordination among related agencies to provide necessary support for the removal of all kinds of obstacles; third, to provide basic information for energy conservation at national and other levels and reference for decision making for leaders; fourth, to enhance the work quality and capacity.

Mr. Zhang, the deputy director of Wall Materials Reform Office of Liaoning Province, said that there were 16 TVEs selected as replication TVEs in Shenyang City. Although they knew this project relatively late, the project progress was satisfied. The target developed earlier was that 10 thousand tons of GHG emission would be reduced; however, the actual quantity of GHG emission reduction was 14 thousand tons. The successful experiences include: 1. guidance of PMO and PIC avoided the trouble might be met; 2. LPIC (including the Provincial Building Materials Industrial Association, Wall Materials Reform Office of Shenyang City, etc) provided strong support, for the TVEs proposed were all selected strictly; 3. Subcontractor's excellent work, such as the familiarity with replication TVEs, ensure the implementation of the project; 4. The enthusiasm of TVEs make them implement project seriously and no difficulty in self-fund, which ensure the project implementation. The key work in next step is: 1. to summary the experiences and hold a summary workshop; 2. to conduct dissemination activities, in the meeting of Industrial Association, 16 TVEs would introduce their experiences and one of them would make key speech; 3. to conduct

popularization activities, that is to summary the new production process and techniques and make them as important contents for popularization in brick industry after experts' argumentation; the new techniques should be adopted will be listed in the 11th Five-Year Plan and adopted in other TVEs. One suggestion is that GEF Project should be continued to win more support of national agencies. For only several demonstration TVEs and almost one hundred replication TVEs are far from enough.

Principals of LPIC in Shuangliu County introduced that, industrial economy of Shuangliu was on the top position in the west of China. They knew this project last year. They thought that governmental departments should participate in the strengthening guidance, improving energy saving awareness of TVEs and participation of industrial organization. For the LPIC's membership, if the head of related agencies are the delegates of LPIC, the project implementation will be easier. Their suggestions are: 1. to enhance the position of PIC and strengthen the guidance on policy; 2. to find a mechanism so as to coordinate and interact among PIC and LPIC.

Mr. Wang Lizhi of LPIC in Xinjin County said that they had the same staff and institutional arrangement of TVE Bureau, SME Bureau and Personal Owned Enterprises Bureau. They pulled the establishment of LPIC and the Director of LPIC was the Deputy Head of the County. They had obvious achievements through the work in last phase.

4. Results

(1) Participants understood the project implementation strategy and approach deeply;

(2) Local government officials and TVE managers knew the objectives, significance, framework and procedures of establishment and capacity building of LPICs;

(3) Participants exchanged experience in LPIC establishment & capacity building and project implementation of demonstration TVEs, which were valuable experiences for replication TVEs;

(4) Participants' knowledge was enriched on environmental and energy saving policies and the new mechanism like Energy Management Contract.

(5) Participants understand tasks and requirements in different areas and TVEs deeply.

Annex 13.4

List of Participants of the Training Workshop on Establishment and Capacity Building of LPIC

Hangzhou, September 11

Catogory	No	Name	Unit	Tiltle
Particpants from member unit of PIC	1	Gao Shangbin	Science Technology and Edcucation Department of MOA	Director
	2	Luo Gaolai	Foreign Economic Cooperation Offcie of SEPA	Deputy Direcgtor General
	3	Cai Li	TVE Bureau of MOA	Deputy director
	4	Xu Zhiqiang	Energy Conservation Division of Resource and Environmental Department of NDRC	Director
	5	Xu Hao	Loan Department of China Agricutlure Bank	Director
	6	Ye Zhenqin	TEDC of MOA	Director General
	7	Zhu Ming	Agriculture Engneering Academy of MOA	President
	8	Liu Ping	Scince and Technology Develoment Center of MOA	Deputy Direcgtor General
	9	Wang Xiwu	PIC	Senior Manager
	10	Wang Jian	Agricultural Loan Department of China Agrcultural Bank	
International organization	11	Hanawa	UNDP Beijing Office	Project Manager
	12	Ma Jian	UNIDO Beijing Office	Project Coordinator
	13	Wen Gang	GEF Secrotary Office	Ph.D
PMO	14	Wang Guiling	PMO of MOA	Deputy Director
	15	Xu Litong	PMO of MOA	Senior Project Consultant
Expert	16	Dai Yande	ERI of NDRC	Deputy Director General
Participants from LPIC	17	He Rongfei	Zhejiang TVE Bureau	Deputy Director General
	18	Shen Xinglong	Zhejiang TVE Bureau	Director
	19	Zhou Chaohui	Zhejiang TVE Bureau	Engineer
	20	Shen Weizhong	Zhejiang Cement Monitoring Station	Director
	21	Zhang Shaoxian	Liaoning Qiangai Office	Deputy Director
	22	Wang Zhimin	Small and Mid Enterprise Bureau of Jinnan of Tianjin	Deputy Director
	23	Chen Xiaoping	Small and Mid Enterprise Bureau of Shuangliu of Sichuan	Director
	24	Qian Yuefang	Small and Mid Enterprise Bureau of Tongxiang of Zhejiang	Director
	25	Yang Jingui	Small and Mid Enterprise Bureau of Xinjin of Chengdu	Deputy Director actor
	26	Li Longbao	Small and Mid Enterprise Bureau of Jiangning of Nanjing	Director
	27	Wang Yuman	TVE Bureau of Baqiao District of Xi'an	Director
	28	Mao Anzhi	TVE Bureau of Baqiao of Xi'an	Director
	29	Han Zhenzhong	Small and Mid Enterprise Bureau of Jinzhong of Shanxi	Section Chief
	30	Lai Wansheng	Small and Mid Enterprise Bureau of Jinzhong of Shanxi	Section Chief
	31	Ma Jiangang	ETC of Shanxi Province	Section Chief
	32	Han Jigang	ETC of Shanxi Province	Section Chief
	33	Zhouguo xiang	Small and Mid Enterprise Bureau of Shuangliu of Sichuan	Secretary
	34	Meng Qinggui	Foundry Association of Nanjing	Section Chief
	35	Xue Ping	Construction Material Association of Shuangliu of Sichuan	Director
	36	Zhou Shuihe	Building Material Association of Shuangliu of Sichuan	Deputy Director

List of Participants of the Training Workshop on Establishment and Capacity Building of LPIC

Hangzhou, September 11

Catogory	No	Name	Unit	Tiltle
Particiapants from Sub contractor	37	Cao Guangming	TEDC of MOA	Director
	38	Zhou Hong	TEDC of MOA	Deputy Director
	39	Zhang Ze	Tianjin Enviromental Protection Institute	Engineer
	40	Zeng Siyuong	Central Agricultural Broadcasting College	Director
	41	Li Gang	Central Agricultural Broadcasting College	Photographer
	42	Wang Xinhua	Beijing Hongyuan Energy and Environemtnal Protection Technology Co. Ltd	Deputy Chairman of Board
	43	Wang Hai	Beijing Hongyuan Energy and Environemtnal Protection Technology Co. Ltd	General Manager
	44	TianYishui	Agriculture Engneering Academy of MOA	Senior Engineer
	45	Xiao Hui	Xi'an Wall Materials Research Institute	President
	46	Zhou Xuan	Xi'an Wall Materials Research Institute	Doirector
	47	Wang hao	Xi'an Kaisheng Construction Materials Engineering Ltd	Chairman of Board
	48	Mao Lifang	Shenyang Hetai Company	General Manager
	49	Zhang Fu	Taijing Cement Design Institute	Director
	50	Liu Xin	EED Consulting	Managing Director
	51	Zhong Lei	Shanxi Century School	Project Manager
Paticipants from pilot enterprises	52	Yu Deyan	Dalian Jinmei Foundry Ltd.	General Manager
	53	Ling Fuhe	Xian Liucun Brick Plant	General Manager
	54	Liang Xinnian	Nanjing Muling Coke Plant	deputy General Manager
	55	Shen Fuqiang	Zhejiang Shenhe Cement Plant	General Manager
	56	Gong Muquan	Sichuang Yongxing Construction Material Ltd	General Manager
	57	Zou Xinglong	Hubei Lufeng Cement Plant	Assisstant Manager
Working staff	58	Jiang Yuegang	Zhejiang Cement Quality Monitoring Station	Director
	59	Zheng Ge	PMO of MOA	Project Assisstant
	60	Fan Liping	PMO of MOA	Secretary
	61	Song Dongfeng	Beijing Hongyuan Energy and Environemtnal Protection Technology Co. Ltd	Contract Officer
	62	Shao Chen	Beijing Hongyuan Energy and Environemtnal Protection Technology Co. Ltd	Project Assisstanct

Annex 14

Summary Report for Establishment and Capacity Building of LPIC in Phase II

The project *Energy Conservation & GHG Emissions Reduction in Chinese TVES – Phase II*, which has been jointly funded by UNDP, UNIDO and GEF, aims to remove the market, policy, technical and financial obstacles to the adoption of GHG emission reduction technologies, which have been identified in brick, cement, casting and coking TVEs. National PIC has been established to remove these obstacles. According to PIC's requirements, four LPICs have been established in Phase I in Xinjin county of Sichuan Province, Dalian City of Liaoning Province, Tieshan district, Huangshi city of Hubei province, Jiangning district, Nanjing city of Jiangsu province. 4 more LPICs have been established in Phase II in Tongxiang city of Zhejiang province, Yingde city of Guangdong province, Baqiao district, Xi'an city of Shanxi province and Shanxi province. A lot of work has been done in the above-mentioned 8 demonstration areas.

According to subcontract TOR, the 4 LPICs established in Phase II should be assessed and the Action Plans and Assessment Systems be revised. Based on the subcontractor's good performance in Phase I, the Phase II subcontract has been directly granted to the subcontractor, which contributes a lot to the smooth process of Phase II work. The work done in Phase I is also included in this report for summery and assessment.

I Brief introduction of phase I and phase II projects

During the implementation of Phase I and Phase II subcontract, with the help of PMO, the subcontractor has conducted a lot of work in the 8 demonstration areas as follows:

1. A lot of background materials and information have been collected by consulting and visiting government agencies, officials and experts.

2. The subcontractor communicated with local governments and TVEs and helped them to understand the project objectives, significance, contents, procedures, working methods and outputs.

3. The subcontractor formulated survey schedule, survey outline and formats and handed them out to local governments and TVES for preparation.

4. The subcontractor conducted field visits.

(1) The subcontractor discussed with potential LPIC members and industrial experts on the preparation work for LPIC establishment, its nature, vision, organization, responsibility and working procedure. The subcontractor assisted local governments to establish LPIC and confirmed it by issuing formal government documents.

(2) The subcontractor conducted workshops and discussed with TVEs' managers, LPIC members and industrial experts on TVEs' willingness to adopt energy efficiency technologies, the existing policy, technology, market and finance barriers, TVEs' ideas on the current policies, their suggestions for better administrative management. Surveys were conducted to identify problems existed in the implementation of energy conservation and environment policies, policy barriers were summarized and the ways to remove these barriers were discussed with TVEs' managers and LPIC members.

(3) The subcontractor visited local government agencies, collected first-hand materials on local government policies and discussed with government officials on

the ways to remove the barriers. On the basis of this, Survey Reports and Action Plans were formulated.

(4) The subcontractor visited demonstration TVEs' production lines and discussed with technical professional on technical reform plan and confirmed Energy Efficiency Voluntary Agreements.

5. The subcontractor contacted LPIC members and TVEs by different means such as phone calls, workshops and field visits to keep track of their work developments.

Up to now, the work conducted in the 8 demonstration areas can be summarized in the following table. LPICs establishment and LPIC constitution in these areas have been formally confirmed by local government documents. Barriers against TVEs' adopting energy efficiency technologies have been identified and Action Plans have been formulated accordingly. All demonstration TVEs had signed Energy Efficiency Voluntary Agreements with local governments.

Summary of Progress of the 8 Demonstration Areas

	Setup of LPIC						Progress in the Demonstration TVEs			
	Demonstration Areas	Establishment Date	Member	Survey Report	Action Plan	M&E Report	Demonstration TVE	Energy Saving (tce)	VA Signing	CO_2 Emission Reduction(t)
Phase I	Xinjin County of Sichuan	March 25,2002	Government Office, Information Office, Bureau of Medium & Small Enterprises, Bureau of Environment Protection (EPB), Administration of Land & Resources, Bureau of Construction & Planning	Finished	Finished	Finished	Yongxing Shale Brick Factory of Xinjin County	1,476.00	Finished	3,681.00
	Dalian of Liaoning	Sep 8,2003	TVEs Bureau, Bureau of Science & Technology, EPB, Finance Office	Finished	Finished	Finished	Jinmei Pipe Casting Ltd of Lvshun	152.00	Finished	381.00
	Tieshan district of Huanhshi of Hubei	Sep 10,2003	Government Office, Bureau of Planning, Statistics and Pricing, Bureau of Economic Development, Bureau of Science & Technology, EPB, Bureau of Finance, Bureau of Agriculture, Forestry and Water Resources, Agriculture and Industry Relation Office, Luzhangshan Street Committee, Agriculture Bank of Tieshan Branch	Finished	Finished	Finished	Lufeng Cement Ltd.	9,375.00	Finished	23,373.00
	Jiangning district of Nanjing of Jiangsu	Aug 22,2002	Government Office, Bureau of Finance, Bureau of Science & Technology, EPB, Agricultural Bank, Planning and Economic Development, Government of Moling Township, Moling Casting Factory (Headquarter)	Finished	Finished	Finished	Moling Casting Factory	1,597.00	Finished	3,981.00

Phase II	**Tongxiang City of Zhejiang**	Oct 8, 2004	Bureau of Finance and Local Taxation, Bureau of Science & Technology, EPB, Bureau of National Taxation, People's Bank of Tongxiang Branch, Heshan Township Government, Shenhe Cement Ltd	Finished	Finished	Finished	**Shenhe Cement Ltd**	8,119.00	Finished	20,242.00
	Yingde City of Guangdong	Jan 13, 2005	Government Office, Bureau of Economy & Trade, Bureau of Science & Technology, EPB, Agriculture Bank of Yingde Branch	Finished	Finished	Finished	**Baojiang Cement Material Ltd**	24,265.00	Finished	60,493.00
	Baqiao District of Xi'an of Shanxi	June 14, 2004	Government Office Bureau of Economy & Trade, Bureau of Science & Technology, EPB of Baqiao Brach, Bureau of Construction, Administration of Land and Resources, Construction Material Quality Testing Station, Agriculture Bank of Baqiao Branch	Finished	Finished	Finished	**Liucun Brick Factory**	669.00	Finished	1,670.00
	Shanxi Province	Feb. 28, 2005	Shanxi Bureau of SME, Shanxi Economic Committee, Shanxi Bureau of Science and Technology, Shanxi Commission of Finance	Finished	Finished	Finished	**Gangyuan Coking Company of Taiyuan**	41,364.00	Finished	103,120.00
							Xinggao Coking Company of Shanxu	45,960.00	Finished	114,578.00

II Achievements in phase I and phase II

From June 2003 when the first LPIC was established in Xinjin county of Sichuan province to January 2005 when the last LPIC was established in Yingde City of Guangdong Province, 19 months have passed and 8 LPICs have been established. They have conducted a lot of activities according to their Action Plans and notable results have been achieved.

The subcontractor has encouraged LPICs to conduct work according to local realities, government policies, industrial features and characteristics. The work done by the LPICs is summarized as follows:

1. LPICs have promoted demonstration TVEs' energy conservation and GHG emission reduction

LPICs have provided policy and financial support to hasten the process of demonstration TVEs' energy conservation and GHG emission reduction. 9 demonstration TVEs in 8 regions have signed Energy Efficiency Voluntary Agreements with local governments and 7 TVEs have almost finished the technical renovation tasks. By now, the 9 demonstration TVEs have reduced or achieved the annual reduction target of nearly 340,000 tons of CO2 emission. The project target is that 85,000 tons of CO2 emission should be reduced in 8 demonstration TVEs. It is clear that the project is successful in the energy conservation and GHG emission reduction.

2. LPICs have helped to extended Energy Efficiency Voluntary Agreement and 118 TVEs have been recommended to PMO as extension TVE.

The established LPICs signed the Energy Efficiency Voluntary Agreement with demonstration enterprises actively. Up to now, 9 demonstration enterprises all signed the VA. Furthermore, the LPICs assisted the subcontractor in formulating the template of VA for the replication in more areas. For the achievements in demonstration area, LPIC established proposed good potential replication TVEs for PMO voluntarily in the replication phase. This accelerates the process of replication greatly.

The established LPICs not only carried their work in local areas, but also cooperated with PMO and PIC for the LPIC's replication. They proposed good potential replication TVEs and areas for PMO. For example, LPIC in Xinjin Country of Sichuan Province proposed the Shuangliu Country of Sichuan Province as replication area. The demonstration TVE, Xinjin Yongxing Brick Plant, and LPIC in Xinjin Country and the subcontractor jointly assisted the Shuangliu Country in LPIC establishment. The introduced their experiences and lessons to Shuangliu Country and provided technical advices for the 6 replication TVEs in Shuangliu.

Another example is that the LPIC in Shanxi Province proposed Jinzhong and Linfen as the replication areas to PMO, and two LPICs at city level in these two cities should be established. LPIC in Shanxi Province also helped PMO with the selection of 10 replication TVEs.

With the progress of the project, on the basis of the LPICs' cooperation with PIC and PMO, up to now, 118 replication TVEs were selected, including 60 brick making TVEs, 31 foundries, 7 coking TVEs and 20 cement TVEs.

3. LPICs have assisted TVEs to apply for preferential fund to conduct technical reform

For example, LPIC of Xinjin County, Sichuan province signed a 50 million Medium

and Small Enterprise Loan agreement with Sichuan subsidiary of State Development Bank. LPIC recommended Yongxing Shale Brick Factory as demonstration enterprise to Chengdu Finance Bureau. LPIC's efforts helped to provide 500,000 Yuan financial support for demonstration TVE's energy efficiency and GHG emission reduction technical reform.

For another example, LPIC of Jiangning District, Jiangsu Province has applied to Nanjing City Science and Technology Bureau for 125,000 Yuan as technical reform fund. The district Science and Technology Bureau has matched 80,000 Yuan to help Nanjing Moling Casting Factory, one of the demonstration enterprises, to establish a 1000-ton lost -foam aluminum alloy casting line. This project shall increase the total qualified rate from the former 85% to 95%.

4. LPICs have promoted the implementation of the tax policies and industrial policies

On the PIC annual meeting and LPIC training workshop, which was held in April 2004, Tieshan district LPIC of Hubei province introduced local policy implementation status to the participants. According to Notice on Added-value Tax for Some Comprehensive Utilized Resources and Other Products, which has been issued by Ministry of Finance and State Tax Administration, "the added-value tax, which is levied on cement that in the process of production, not less than 30% gangue, stone coal, pulverized fuel ash and furnace cinder (not including water granulated slag in the furnace) and other waste residues is mixed into the raw materials, is reimbursed", local LPIC helped Lufeng Cement Ltd, one of the demonstration enterprises, got 6 million Yuan as reimbursed added-value tax in 2002 alone. The same policy had not been satisfactorily implemented in Tongxiang city of Zhejiang province. Less than 60% added-value tax has been exempted. The Tongxiang LPIC has attached great importance to this fact and a report was submitted to local government. The local government strictly implemented the policy in 2005.

5. LPICs have provided policy recommendations to governments agencies

In Shanxi province, for example, there used to be two different development ideas for coking industry. One supports coking production with large-scale mechanical coking ovens, which is integrated utilization oriented. The other one supports heat recovery technology, which is clean and environment friendly. In selecting demonstration technologies for phase II subcontract, LPIC consulted with PMO, PIC and CTA and agreed that the heat recovery technology would be adopted and demonstration enterprises would be selected on the basis of this technology. The decision was discussed and passed by the tripartite meeting. In the process of implementation, this new technology had inevitably met the problem of low market and policy recognition. With this technology being adopted, the emission of benzopyrene has almost been reduced to zero and the emission of CO2 and SO2 is notably lower than that from large-scale mechanical coking ovens. A standard on heat recovery oven's waste gas emission has been planned in Shanxi province. This standard is much stricter than that for large-scale mechanical coking ovens. LPIC of Shanxi province proposed to provincial government that different standards for different production processes are quite unfavorable to the extension of the heat recovery technology. The provincial government has attached great importance to the proposal.

6. NGOs have played an active role

The role of NGOs such as schools, industrial associations, research institutes and volunteers has been fully played in formulating LPIC Action Plans. The NGOs' advantages of information, publicity, technologies, human resources, working network and influences are important for energy conservation and GHG emission reduction.

The industrial associations have played an important role in LPIC establishment during phase II. The influential Guangdong Cement Association has about 300 members and it has not only recommended demonstration TVEs in Yingde City to PMO and PIC, but also introduced the project to TVEs and governments. It has also helped subcontractor to conduct surveys. It provides local industrial policies, technical information and development plan to the surveyors. It also communicates with LPIC members. For another example, Dalian LPIC has conducted surveys among casting TVEs and helped to establish Dalian Casting TVE branch Association. The branch association shall play an active role in promoting industrial development and achieve industrial self-discipline.

7. LPICs have cooperated with local governments

For example, cement industry of Yingde City of Guangdong province is a pillar industry. Local government had invited China Building Materials Industry Academy to formulated local Cement Industry Development Plan. LPIC organized order-placing meeting and invited cement TVEs and large and medium scaled coal supplier from Shanxi province, Henan province, Hunan province, Guizhou province and Shaoguan city of Guangdong province to participate in the meeting.

Another example is that, in 2004, LPIC of Jiangning District of Nanjing City organized local casting TVEs to go to Dalian, Jinan, Suzhou and Shanghai to visit the static pressure production line and how they have reformed the welfare enterprises. This activity helped local TVEs to conduct institutional reform and to introduce new technologies.

III Experiences accumulated in phase I and phase II

1. It is necessary to establish LPIC to remove barriers against improving TVEs' energy efficiency

After the surveys conducted in 8 TVEs in different provinces and counties, the major policy barriers have been identified:

For a long time, government energy conservation and environment policies have heavily focused on state-owned enterprises, with TVEs being neglected. A great many preferential policies have been granted to state-owned enterprises, while many restrictive policies have been implemented among TVEs. The policy differences have not only restricted TVs' participation in energy conservation and environment protection activities, but also caused the collision between government behavior and enterprises' interest.

The newly promulgated laws and regulations on energy conservation and environment protection are equally applicable to TVEs, but there is a long way to go for local government to improve its law enforcement capability. The incomplete method system and incentive measures for the extension of energy conservation technologies have been unfavorable to motivate TVEs to participate in energy conservation and environment protection activities.

Most TVEs' lower awareness of the importance of energy conservation and environment protection has also been a major obstacle to the enforcement of relevant laws and regulations. The lack of self-discipline mechanism among TVEs and the prevalence of local protectionism have seriously reduced the effect of the laws and regulations.

Another major obstacle to TVEs' conducting GHG emission reduction activities is the shortage of staff that is familiar with energy conservation and environment protection. Many people have been used to traditional technologies and management methods and their reluctant response to new things have slowed down the management,

technical reform and fund-raising activities for energy conservation and environment protection.

The property right reform in many TVEs has not done yet. The unclear relation between ownership and management and the too high asset-liability ratio has seriously affected the TVEs' ability to obtain advanced technologies, to absorb social capital and to get bank loan.

Since the end of 2003, the shortage of power, coal and oil in China has produced considerable impact on China's economy. The higher energy price means that energy accounts for a higher share in product cost. In Tongxiang city, Zhejiang province, for example, the coal price in December 2003 was 300 Yuan per ton, and it accounted for 30% of the cement chamotte cost. In July 2004, the coal price was 600 Yuan per ton, and the coal share increased to 52%. According to some official predictions, energy shortage in China shall not be relieved in the near future.

It is very hard for one single institution to solve the above-mentioned problems because of the complicated administration system in China. As a special coordination institute, LPIC consists of members from different administrations that have different functions. The operation of LPIC has created an effective mechanism for different administrations to play roles. The functions of different government administrations have been integrated, which helps to strengthen law enforcement force, to change the policy environment that does not fit into market mechanism and to promote local government to adopt energy conservation policies and measures. The incentive policies shall increase TVEs' self-discipline awareness, promote them to implement environment protection and energy conservation laws and regulations and technical standards, and realize the goal of GHG emission reduction. LPIC is constituted by technical professionals, government officials and financial staff. All these members have offered their advice on how to help TVEs improve their energy efficiency and on how to formulate Action Plan. LPIC has also contributed a lot to environment protection and energy conservation cause by signing Energy Efficiency Voluntary Agreements with TVEs.

2. Experiences accumulated from LPIC establishment

(1) Communicate widely with relevant stakeholders and helps local governments and TVEs to fully understand the project

In the process of project implementation, it is the first time for many government officials and entrepreneurs to come into contact with the concept of international project as well as LPIC and Voluntary Agreement. It proves to be the biggest obstacle to the smooth implementation of the project. PMO and PIC have actively publicized the concept of LPIC and Voluntary Agreement on many occasions such as PIC annual meeting and other activities conducted by other subcontractors. They have also spent a lot of time and energy on communicating with demonstration TVEs and local governments. In order to guarantee the quality of LPIC construction, PMO and PIC officials have participated in the surveys conducted by LPIC subcontractors. As to the establishment of LPIC and the extension of Voluntary Agreement, the subcontractors have changed their attitude from that I'll help them to that local governments wants my help.

(2) Conduct surveys before establishing LPIC

Before organizing a LPIC, surveys should be conducted to find policy barriers. According to the survey results, a practical Action Plan is to be formulated to remove the policy barriers and to extend Energy Efficiency Voluntary Agreement among TVEs. The relevance, effectiveness and operability of the survey and research are the key to the success of LPIC. The first-hand materials gathered during the surveys

are crucial to future work.

(3) Diversify the setup of LPICs

- With TVE concept changes and economic reform deepens, the LPICs' supporting agencies are diversified

With enterprises' ownership becoming increasingly clear, the concept of TVE has become diversified. TVE is closely related to rural communities, agriculture and farmers and it is a geographic term. The term of medium and small-sized enterprise stresses the enterprise scale. The term of nongovernmental enterprise refers to enterprises that are not proprietarily controlled by government and big collectives and it stresses the ownership of the enterprise.

Identifying LPIC's supporting institute depends on actual situations. The relevant institutes' capability and local government's willingness should be fully considered. The establishment of LPIC with local characteristics is helpful for TVEs' energy conservation and GHG emission reduction.

- Industrial policy restructuring and the application of new technologies and new equipments has helped to change the geographic concept of LPIC

Industrial policy restructuring and the application of new technologies and new equipments have exerted considerable impact on the leading industries in some regions. It has not only changed local leading industry's technical equipment structure but also brought new opportunities for its development and for energy conservation and pollution reduction. LPIC at county level is quite limited to play an effective role. LPIC at municipal level or even at provincial level shall be a more effective coordination mechanism. The vision of LPIC integrated into municipal and provincial industrial restructuring and economic development is a breakthrough and a new trial for the regional concept of LPIC. It helps to promote energy conservation and GHG emission reduction among municipal and provincial leading industries. LPIC at municipal and provincial level have been established in Shanxi province and Dalian city.

- Industrial associations play an effective role as NGO to change LPIC's undiversified membership

With government administration style changes from micro level to macro level and from command-oriented to service-oriented, various kinds of industrial associations emerge as the times require. These associations have been engaged in enterprise management. At the same time, entrusted by the local governments, they have undertaken certain government functions. It has become feasible for associations to support the establishment of LPIC and for its capacity building. Therefore, PMO has planned to establish LPICs among extended TVEs on the basis of Guangdong Cement Association, Xi'an Wall Materials Industrial Association and Liaoning Wall Materials Reform Office, and use this model in the LPICs building in other replication areas step by step.

(4) LPIC's work being integrated into local government's work is a major step to keep LPIC's sustainability and vitality

LPIC's nature, working contents and achievements is closely related to government function and working objective. LPIC's work of identifying barriers against adopting energy conservation and GHG emission reduction technologies, helping them to remove these barriers and promoting TVEs' to adopt Voluntary Agreement has added living force to local government work. LPIC's work being integrated into local government's work is a major step to keep LPIC's sustainability and vitality.

(5) LPICs' work has closely depended on NGOs

Since 1990s, Chinese government has established the reform objective of "small government and big society". On the one hand, government needs NGOs to exchange information with the public and to help to maintain market and social order, to reduce government administration costs and to improve the efficiency of public decision making. On the other hand, the unorganized individuals also need NGOs to safeguard their interests. LPIC can utilize its advantages in information, communication, publicity, technologies, human resources, working network and influence to provide powerful support for energy conservation and GHG emission reduction.

IV Problems identified in phase I and phase II

1. The public supervision and TVEs' self-discipline should be strengthened

The advanced technologies and ideas adopted in developed countries for energy conservation, GHG emission reduction and environment protection should be learnt with more open attitude and public supervision and TVEs' self-discipline should be strengthened. Like tax, energy conservation and GHG emission reduction and environment protection should be accepted as a kind of reward to the society.

2. LPICs' work should be closely integrated into demonstration TVEs' and local governments' work

It has been proved that the energy conservation and GHG emission reduction technologies and the technical reform plan recommended by PMO must be part of demonstration TVEs' development plan. LPIC action plan must be integrated into local government development plan. It is the only way to ensure the smooth implementation of demonstration TVEs' technical reform. The major reason why there are some LPICs and demonstration TVEs whose construction process has lagged behind is because of the changed technical reform policy and plan. Accordingly, our work has to be adjusted.

3. LPICs' working experiences should be summarized and refined

It has been proved that in China, it is impossible for one single administrative institute to solve the complicated problem of energy conservation and GHG emission reduction. It is feasible for a special coordination institute, like LPIC, which was constituted by some relevant government administrations, to play an important role to remove policy barriers and to extend Energy Efficiency Voluntary Agreement. LPIC's operation experiences shall be summarized and problems shall be identified. Recommendations should be submitted to local institutional reform administration for their reference.

Annex 15.1

Energy Efficiency Voluntary Agreement Template for Brick Industry

BETWEEN

1. _____(Hereinafter referred to the local Government)

AND

2. _____(*Hereinafter referred to the Enterprise*)

1. Background

1.1 Voluntary Agreement is an agreement that is entered voluntarily by and between a trade organization or individual enterprise and the local government in order to improve energy efficiency and reduce greenhouse gas emissions. Industry organizations or enterprises commit to meet the target of energy efficiency or GHG emission reduction, and the local government provides preferential policies to the industry organizations and the enterprises.

1.2 The Project of "Energy Conservation and Greenhouse Gas (GHG) Emissions Reduction in Chinese Township and Village Enterprises ("TVEs") – Phase II, sponsored by the GEF, was implemented by the Untied Nations Industrial Development Organization (UNIDO) and Ministry of Agriculture (MOA) of the People's Republic of China. The purpose of the Project is to help Chinese township enterprises to adopt efficient energy conservation technologies and reduce the greenhouse gas emission from brick industry, cement industry, casting industry, and coke industry in China.

1.3 In order to formulate and implement action plans to promote regulatory reforms and commercialization of energy efficiency technologies and projects among TVEs, the Energy Conservation Voluntary Agreement is formulated so as to construct a society of saving resource and carry out the national "medium-and-long-term special energy efficiency layout" in respect of generalization of the spirit of Energy Conservation Voluntary Agreement.

2 General Situation of Enterprise

2.1 Brief Introduction of the Enterprise

Including the year of established, the ownership, the fixed assets, the output, the total employees, the raw materials, the main products, the sale situation and so on.

2.2 Technical Process of the Enterprise

Including the processing flow, installed capacity, the major energy- consumption equipments.

2.3 Energy Consumption

The Energy use of the Enterprise in 2005

types	Energy consumption (physical quantity)	Conversion Factor	Energy use in tce	CO2 Emissions (t-CO_2)
Coal				
fly ash				
Electricity				
Total				
Production (10,000bce)				
Unit product Energy Consumption (tce/10,000bce)				

3. Targets of Energy Conservation

3.1 Through the Voluntary Agreement implement, the local Government shall fulfill the transformation of governmental function and explore a new mechanism aimed to achieve the same energy conservation goal but without compulsory commands. Furthermore, the Enterprise shall reduce production cost, improve product quality, protect environment, and thus, establish a better public image for the enterprise.

3.2 The Enterprise establishes voluntarily the following direct Energy Efficiency targets: based on 2005 (reference year), by 31st December 200___, the Enterprise shall complete the project of Technical Renovation and energy saving. Energy Reduction of 10,000 bce ___%, Energy Savings ___tce/a, CO_2 emission Reduction t.

3.3 Because the government adopts stricter environmental standard and more energy is consumed, the targets shall be adjusted if the conditions occur.

4. Measures for Energy Conservation

4.1 In order to fulfill the target of Energy Conservation on time, the Enterprise shall establish a concrete Energy Conservation Plan, which shall be reviewed and approved by the Government, and implement the plan carefully.

4.2 The Enterprise shall enhance the energy management, establish energy management system and energy efficiency standards, improve the internal regulations, assign full-time energy manager to be responsible for the energy management, improve employee's consciousness of energy conservation.

4.3 The Enterprise decide to take the following measure so as to complete the project in the certain time:

No	Measures of saving energy	Anticipated Energy Savings (tce/a)	CO_2 emission Reduction (t/a)	Start-end date
1				
2				
3				
4				
Sum Total				

5. Preferential Policies

5.1. Depreciation acceleration can be applied to the equipment in the Clean Production List.

5.2. Energy audit and training expense for the Energy Conservation Project can be included in the management cost.

5.3. The proportional limit of cost of R&D on energy conservation can be

increased and included in the management cost.

5.4. The local Government committed to assist the Enterprise in solving financing problems such as financing difficulties through the local governmental credit system for medium- and small-scale enterprises and to recommend the Enterprise to apply for recycling fund loan and other commercial loans, which will be used in the energy conservation project.

5.5. After the Enterprise signs the Voluntary Agreement, the local Government shall promise to recommend for the pilot program as well as award the honorable title to the Demonstration while introducing and extending the experience of the Enterprise in the pilot on media.

5.6 any other Preferential Policies include:

6. Monitoring and Assessment

6.1 The Enterprise agrees to receive assessment of the effect of the Voluntary Agreement implementation.

6.2 In the valid period of the agreement, the Enterprise shall submit an annual Supervision Report to the local Government and the Technical Team in written form in the first quarter every year, and submit the final report in the first quarter in the next year after the Agreement ends. The report shall include: production statistics, energy consumption data, status of implementation of Energy Conservation Plan and Energy Conservation Project, effect of energy conservation, problems and barriers, plan for the next year, measure adjustment, experiences and lessons, and suggestion for perfecting the Voluntary Agreement.

6.3 The Technical Team is responsible for evaluation in the implementation of the agreement, including the evaluation of the Energy Conservation Plan, Annual Monitoring Reports, the Interim Report, and the Final Report submitted by the Enterprise. The Technical Team shall inform the assessment result in writing to the local Government and the Enterprise. The assessment report shall cover evaluated comments on the authenticity of data, the Energy Conservation Plan and projects of the Enterprise, the status to meet the targets, and the suggestion on Agreement modification.

6.4 If the Evaluation Report indicates that the Enterprise failed to meet the requirement that the Agreement defines, the Enterprise shall adopt measures including identifying problems, seeking new energy conservation measures, improving the energy conservation efforts in the next year, modifying energy conservation plan, based on the advice from the Technical Team.

7. Modifications and Termination

The agreement shall be modified or terminated if the following conditions occur:

- ✧The Laws, Regulations, or policies related to energy or environmental protection have big changes compared with the year when the agreement is signed.

- ✧Implementation of the Agreement has negative impact to the development or normal operation of the Demonstration.

The agreement shall come into force from the date it is signed. Any pending matters in the agreement shall be discussed jointly between parties and an additional agreement shall be entered and being equally valid.

(seal)	(seal)
Authorized representative	Authorized representative
Date:	Date:

Annex 15.2

Energy Efficiency Voluntary Agreement Template for Casting Industry

BETWEEN

1. _____(Hereinafter referred to the local Government)

AND

2. _____ (Hereinafter referred to the Enterprise)

1. Background

1.1 Voluntary Agreement is an agreement that is entered voluntarily by and between a trade organization or individual enterprise and the local government in order to improve energy efficiency and reduce greenhouse gas emissions. Industry organizations or enterprises commit to meet the target of energy efficiency or GHG emission reduction, and the local government provides preferential policies to the industry organizations and the enterprises.

1.2 The Project of "Energy Conservation and Greenhouse Gas (GHG) Emissions Reduction in Chinese Township and Village Enterprises ("TVEs") – Phase II, sponsored by the GEF, was implemented by the Untied Nations Industrial Development Organization (UNIDO) and Ministry of Agriculture (MOA) of the People's Republic of China. The purpose of the Project is to help Chinese township enterprises to adopt efficient energy conservation technologies and reduce the greenhouse gas emission from brick industry, cement industry, casting industry, and coke industry in China.

1.3 In order to formulate and implement action plans to promote regulatory *reforms and commercialization of energy efficiency technologies and projects among* TVEs, the Energy Conservation Voluntary Agreement is formulated so as to construct a society of saving resource and carry out the national "medium-and-long-term special energy efficiency layout" in respect of generalization of the spirit of Energy Conservation Voluntary Agreement.

2 General Situation of Enterprise

2.1 Brief Introduction of the Enterprise

Including the year of established, the ownership, the fixed assets, the output, the total employees, the raw materials, the main products, the sale situation and so on.

2.2 Technical Process of the Enterprise

Including the processing flow, installed capacity, the major energy- consumption equipments.

2.3 Energy Consumption

The Energy use of the Enterprise in 2005

types	Energy consumption (physical quantity)	Conversion Factor	Energy use in tce	CO2 Emissions (t-CO_2)
Coal				
coke				
Electricity				
Product oil				
Total				
The ratio of the waster(%)				
Production (t)				
Unit product Energy Consumption (tce/t)				

3. Targets of Energy Conservation

3.1 Through the Voluntary Agreement implement, the local Government shall fulfill the transformation of governmental function and explore a new mechanism aimed to achieve the same energy conservation goal but without compulsory commands. Furthermore, the Enterprise shall reduce production cost, improve product quality, protect environment, and thus, establish a better public image for the enterprise.

3.2 The Enterprise establishes voluntarily the following direct Energy Efficiency targets: based on 2005 (reference year), by 31st December 200___, the Enterprise shall complete the project of Technical Renovation and energy saving. Energy Reduction every ton of cast___%, Energy Savings___tce/a, CO2 emission Reduction t.

3.3 Because the government adopts stricter environmental standard and more energy is consumed, the targets shall be adjusted if the conditions occur.

4. Measures for Energy Conservation

4.1 In order to fulfill the target of Energy Conservation on time, the Enterprise shall establish a concrete Energy Conservation Plan, which shall be reviewed and approved by the Government, and implement the plan carefully.

4.2 The Enterprise shall enhance the energy management, establish energy management system and energy efficiency standards, improve the internal regulations, assign full-time energy manager to be responsible for the energy management, improve employee's consciousness of energy conservation.

4.3 The Enterprise decide to take the following measure so as to complete the project in the certain time:

No	Measures of saving energy	Anticipated Energy Savings (tce/a)	CO_2 emission Reduction (t/a)	Start-end date
1				
2				
3				
4				
Sum Total				

5. Preferential Policies

5.1. Depreciation acceleration can be applied to the equipment in the Clean Production List.

5.2. Energy audit and training expense for the Energy Conservation Project can be included in the management cost.

5.3. The proportional limit of cost of R&D on energy conservation can be increased and included in the management cost.

5.4. The local Government committed to assist the Enterprise in solving financing problems such as financing difficulties through the local governmental credit system for medium- and small-scale enterprises and to recommend the Enterprise to apply for recycling fund loan and other commercial loans, which will be used in the energy conservation project.

5.5. After the Enterprise signs the Voluntary Agreement, the local Government shall promise to recommend for the pilot program as well as award the honorable title to the Demonstration while introducing and extending the experience of the Enterprise in the pilot on media.

5.6 any other Preferential Policies include:

6. Monitoring and Assessment

6.1 The Enterprise agrees to receive assessment of the effect of the Voluntary Agreement implementation.

6.2 In the valid period of the agreement, the Enterprise shall submit an annual Supervision Report to the local Government and the Technical Team in written form in the first quarter every year, and submit the final report in the first quarter in the next year after the Agreement ends. The report shall include: production statistics, energy consumption data, status of implementation of Energy Conservation Plan and Energy Conservation Project, effect of energy conservation, problems and barriers, plan for the next year, measure adjustment, experiences and lessons, and suggestion for perfecting the Voluntary Agreement.

6.3 The Technical Team is responsible for evaluation in the implementation of the agreement, including the evaluation of the Energy Conservation Plan, Annual Monitoring Reports, the Interim Report, and the Final Report submitted by the Enterprise. The Technical Team shall inform the assessment result in writing to the local Government and the Enterprise. The assessment report shall cover evaluated comments on the authenticity of data, the Energy Conservation Plan and projects of the Enterprise, the status to meet the targets, and the suggestion on Agreement modification.

6.4 If the Evaluation Report indicates that the Enterprise failed to meet the requirement that the Agreement defines, the Enterprise shall adopt measures including identifying problems, seeking new energy conservation measures, improving the energy conservation efforts in the next year, modifying energy conservation plan, based on the advice from the Technical Team.

7. Modifications and Termination

The agreement shall be modified or terminated if the following conditions occur:

- ✧ The Laws, Regulations, or policies related to energy or environmental protection have big changes compared with the year when the agreement is signed.

- ✧ Implementation of the Agreement has negative impact to the development or normal operation of the Demonstration.

The agreement shall come into force from the date it is signed. Any pending matters in

the agreement shall be discussed jointly between parties and an additional agreement shall be entered and being equally valid.

(seal)	(seal)
Authorized representative	Authorized representative
Date:	Date:

Annex 15.3

Energy Efficiency Voluntary Agreement Template for cement Industry

BETWEEN

1. _____(Hereinafter referred to the local Government)

AND

2. _____(Hereinafter referred to the Enterprise)

1. Background

1.1 Voluntary Agreement is an agreement that is entered voluntarily by and between a trade organization or individual enterprise and the local government in order to improve energy efficiency and reduce greenhouse gas emissions. Industry organizations or enterprises commit to meet the target of energy efficiency or GHG emission reduction, and the local government provides preferential policies to the industry organizations and the enterprises.

1.2 The Project of "Energy Conservation and Greenhouse Gas (GHG) Emissions Reduction in Chinese Township and Village Enterprises ("TVEs") – Phase II, sponsored by the GEF, was implemented by the Untied Nations Industrial Development Organization (UNIDO) and Ministry of Agriculture (MOA) of the People's Republic of China. The purpose of the Project is to help Chinese township enterprises to adopt efficient energy conservation technologies and reduce the greenhouse gas emission from brick industry, cement industry, casting industry, and coke industry in China.

1.3 In order to formulate and implement action plans to promote regulatory reforms and commercialization of energy efficiency technologies and projects among TVEs, the Energy Conservation Voluntary Agreement is formulated so as to construct a society of saving resource and carry out the national "medium-and-long-term special energy efficiency layout" in respect of generalization of the spirit of Energy Conservation Voluntary Agreement.

2 General Situation of Enterprise

2.1 Brief Introduction of the Enterprise

Including the year of established, the ownership, the fixed assets, the output, the total employees, the raw materials; the main products, the sale situation and so on.

2.2 Technical Process of the Enterprise

Including the processing flow, installed capacity, the major energy- consumption equipments.

2.3 Energy Consumption

The Energy use of the Enterprise in 2005

types	Energy consumption (physical quantity)	Conversion Factor	Energy use in tce	CO2 Emissions (t-CO_2)
Coal				
Electricity				
Total				
The Output of cement(t)				
The Output of clinker(t)				
The Coal consumption of clinker(tce/t)				
The total Electricity consumption of cement(kWh/t)				
The total energy consumption of cement(tce/t)				

3. Targets of Energy Conservation

3.1 Through the Voluntary Agreement implement, the local Government shall fulfill the transformation of governmental function and explore a new mechanism aimed to achieve the same energy conservation goal but without compulsory commands. Furthermore, the Enterprise shall reduce production cost, improve product quality, protect environment, and thus, establish a better public image for the enterprise.

3.2 The Enterprise establishes voluntarily the following direct Energy Efficiency targets: based on 2005 (reference year), by 31st December 200___, the Enterprise shall complete the project of Technical Renovation and energy saving. The total energy Reduction of cement(or clinker) ____%, Energy Savings（or Energy Recovered）___tce/a, CO_2 emission Reduction___t.

3.3 Because the government adopts stricter environmental standard and more energy is consumed, the targets shall be adjusted if the conditions occur.

4. Measures for Energy Conservation

4.1 In order to fulfill the target of Energy Conservation on time, the Enterprise shall establish a concrete Energy Conservation Plan, which shall be reviewed and approved by the Government, and implement the plan carefully.

4.2 The Enterprise shall enhance the energy management, establish energy management system and energy efficiency standards, improve the internal regulations, assign full-time energy manager to be responsible for the energy management, improve employee's consciousness of energy conservation.

4.3 The Enterprise decide to take the following measure so as to complete the project in the certain time：

No	Measures of saving energy	Anticipated Energy Savings (tce/a)	CO_2 emission Reduction (t/a)	Start-end date
1				
2				
3				
4				
Sum Total				

5. Preferential Policies

5.1. Depreciation acceleration can be applied to the equipment in the Clean Production List.

5.2. Energy audit and training expense for the Energy Conservation Project can be included in the management cost.

5.3. The proportional limit of cost of R&D on energy conservation can be increased and included in the management cost.

5.4. The local Government committed to assist the Enterprise in solving financing problems such as financing difficulties through the local governmental credit system for medium- and small-scale enterprises and to recommend the Enterprise to apply for recycling fund loan and other commercial loans, which will be used in the energy conservation project.

5.5. After the Enterprise signs the Voluntary Agreement, the local Government shall promise to recommend for the pilot program as well as award the honorable title to the Demonstration while introducing and extending the experience of the Enterprise in the pilot on media.

5.6 any other Preferential Policies include:

6. Monitoring and Assessment

6.1 The Enterprise agrees to receive assessment of the effect of the Voluntary Agreement implementation.

6.2 In the valid period of the agreement, the Enterprise shall submit an annual Supervision Report to the local Government and the Technical Team in written form in the first quarter every year, and submit the final report in the first quarter in the next year after the Agreement ends. The report shall include: production statistics, energy consumption data, status of implementation of Energy Conservation Plan and Energy Conservation Project, effect of energy conservation, problems and barriers, plan for the next year, measure adjustment, experiences and lessons, and suggestion for perfecting the Voluntary Agreement.

6.3 The Technical Team is responsible for evaluation in the implementation of the agreement, including the evaluation of the Energy Conservation Plan, Annual Monitoring Reports, the Interim Report, and the Final Report submitted by the Enterprise. The Technical Team shall inform the assessment result in writing to the local Government and the Enterprise. The assessment report shall cover evaluated comments on the authenticity of data, the Energy Conservation Plan and projects of the Enterprise, the status to meet the targets, and the suggestion on Agreement modification.

6.4 If the Evaluation Report indicates that the Enterprise failed to meet the requirement that the Agreement defines, the Enterprise shall adopt measures including identifying problems, seeking new energy conservation measures, improving the energy conservation efforts in the next year, modifying energy conservation plan, based on the advice from the Technical Team.

7. Modifications and Termination

The agreement shall be modified or terminated if the following conditions occur:

- ✧The Laws, Regulations, or policies related to energy or environmental protection have big changes compared with the year when the agreement is signed.
- ✧Implementation of the Agreement has negative impact to the development or normal operation of the Demonstration.

The agreement shall come into force from the date it is signed. Any pending matters in

the agreement shall be discussed jointly between parties and an additional agreement shall be entered and being equally valid.

(seal)	(seal)
Authorized representative	Authorized representative
Date:	Date:

1. Background

1.1 Voluntary Agreement is an agreement that is entered voluntarily by and between a trade organization or individual enterprise and the local government in order to improve energy efficiency and reduce greenhouse gas emissions. Industry organizations or enterprises commit to meet the target of energy efficiency or GHG emission reduction, and the local government provides preferential policies to the industry organizations and the enterprises.

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1.3 In order to formulate and implement action plans to promote regulatory reforms and commercialization of energy efficiency technologies and projects among TVEs, the Energy Conservation Voluntary Agreement is formulated so as to construct a society of saving resource and carry out the national "medium-and-long-term special energy efficiency layout" in respect of generalization of the spirit of Energy Conservation Voluntary Agreement.

2 General Situation of Enterprise

2.1 Brief Introduction of the Enterprise

Including the year of established, the ownership, the fixed assets, the output, the total employees, the raw materials, the main products, the sale situation and so on.

2.2 Technical Process of the Enterprise

Including the processing flow, installed capacity, the major energy- consumption equipments.

2.3 Energy Consumption

The Energy use of the Enterprise in 2005

types	Energy consumption (physical quantity)	Conversion Factor	Energy use in tce	CO2 Emissions (t-CO_2)
Coal				
Electricity				
Product oil				
Total				
Production (t)				
Unit product Energy Consumption (tce/t)				

3. Targets of Energy Conservation

3.1 Through the Voluntary Agreement implement, the local Government shall fulfill the transformation of governmental function and explore a new mechanism aimed to achieve the same energy conservation goal but without compulsory commands. Furthermore, the Enterprise shall reduce production cost, improve product quality, protect environment, and thus, establish a better public image for the enterprise.

3.2 The Enterprise establishes voluntarily the following direct Energy Efficiency targets: based on 2005 (reference year), by 31st December 200___, the Enterprise shall complete the project of Technical Renovation and energy saving. Energy Reduction every ton of coke___%, Energy Savings（or Energy Recovered）___tce/a, CO_2 emission Reduction___t.

3.3 Because the government adopts stricter environmental standard and more energy is consumed, the targets shall be adjusted if the conditions occur.

4. Measures for Energy Conservation

4.1 In order to fulfill the target of Energy Conservation on time, the Enterprise shall establish a concrete Energy Conservation Plan, which shall be reviewed and approved by the Government, and implement the plan carefully.

4.2 The Enterprise shall enhance the energy management, establish energy management system and energy efficiency standards, improve the internal regulations, assign full-time energy manager to be responsible for the energy management, improve employee's consciousness of energy conservation.

4.3 The Enterprise decide to take the following measure so as to complete the project in the certain time:

No	Measures of saving energy	Anticipated Energy Savings (tce/a)	CO_2 emission Reduction (t/a)	Start-end date
1				
2				
3				
4				
Sum Total				

5. Preferential Policies

5.1. Depreciation acceleration can be applied to the equipment in the Clean Production List.

5.2. Energy audit and training expense for the Energy Conservation Project can be included in the management cost.

5.3. The proportional limit of cost of R&D on energy conservation can be

increased and included in the management cost.

5.4. The local Government committed to assist the Enterprise in solving financing problems such as financing difficulties through the local governmental credit system for medium- and small-scale enterprises and to recommend the Enterprise to apply for recycling fund loan and other commercial loans, which will be used in the energy conservation project.

5.5. After the Enterprise signs the Voluntary Agreement, the local Government shall promise to recommend for the pilot program as well as award the honorable title to the Demonstration while introducing and extending the experience of the Enterprise in the pilot on media.

5.6 any other Preferential Policies include:

6. Monitoring and Assessment

6.1 The Enterprise agrees to receive assessment of the effect of the Voluntary Agreement implementation.

6.2 In the valid period of the agreement, the Enterprise shall submit an annual Supervision Report to the local Government and the Technical Team in written form in the first quarter every year, and submit the final report in the first quarter in the next year after the Agreement ends. The report shall include: production statistics, energy consumption data, status of implementation of Energy Conservation Plan and Energy Conservation Project, effect of energy conservation, problems and barriers, plan for the next year, measure adjustment, experiences and lessons, and suggestion for perfecting the Voluntary Agreement.

6.3 The Technical Team is responsible for evaluation in the implementation of the agreement, including the evaluation of the Energy Conservation Plan, Annual Monitoring Reports, the Interim Report, and the Final Report submitted by the Enterprise. The Technical Team shall inform the assessment result in writing to the local Government and the Enterprise. The assessment report shall cover evaluated comments on the authenticity of data, the Energy Conservation Plan and projects of the Enterprise, the status to meet the targets, and the suggestion on Agreement modification.

6.4 If the Evaluation Report indicates that the Enterprise failed to meet the requirement that the Agreement defines, the Enterprise shall adopt measures including identifying problems, seeking new energy conservation measures, improving the energy conservation efforts in the next year, modifying energy conservation plan, based on the advice from the Technical Team.

7. Modifications and Termination

The agreement shall be modified or terminated if the following conditions occur:

- ✧The Laws, Regulations, or policies related to energy or environmental protection have big changes compared with the year when the agreement is signed.

- ✧Implementation of the Agreement has negative impact to the development or normal operation of the Demonstration.

The agreement shall come into force from the date it is signed. Any pending matters in the agreement shall be discussed jointly between parties and an additional agreement shall be entered and being equally valid.

(seal)	(seal)
Authorized representative	Authorized representative
Date:	Date:

Annex 16

List of Replication TVEs which signed VA

1. Shengyang Xihuan Hollow Brick Plant
2. Shengyang Xinchengzi Qingshuitai Gaotang Hollow Brick Plant
3. Anshan Mayi Brick Plant
4. Shenyang Dongbeihong Brick Plant
5. Shenyang Yuhong Huangtukang Construction Material Plant
6. Shengyang Pingluo Construction Material Plant
7. Shuangliu Huayanghonghuo Shale Hollow Brick Plant
8. Shuangliu Changhong Shale Hollow Brick Plant
9. Shuangliu Gaofeng Shale Hollow Brick Plant
10. Shuangliu Jiancha Shale Brick Plant
11. Shuangliu Liugonghuineng Shale Brick Plant
12. Chengdu Sanli Shale Hollow Brick Ltd.
13. Nanjing Jiali Metalwork Co.Ltd
14. Shuanglong Anti- abrade Alloy Co.Ltd
15. Dongjun Machine Co.Ltd
16. Lishui Xusheng Foundry Co.Ltd
17. Huafeng Oil Pump Co.Ltd
18. Zhongshan Foundry Co. Ltd
19. Dalian Fengming Alloy Cast Steel Co. Ltd.
20. Dalian Jinzhou Tianyuan Foundry Machine Factory
21. Dalian Jinze Special Casting Co. Ltd.

Annex 17

Specification for Revision on Evaluation System of Action Plan of the LPLC

1. Background

The Phase II of project of "UNDP/GEF Energy Conservation & GHG Emission Reduction in Chinese TVEs" has been funded by GEF. The aim of the project is to help Chinese TVEs that engaged in cement, foundry, brick-making, and coking industry to overcome the market, policy, technology and financing barriers to the adoption of energy efficiency technologies

During the project's first phase, 4 LIPCs were established in Xinjing County in Sichuan, Dalin City, Tieshan District in Huangshi, and Jiangning District in Nanjing respectively. During the second phase, other 4 LIPC was established in Tongxiang city in Zhejiang, Yingde city in Guangdong, Baqiao district in Xi'an, and Shanxi respectively. During the third phase, 11 replication areas are selected to develop LPIC building. The replication areas are located in Jingnan District in Tianjing, Jinzhou District in Dalian, Shuangliu County in Chengdu, Xi'an City in Shaanxi, Xianyang City in Shaanxi, Jinzhong City in Shanxi, Linfen City in Shanxi, Nanjing City in Jiangsu, Liaoning Province, Guandong Province and Zhejiang Province.

Because of the support of local government, LPIC building has been succeeded in the replication area. Some former and abuilding LPIC participate actively in the implementation of project and incorporated the project to the objective of the government's work. To monitor the working condition of LIPC, summarize experiences, and promote the energy conservation and technical innovation in TVEs, subcontractor designed monitoring and evaluation system of action plan of the LPLC in subcontract of phase I. LPICs were required to submit the annual working report and evaluated in phase II and phase III. Evaluation system is required to be revised in phase III. Revised specification was shown as follow.

2. Existing Problem of the Former Evaluation System

The subcontractor analyzed the annual reports which were submitted by each LPIC and found some problems in the evaluation system.

1) The evaluation indices are not specified enough.

The indices of former evaluation system include polity coordination and implementation, capability building, implementation of the Energy Conservation Voluntary Agreement, the popularized condition of Energy Conservation Voluntary Agreement. Main role of the LPIC was covered in these five fields approximately. But work plan of LPICs was established in accordance with local and industrial condition. Because the actual work will not be explanation by the former system, it is necessary to develop detailed evaluation indices.

2) Benchmark of the evaluation for annual work is missing

The annual work of LPIC is evaluated in two aspects including outputs and implementation of the action plan in the former evaluation system. What have been done and the output were described, but benchmark of the evaluation is missing. Because many activities and the finished time of each scheme have been described in the action plan, the LPIC should establish the detailed annual work plan and carry out strictly. If the objective and mission were not reflected in the evaluation system, it is hard to evaluate the LPIC's work exactly and integrally.

3) The detailed rules are not exact.

The description in former system is that excellent for less than 3"B"and no"C"; ok for less than 5"B" or less than 3"C"; not ok otherwise. The description is not exact. The detailed rules should be revised.

3. Specification of Revision

1) Specify the indexes of evaluation

(I) The clause 1.3.1 "coordination and implementation of policy" should be subdivided to policy making and implementation of preferential policy. The responsibilities of LPIC include not only assisting and facilitating the technical renovation for the replication enterprise, but also helping the local TVEs to overcome the obstacle in the implementation of energy conservation and GHG emission reduction. "Policy making" means that LIPC will coordinate with other departments and make policy which will in favor of implementation of technology for energy conservation and GHG emission reduction. "Implementation of preferential policy" means the preferential policy will be supplied to replication enterprises.

(II) The clause 1.3.2 "capability building" should be subdivided to two parts including "carry out training" and "dissemination and education". The comprehensive evaluation includes improvement of capability, enhancement of awareness of enterprise and public, and improvement of the management of technology and energy source.

(III) The clause 1.3.3 "TVE performance in VA implementation" should be subdivided to two parts including "progress of technical innovation in TVE" and "achieved quantity for energy conservation and emission reduction". The objective of action plan will associate with the condition of implementation of technical renovation. It will reflect the work effect directly.

(IV) The clause 1.3.4 "Replication of VA" should be subdivided to "the non-pilot/replication TVEs who have signed VA" and "the non-pilot/replication TVEs that are willing to sign VA". It is easy to quantify the popularizing work.

2) Add benchmark of the evaluation for annual work

The two standards of "result" and "review of action plan implementation" will be revised to three standards including objective, activities and review of result. The integrated chain including objective, activity and result will be established.

3) The detailed rules are logical.

The description in former system is that excellent for less than 3"B"and no"C"; ok for less than 5"B" or less than 3"C"; not ok otherwise. The revision is that excellent for less than 3"B"and no"C"; ok for less than 5"B" and less than 3"C"; not ok otherwise.

4. Revised evaluation system

See the annex.

Annex

Revised Evaluation System of Action Plan

Working Procedure of LPIC Evaluation

1. PIC is responsible for evaluation of LPICs.
2. LPIC submits to the PIC Secretariat (the Secretariat in short) LPIC Annual Work Report (Work Report in short) before January 31 every year. Document Two gives the form of the Work Report.
3. The Secretariat presents the Work Report to PIC members within seven days after it is received.
4. PIC members review and evaluate the Work Report against the LPIC Evaluation Form, which should be handed over to the Secretariat before March 30.
5. The Secretariat will sum up the completed evaluation forms and submit to PMO a summary of the evaluation.
6. PMO examines the Work Report and the evaluation summary and if necessary, makes field survey of individual LPIC. An annual evaluation after the examination will be circulated.
7. It is proposed that at the project end, a national organization administrating TVEs appoint an agency to take over the Secretariat's responsibility of LPIC evaluation. A panel of experts is proposed to examine the evaluation.

LPIC Annual Work Report

1、General information			
1.1Contact information			
LPIC Name			
Office Address			
Contact person		Tel	
1.2 Staff (information of replacing staff including work unit, position, education and working experience)			
1.3 Annual Work			

Major activities		**Objective**	**Activities**	**Review of Result**
1.3.1 Coordination and implementation of policy	a. Policy making			
	b. Implementation of preferential policy			
1.3.2 Capability building	a. Carry out training			
	b. Dissemination and education.			
1.3.3 TVE performance in VA implementation	a. Progress of technical renovation in TVEs			
	b. Achieved quantity for energy conservation and emission reduction			
1.3.4Replication of VA	a. Non-pilot /replication TVEs who have signed VA			
	b. Non-pilot /replication TVEs that are willing to sign VA			
1.3. 5Others				

1.4 Work Plan for next year		
Major activities planned	Expected Results	Review of Action Plan Implementation

Rules of LPIC Annual Evaluation

I. Organization and staff

No.	Evaluation Item	Evaluation	Proposal
1	Office address fixed and furnished with modern office equipment		
2	Established with official document		
3	Profile of LPIC staff available, whose special knowledge and position are in conformity with job requirements.		
4	Full-time staff in conformity with job requirements in terms of staff number, special knowledge and capacity		
5	Operation in strict compliance with LPIC statute		

2、Annual work

No.	Evaluation Item	Evaluation	Proposal
6	Active coordination for and formulation of environment policy, favorable policy for pilot TVEs or replication TVEs in particular.		
7	Active development of policies aimed at promoting industrial energy conservation and emissions reduction at the local level		
8	Training and survey activities aimed at improving the environment awareness of local officer's and TVE executive's at the local level		
9	Clear evaluation of TVE performance in implementing VA and technical innovation, and assessment of TVE energy efficiency potential.		
10	Replication of VA mechanism in non-pilot TVEs and industries (VA signed every year by and between TVEs and the local government)		
11	Effective implementation and timely modifications and adjustment of Action Plan aimed at better energy efficiency and emissions reduction		
12	Annual work plan developed and fulfilled based on Action Plan		

3、Objective

No.	Evaluation Item	Evaluation	Proposal
13	EEI fulfilled as set in immediate objectives		
14	EEI reduction fulfilled as immediate objective		
15	EEI reduction fulfilled as medium and long term objectives		

Notes: 1. Evaluation should be done by "A" for good; "B"for OK; "C"for not OK

2. Excellent for less than 3"B" and no "C"; OK for less than 5"B"and less than 3"C"; not OK otherwise