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Energy Conservation and Greenhouse Gas Emissions Reduction in
Chinese Township and Village Enterprises - Phase II (FC/CR/05/G/31)

Metal Casting Sector Replication Projects for Energy Efficiency in
Dalian

First Progress Report

(Dec 8, 2006)



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CECIC Blue Sky Investment Consulting & Management Co., Ltd.

**Energy Conservation and Greenhouse Gas Emissions Reduction in
Chinese Township and Village Enterprises – Phase II (EG/CPR/99/G31)**

**Metal Casting Sector Replication Projects for Energy Efficiency (3)
(Dalian)**

Final
First Progress Report

(Dec. 8, 2006)



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Introduction

Since 2001, funded by the GEF, Ministry of Agriculture of China (MOA), the UNDP and UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO) jointly implemented the Project of “Energy Conservation and Greenhouse Gas Emissions Reduction in Chinese Township and Village Enterprises”. The objective of the project is to reduce greenhouse gas emissions from the Chinese township and village enterprises (TVEs). The project aims to remove key policy, market, technology, and financial barriers to the adoption of energy-efficient technologies in the brick, cement, metal casting, and coking sectors.

In the second half of 2005, the project went from the first phase piloting to the second phase replication. At the end of March 2006, CECIC Blue-Sky Investment Consulting & Management Co. Ltd. (Blue-Sky Company for short) undertook the tasks for offering consulting service on engineering for the project: “Metal Casting Sector Replication Projects for Energy Efficiency (3) (Dalian)”, which is the subproject of “Energy Conservation and Greenhouse Gas Emissions Reduction in Chinese Township and Village Enterprises (TVEs) – Phase II”. The purpose of the subproject is to replicate the technical renovation of prior pilot TVEs in eight foundries for energy efficiency improvement in Jinzhou District, Dalian. They are respectively:

Dalian Tianyuan Foundry

Dalian Baotong Corporation

Dalian Jinze Corporation

Dalian Jinzhoumaolong Industry Co., Ltd

Dalian Qianbao Iron Casting Co., Ltd

Dalian Yongxin Precision Steel Casting Co., Ltd

Dalian Far-east Precision Casting Co., Ltd

CECIC Blue-Sky Investment Consulting & Management Co. Ltd.

Dalian Fengming Alloy and Steel Casting Co., Ltd

The task of Blue-Sky Company is to offer necessary consulting and engineering services to fulfill the purposes. In term of TOR of the project, Blue-Sky Company will finish the project through eight activities in two phases.

Phase 1: Consulting Service. The task is to provide consulting services for 8 potential replication foundries, including carrying out a plant-level assessment, preparing a project proposal and feasibility study, and setting up a plant-wide management system. The main activities are:

- Activity 1: Briefing at start of project
- Activity 2: Site Survey, Assessment and Consultation with Plant Management
- Activity 3: Prepare the Project Plan, Feasibility study and Management Framework
- Activity 4: Review and Examine Feasibility Study Report, Project Plan Decided

Phase 2: Engineering Service. The task is to implement the 8 replication projects, including engineering design and construction, equipment purchase and installation, and personnel training. The main activities are:

- Activity 5: Assist plant management in engineering design, construction preparation and Equipment Purchase, Write Project Progress Report
- Activity 6: Track Construction Progress, Co-financing, Training and Write Project Progress Report
- Activity 7: Equipment Installation, Testing, and Commissioning, Set up Management System, Write Draft Final Report
- Activity 8: Project Operation, Wrap-up and Write Final Report

Up to September 3, 2006, Blue-Sky Company has already finished all tasks of the project plan. This document is the Draft Final Report to UNIDO, prepared by Blue-Sky Company in accordance with the contract. The paper will summarize in detail all the activities and their results that occurred in each phase of project plan on the purpose to make all the executive officers from UNIDO and Project Managing Office (PMO) under Ministry of Agriculture (MOA) aware of the project progress thoroughly and authentically.

A. Works before Start of The Project

1. Signing of the Service Contract

Dec. 7, 2005, in responding the request for invitation from UNIDO, Blue-Sky Company formally submitted the proposal for provision of technical services and other bidding documents.

Feb. 20, 2006, Blue-Sky Company received fax from UNIDO saying that Blue-Sky Company had been selected for the provision of consulting and engineering services.

March 20, 2006, Blue-Sky Company received the formal contracts from UNIDO, signed them, returned two copies of them and retained one copy. The contract was established between two parties.

2. Preparation for the Project

Before receiving formal contract, Blue-Sky Company started preparing for the project.

March 6, 2006, the project team members held work meeting to discuss and to decide the work plan and assignments of workloads. It was decided to do site survey early in April. Before doing site survey, it was emphasized to collect papers and documents about

technical renovation in pilot TVEs and to formulate outlines and data forms.

B. Project Progress in Phase 1

1. Briefing on Project Plan

March 15 to 16, 2006, the project team from Blue-Sky Company made a briefing on work plan and assuring measures to the PMO in Henan Plaza, Beijing. Present in this event were: PMO officers Wang Guiling, Xu Litong, Wang Hai and Song Dongfeng from Hongyuan Company and local government officer Han Jigang from Dalian Local Policy Instruction Committee (LPIC).

At first, the project team leader Zeng Wu made a speech on:

- Introduction to team members;
- Comprehension to the objectives and tasks of the project;
- Work plan;

Secondly, the team members and all officers discussed and affirmed project schedule and content and manner of outcomes. With the exchange of views and ideas, the work team was much clearer about the significance and objectives of this project, and ascertained the path and strategies to achieve the objectives.

In addition, the work team also exchanged with other contractors the views on selection of technical plans of energy conservation renovation for foundries and the characteristics of this kind of enterprises. That brought *richness in ideas and width in sight*.

2. Site Survey, Assessment and Consultation with Plant Management

From April 3 to 14, 2006, five members of the project team from Blue-Sky Company, Zeng Wu, Lu Shaoyang, Wang Jin, Xu Keliang and Zhu Jilu, did site survey, assessment and consultation with plant management in eight TVEs in Jinzhou District, Dalian.

On the first day of the trip, there was held a meeting of all leaders from eight TVEs. Mr. Han Jigang from Dalian LPIC presided over the meeting. Mr. Lu Shaoyang gave the central speech in the meeting. The aim of the meeting is to inform the leaders of the TVEs about the objectives and significance of the project and work plan, some tasks that the TVEs needed to help finishing in this time survey, etc. All participants also discussed the work plan and decided the schedule for the survey.

From the second day on, members of the project team from Blue-Sky Company got to the work shop of the TVEs, stayed for one or two days in each TVE, and finished following work:

Survey on production situation of the TVEs and collection of data needed. They are: production processes, technologies and equipment, raw materials, energy (electricity and coal) use and saving potential, products, output, and markets, production workers and technical personnel, ownership, fixed assets, loans, and other financial information.

Based on the information collected, do comprehensive assessment and consultation with plant management, propose a list of measures and investments to the plant management to upgrade the existing production technologies and equipment, and submit a preliminary plan for capital input for the investments and co-financing commitment of each TVEs.

3. Prepare Feasibility Study Report

From the end of April to the end of May of 2006, the project team from Blue-Sky Company prepared feasibility study reports of the renovation project for eight TVEs. During the period, the reports have been discussed and modified in seminars. Additional rounds of complementary investigation and data verification have taken place. Finally the reports have passed the examination of expert group.

The total capital input for renovation of eight foundry TVEs is RMB 12,566,700.

After renovation, the weighed average energy-saving rate per ton casting is 28.38 %;

Total energy saving per year is 2010 tce;

Total CO₂ emission reduction per year is 5012 ton.

The above result will be in accordance with the requirement of the TOR in the contract under the “Energy Conservation and Greenhouse Gas Emissions Reduction in Chinese Township and Village Enterprises (TVEs) ---Phase II” of UNIDO.

3.1 Baseline for eight TVEs

3.2 Renovation Plan and Investment Arrangement

No.	TVEs	Energy Use/Unit Product (tce/t castings)	Total Energy Use (tce)	CO ₂ Emissions (t/a.)
1	Dalian Tianyuan Foundry	0.416	1,249.36	3,114.65
2	Dalian Baotong Corporation	0.410	573.91	1,430.76
3	Dalian Jinze Corporation	0.392	1,175.30	2,930.02
4	Dalian Jinzhoumaolong Industry Co., Ltd	0.368	552.34	1,376.98
5	Dalian Qianbao Iron Casting Co., Ltd	0.301	1,506.44	3,755.56
6	Dalian Yongxin Precision Steel Casting Co., Ltd	0.377	565.31	1,409.31
7	Dalian Far-east Precision Casting Co., Ltd	0.518	251.09	625.98
8	Dalian Fengming Alloy and Steel Casting Co., Ltd	0.571	228.27	569.07

No.	TVEs	Proposed Technical Renovation	Total Investment	GEF (US\$10,000)	Self-Funding (RMB)
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			(RMB ¥10,000))	¥10,000)
1	Dalian Tianyuan Foundry	Adoption of furnace hot-air cupola instead of cool-air cupola	66.16	1.375	55.16
2	Dalian Baotong Corporation	Adoption of intermediate frequency-conversion induced furnace instead of cool-air cupola.	114.64	1.375	103.64
3	Dalian Jinze Corporation	With one 1.5t frequency-conversion intermediate-frequency furnace instead of existing 3 small-sized furnaces	232.02	2.000	216.02
4	Dalian Jinzhoumaolong Industry Co., Ltd	Cupola replaced by medium-frequency induction furnace	114.64	1.375	103.64
5	Dalian Qianbao Iron Casting Co., Ltd	old cupola and furnace replaced by 2.5t frequency conversion induction furnace with medium-frequency	267.94	1.375	256.94
6	Dalian Yongxin Precision Steel Casting Co., Ltd	Renovate 0.4t electric induction furnace from capacity adjustment into frequency conversion	74.64	1.250	64.64
7	Dalian Far-east Precision Casting Co., Ltd	Renovate 0.25t electric induction furnace from capacity adjustment into frequency conversion	56.14	1.250	46.14
8	Dalian Fengming Alloy and Steel Casting Co.,	0.25t furnace replaced by 3t induction furnace with medium frequency and 3	330.49	2.000	314.49

	Ltd	bridge cranes			
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3.3 Anticipated Results

No.	TVEs	Production After Renovation (t castings/a.)	Energy Use/Unit Product (tce/t castings)	Energy Savings (tce/a.)	CO ₂ Emission Reduction (t/a.)
1	Dalian Tianyuan Foundry	3,000	0.164	757.36	1,888.09
2	Dalian Baotong Corporation	1,400	0.356	75.51	188.25
3	Dalian Jinze Corporation	3,000	0.205	560.30	1,396.83
4	Dalian Jinzhoumaolong Industry Co., Ltd	1,500	0.292	114.34	285.04
5	Dalian Qianbao Iron Casting Co., Ltd	5,000	0.273	141.44	352.62
6	Dalian Yongxin Precision Steel Casting Co., Ltd	1,500	0.317	89.81	223.89
7	Dalian Far-east Precision Casting Co., Ltd	485	0.430	42.54	106.06
8	Dalian Fengming Alloy and Steel Casting Co., Ltd	1,500	0.418	229.01	570.91
	Total	17385		2010.31	5011.69

4. Problems Encountered in Progress

At the beginning of April, 2006, LPIC of Jinzhon District, Dalian sent PMO under MOA an application to replace two of eight participant TVEs with two other foundry TVEs. The replaced TVEs and reasons for replacement are respectively:

Dalian Jinzhou Yuanjie Special Steel Foundry: it is because the foundry cannot meet the lowest co-finance requirement of TOR.

Dalian Xinzhong Foundry Co. Lid: because this plant was newly built by means of importing advanced equipments from Italy. It is extremely hard to attain the energy-saving target of 15% with present technology levels.

The two substituting foundries are Dalian Yongxin Precision Foundry and Dalian Baotong Foundry Co, Ltd. They are located in Hejia Town and Xiangying Town of eastern part of Jinzhou District where there are thirty-eight small-size foundries. Their involvement in the project will be much more influential. The managements of the two foundries are initiative and enthusiastic in energy-saving technical renovation. Their participation in the project will be speeding up the energy-saving technical renovation in the area.

The application has been approved by PMO under MOA.

This change did not bring any disadvantageous effect on the project's progress.

5. The Outcomes in Phase 1

Up to May 31, 2006, Blue-Sky Company has already finished all tasks in the first phase. They are: to design the energy-saving technical renovation plan for eight TVEs, to make the list of equipment purchased and investments, and to calculate the budget of the technical renovation and financing plan. All the results have been agreed by the management of participant TVEs. The expected performance of technical renovation and co-financing undertaken by the TVEs meet the requirements of the TOR in the contract under the "Energy Conservation and Greenhouse Gas Emissions Reduction in Chinese Township and Village Enterprises (TVEs) ----Phase II" of UNIDO.

Blue-Sky Company offered in the first phase such outcomes as: the M&E Forms and “The Energy-saving Technical Renovation Feasibility Study Report” for eight TVEs.

C. Project Progress in Phase 2

1. Design Drawings Completed

Starting from May, 2006, Blue-Sky Company conducted engineering design and provided 23 drawings in accordance with the feasibility research reports approved by the managements of the TVEs and the expert team.

2. Equipment Purchase

At the same time as the design drawings were started, Blue-Sky Company helped the TVEs to select and buy the necessary equipments for the projects by means of inviting bids equitably and openly.

The eight TVEs purchased 16 sets of equipments in total and the cost was RMB 9,693,500.

3. Construction, Installation and Check for Completion

Up to July 31, 2006, seven out of eight TVEs has finished construct, installation and been checked and accepted for project completion. Only the project of Dalian Baotong Corporation was still in the process and would be finished on August 15. The cost of installation for all eight TVEs would be RMB1, 369, 600.

The total investment for renovation projects of eight TVEs would be RMB12, 486, 900.

No.	TVEs	GEF (US\$10, 000)	Self-Funding (RMB¥ 10, 000)	GEF/ Self-Funding	Total Investment (RMB ¥ 10, 000)
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1	Dalian Tianyuan Foundry	1.375	53.7	1: 4.88	64.7
2	Dalian Baotong Corporation	1.375	108.6	1: 878	119.6
3	Dalian Jinze Corporation	2.000	221.18	1: 13.82	237.18
4	Dalian Jinzhoumaolong Industry Co., Ltd	1.375	103.64	1: 9.42	114.64
5	Dalian Qianbao Iron Casting Co., Ltd	1.375	257.08	1: 23.37	268.08
6	Dalian Yongxin Precision Steel Casting Co., Ltd	1.250	53	1: 5.3	63
7	Dalian Far-east Precision Casting Co., Ltd	1.250	41	1: 4.1	51
8	Dalian Fengming Alloy and Steel Casting Co., Ltd	2.000	314.49	1: 19.66	330.49
	Total	12	1152.69	1: 12	1248.69

4. Establishment of Energy Efficiency Management Systems

Through site survey and direct discussion with management of TVEs, the project team from Blue-Sky Company has tried to understand the current situation of management in TVEs' production, found out the weakness in the managing systems and suggested some pertinent improving measures. Furthermore, they also introduced the experiences and manners of pilot TVEs in technologies, equipments and management, assisted each TVE in setting up the practical and feasible management regulations and system to reinforce the production management, energy management and quality control.

The measures suggested by Blue-Sky Company focuses on energy efficiency management. The main points are:

Firstly, all TVEs have increased a new post of energy efficiency manager in the list of duty descriptions for work force. The key duties of the manager are: be responsible for recording, collection and analyses of data related to energy consumption; to supervise the implementation of management regulations and systems in energy consumption; and to advise the management of each TVE in heightening the level of energy efficiency management.

Secondly, the statistic system of energy consumption for each TVE has been established. They include energy accounts recording method and monthly report of energy consumption. It facilitates the management's understanding changes in energy efficiency of the TVEs, finding out problems and adopting necessary measures.

Thirdly, the total production cycle quality control is emphasized to reduce energy consumption and increase the rate of qualified product.

5. Training

In the progress of the project, Blue-Sky Company trained the TVEs' managers, technicians and workers towards different requirements. All training works are divided into three levels:

Firstly, at the beginning of the project and through site survey and discussion in person, the experts from Blue-Sky Company made a thorough introduction to technology development and approaches to improving energy efficiency to the TVEs' managements, helped them chose right renovation plan suitable for their foundries. The detail of this kind of training is as below:

Training times: 8

Time: April 2006

Address: on site of each TVE

Trainer: Zhu Jilu, Xu Keliang, and Wang Jin

Trainee: managers from TVEs(20 persons)

Secondly, in the phase of installation and adjustment of equipment, Blue-Sky Company requested the manufacturers to train the operational staff. To guarantee the normal production, it is required that every worker be familiar with the production line, master necessary skills and know his duties. The detail of this kind of training is as below:

Training times: 10

Time: May -June 2006

Address: on site of each TVE

Trainer: technician from equipment manufacturers

Trainee: technicians and operating workers from TVEs (40 persons)

Training materials: operational rules and specifications of equipments

Outputs: all trainees acquired license for operating

Thirdly, Blue-Sky Company held lectures to disseminate and carry out the newly established energy efficiency management systems among staffs to encourage their consciousness in energy saving, to heighten their skill and to promote energy efficiency management in total production cycle. The detail of this kind of training is as below:

Training times: 1

Time: July 2006

Address: Economy Development Bureau, Jinzhou, Dalian

Trainer: Zhu Jilu

Trainee: energy efficiency managers from TVEs (10 persons)

Training contents: duties of energy efficiency management position and rules and regulations of energy efficiency management

During the process of the above training, Blue-Sky Company wrote some training materials as follow:

“Measures to increase energy efficiency in metal melting”

“Characteristics of energy efficiency in intermediate frequency-conversion induced furnace ”

“Key points of duties of energy efficiency management position in foundry enterprises”

“Key points of rules and regulations of energy efficiency management in foundry enterprises”

6. Production Line Commissioning

Since the beginning of August 2006, production line commissioning of the project has been implemented for a month in eight TVEs. During the period, the project experts and officers from LPDC measured and audited the energy performance of the projects. Through collection and conversion of the data in energy consumption and product outputs during commissioning, it is proved that:

The weighed average energy-saving rate per ton casting is 25.11 %;

Total energy saving per year is 1790 tce;

Total CO₂ emission reduction per year is 4463 ton.

These parameters have attained 89% of the targets designed in feasibility reports of the project. (The corresponding data designed are respectively 28.38%, 2010 ton and 5012 ton.) It is creditable that the actual performance will approach and finally obtain the level

designed with the continual improving of proficiency in operation.

The energy performance after renovation:

No.	TVEs	Production After Renovation (t castings/a.)	Energy Use/Unit Product (tce/t castings)	Energy Savings (tce/a.)	CO ₂ Emission Reduction (t/a.)
1	Dalian Tianyuan Foundry	3,000	0.194	667.36	1,663.72
2	Dalian Baotong Corporation	1,400	0.36	69.91	174.28
3	Dalian Jinze Corporation	3,000	0.22	515.30	1,284.64
4	Dalian Jinzhoumaolong Industry Co., Ltd	1,500	0.31	87.34	217.73
5	Dalian Qianbao Iron Casting Co., Ltd	5,000	0.28	106.44	265.36
6	Dalian Yongxin Precision Steel Casting Co., Ltd	1,500	0.32	85.31	212.67
7	Dalian Far-east Precision Casting Co., Ltd	485	0.45	32.84	81.88
8	Dalian Fengming Alloy and Steel Casting Co., Ltd	1,500	0.42	226.01	563.43
	Total	17385		1790.51	4463.73

D. Conclusion

Up to Sep. 30, 2006, Blue-Sky Company has already finished all tasks of the project plan. All eight TVEs have completed their energy efficiency technical renovation project constructions and got through check on commissioning. The energy saving and CO₂

emission reduction are consistent with TOR. The proportions of GEF fund and co-financing undertaken by the TVEs were in accordance with the TOR in the contract, with the lowest 1: 4.1, the highest 1: 23 and the average 1: 12. All renovations have been approved by local governmental departments and accepted by the managements of all TVEs.

Nov. 16-17, 2006, the Blue-sky Company attended "The Promotion Seminar of Chinese TVEs' Energy Efficiency and GHG Emission Reduction Project in Foundry Industries" hosted by PMO under MOA in Nanjing, Jiangsu province. In the meeting, the expert team from the Blue-sky Company introduced to the officers of PMO and participants of the seminar the details about developments and outcomes of technical renovations on eight TVEs in Dalian. They also talked about the experience and lessons gained in the process. The speech was highly appraised by the officers and participants of the seminar.

1. Successful experience in project implementation

In general, the project has successfully completed and achieved the final results in accordance with the project plan. The lessons learned are supposed to be in these aspects:

Correct instructions of PMO under MOA: In many circumstances like project briefing, the PMO has launched many activities of exchanging views and seminar discussions. The PMO emphasized introducing experiences and problems in the prior pilot TVEs, discussed and decided the measures and strategies. The efforts have led the replication project to a right path and avoided the possible waste of manpower and delay in groping for the path.

Dalian Jinzhou LPIC's active coordination: the practice proved that the LPIC played an important role which is like a bridge between Blue-sky Company and the TVEs. They increased the communications and understanding between both parties, encouraged the TVEs to take part in the project and produced a favorable atmosphere for the project. The

CECIC Blue-Sky Investment Consulting & Management Co. Ltd. 17

outcomes resulted from accordance between objectives of the project and the local governments' intentions.

Blue-sky Company's strict plan and implementation: as a result of sufficient understanding of the significance and objectives of the project, Blue-sky Company put high regards to implementation of the project: doing plenty of preparing work prior to contract signing; designating person to studying and making implementation plan and submitting the plan to PMO for modification, improvement and approval.

The TVEs' participation and cooperation: the success of the project cannot be independent of the TVEs' participation. As soon as the managements of the TVEs realize what benefits the project can bring for them, they would firmly support and actively participate in the project.

2. Influences of the project

By means of fund from the GEF, UNIDO implemented project in energy efficiency and GHG emission reduction. It not only brought about direct benefits from the project, but also affected largely the local economic development and environment protection. The influences of the project can be described in below two aspects:

Firstly, it promoted the local government to pay a higher attention to economic development by recycling, to make more investment and to execute much stricter supervision and control. For example, Dalian municipality began to move all industries in urban areas outward for purpose of building the tourism city. As the important industrial base of Dalian, Jinzhou District has made strict admittance criteria for the enterprises being moved, confined and refused a lot of high energy consuming and high pollution load industries. In addition, to accelerate economic development by recycling, Dalian Finance Bureau and Dalian Economy Commission jointly issued official document "The Temporary Management Method of Fund for Promoting Industrial Recycling Economy in CECIC Blue-Sky Investment Consulting & Management Co. Ltd."

Dalian". More than thirty million RMB has been allocated to subsidize the industrial project in recycling economy in which energy efficiency and GHG emission reduction are the content in top priority. Undoubtedly, the implementation of the project funded by GEF has played an active role in bringing up and carrying out these measures.

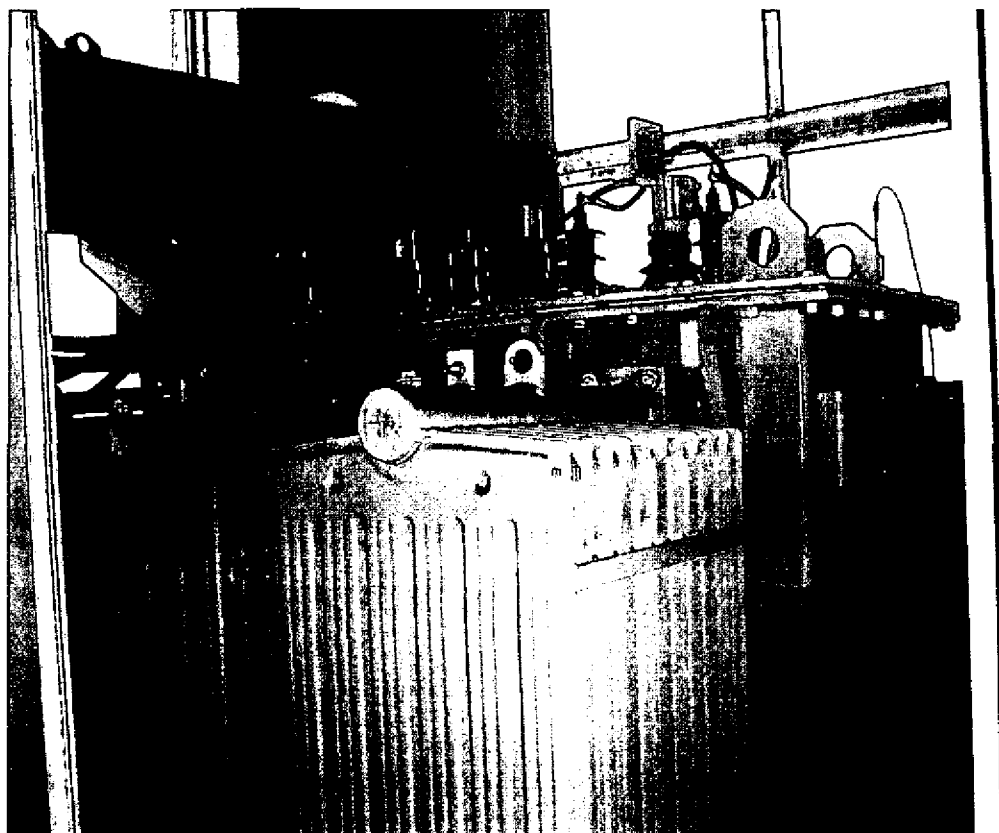
Secondly, implementation of the project has made all eight TVEs participating renovation win a chance and advantageous position in a new competitive environment. It is because of a lot of basic work in investigation, factual materials and adequate reasons that all renovations be hopeful subsidized. This outcome will surely attract more and more TVEs to invest in energy efficiency technical renovations.

Annex 1: On-site Photos of Some Renovated Workshops

Annex 2: Measurement Form after Renovation

Annex 3: Conformation Letters from Management of TVEs

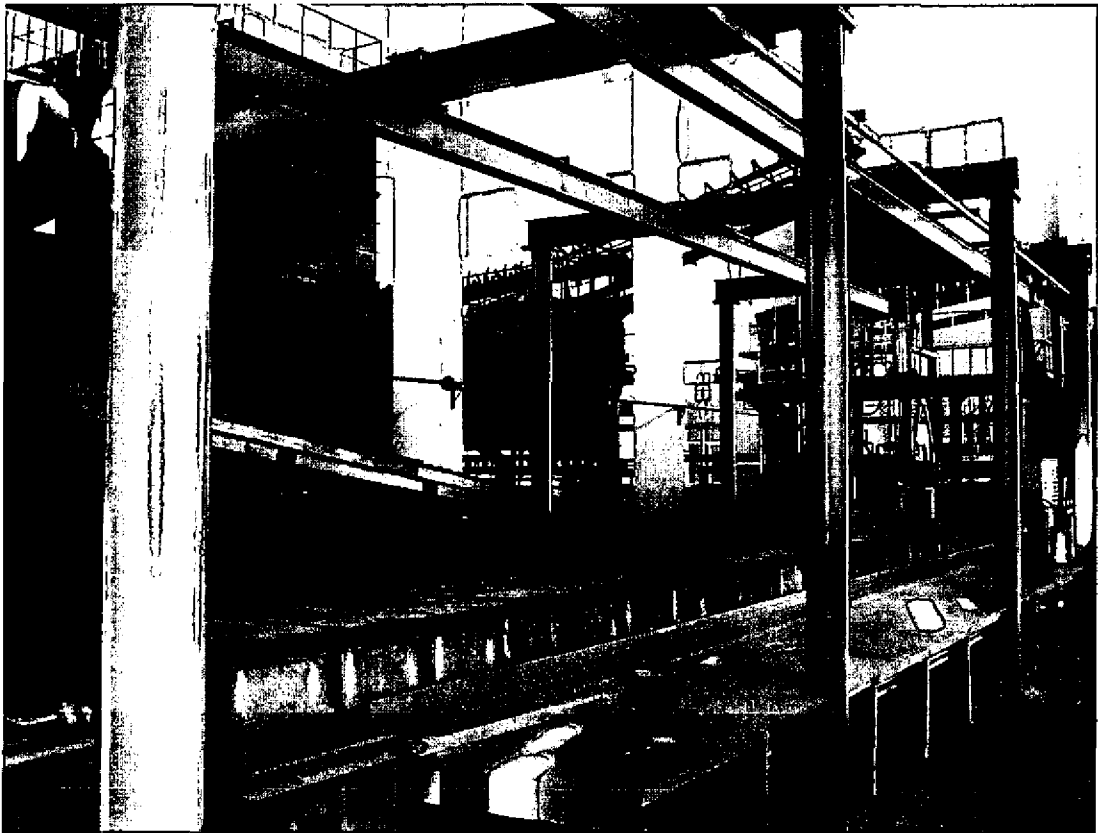
Annex 1: On-site Photos of Some Renovated Workshops



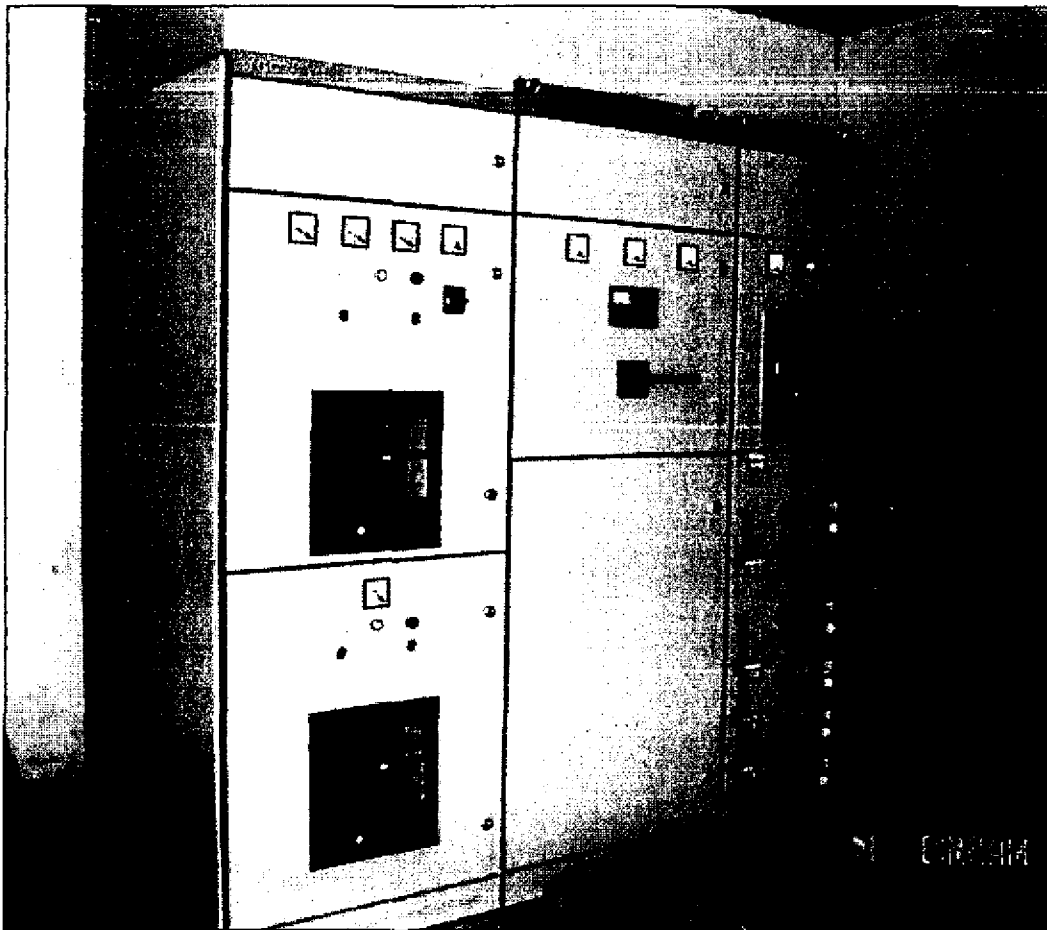
Newly-built 1600KVA transformer of Dalian Qianbao Iron Casting Co., Ltd



Frequency-conversion induced furnace of Dalian Qianbao Iron Casting Co., Ltd



Foundry production line of Dalian Qianbao Iron Casting Co., Ltd



Electrical Control System of Dalian Jinzhoumaolong Industry Co., Ltd



Frequency-conversion induced furnace of Dalian Jinzhoumaolong Industry Co., Ltd

UNIDO

**Energy Conservation and GHG Emissions Reduction in Chinese TVEs – Phase II
Energy Conservation Technical Renovation Replication Project in Casting Industry (Dalian)**

**The Measure & Evaluation Form
One Month after Renovation**



CECIC Blue-Sky Investment Consulting & Management Co., Ltd

Nov. 2006 Beijing

1. Baselines for Renovation

		EE Baseline										
No.	TVEs	Business Profile	Technical Process and Major Energy Use Equipments	Energy Type	Energy Consumption (physical quantity)	Conversion factor	Energy Use (tce)	Energy Use/Unit Product	Output Before Renovation	Total Energy Use (tce)	CO ₂ Coefficient	CO ₂ Emissions (t/a.)
1	Dalian Tianyuan Foundry	Dalian Tianyuan Foundry was founded in 2000, and the factory area occupies 8000 square meter, 5000 square meter for construction. The staff is 85 persons and among them 15 technical persons.	cool-air cupola	Coal (t)			0.00					
				Coke(t)	1,250.00	0.971	1,214.25					
				Electricity (MWh)	91.67	0.383	35.11	tce/t castings	3,000 casting s/a.	1,249.36	2.493	3,114.65
				Product Oil (t)		1.471	0.00					
				Sum Total			1,249.36					
2	Dalian Baotong Corporation	Dalian Baotong Corporation is located at Huadong Village. The corporation area occupies 24,000 m ² , 8000 m ² for construction. The total capital is 30 million Yuan. The main products are valve and pipe juncture.	cool-air cupola	Coal (t)			0.00					
				Coke(t)	583.00	0.971	566.33					
				Electricity (MWh)	19.80	0.383	7.58	tce/t castings	1,400 casting s/a.	573.91	2.493	1,430.76
				Product Oil (t)		1.471	0.00					
				Sum Total			573.91					
3	Dalian Jinze Corporation	Dalian Jinze Corporation is located at Minhe Village. The corporation area occupies 40,000 m ² , 5000 m ² for construction and 2500 m ² for production. Annual output of steel casting is 800 tons; annual output of iron casting is 1500 tons.	intermediate frequency-inversion induced furnace	Coal (t)	1,825.00	0.644	1,175.30					
				Coke(t)		0.971	0.00					
				Electricity (MWh)		0.383	0.00	tce/t castings	3,000 casting s/a.	1,175.30	2.493	2,930.02
				Product Oil (t)		1.471	0.00					
				Sum Total			1,175.30					
4	Dalian Jinzhouma Long Industry Co., Ltd	It was founded in 1992. The area of the company is 12800 m ² and construction area is 3100 m ² . the company produced more than 1200 tonnes of iron casting, 1500 tonnes of spheroidal graphite casting, 1300 tonnes of steel casting.	3t/h cupola	Coal (t)		0.644	0.00					
				Coke(t)	563.00	0.971	546.90					
				Electricity (MWh)	14.20	0.383	5.44	tce/t castings	1,500 casting s/a.	552.34	2.493	1,376.98
				Product Oil (t)		1.471	0.00					
				Sum Total			552.34					

EE Baseline													
No.	TVEs	Business Profile	Technical Process and Major Energy Use Equipments	Energy Type	Energy Consumption (physical quantity)	Conversion factor	Energy Use (tce)	Energy Use/Unit Product	Output Before Renovation	Total Energy Use (tce)	CO ₂ Coefficient	CO ₂ Emissions (t/a.)	
5	Dalian Qianbao Iron Casting Co., Ltd	It was founded in 1954 and mechanism transformed to private company in 1998. Now it owns fixed capital of RMB 15000000. The area is 32000m ² and construction area is 15000m ² .	3t/h cupola, 4t core holding furnace with duplex melting style	Coal (t)		0.644	0.00						
				Coke(t)	1,388.00	0.971	1,348.30						
				Electricity (MWh)	412.90	0.383	158.14	0.301 tce/t castings	5,000 castings/a.	1,506.44	2.493	3,755.56	
				Product Oil(t)		1.471	0.00						
				Sum Total			1,506.44						
6	Dalian Yongxin Precision Steel Casting Co., Ltd	It occupies 7600m ² and the workshops 2600m ² . The enterprise has annual productivity of 1500tonnes and production value of RMB 3,600,000. The total capital is 10000000 and there are 30staff.	0.4t electric induction furnace	Coal (t)		0.644	0.00						
				Coke(t)		0.971	0.00						
				Electricity (MWh)	1,476.00	0.383	565.31	0.377 tce/t castings	1,500 castings/a.	565.31	2.493	1,409.31	
				Product Oil (t)		1.471	0.00						
				Sum Total			565.31						
7	Dalian Far-east Precision Casting Co., Ltd	It was founded in 2000, located in Huajia town Jingzhou district of Dalian. The total registered capital is 2 million Yuan. The factory area occupies 2400m ² , and with 50 employees.	0.25t capacity regulated electric induction furnace	Coal (t)		0.644	0.00						
				Coke(t)		0.971	0.00						
				Electricity (MWh)	655.60	0.383	251.09	0.518 tce/t castings	485 castings/a.	251.09	2.493	625.98	
				Product Oil (t)		1.471	0.00						
				Sum Total			251.09						
8	Dalian Fengming Alloy and Steel Casting Co., Ltd	It locates in Zhanqianjiedao Majia Village, Jinzhou District, Dalian City. Founded in 1987, it is one of earliest TVEs with 2500 m ² workshops majoring in alloy casting. Most of the products were exported.	0.25t capacity regulated electric induction furnace	Coal (t)		0.644	0.00						
				Coke(t)		0.971	0.00						
				Electricity (MWh)	596.00	0.383	228.27	0.571 tce/t castings	400 castings/a.	228.27	2.493	569.07	
				Product Oil (t)		1.471	0.00						
				Sum Total			228.27						

2. Proposed Technical Renovation

No.	TVEs	Proposed Technical Renovation	Total (RMB ¥ 10, 000)	GEF (10, 000US\$)	Project	
					Others (RMB ¥ 10,000)	
1	Dalian Tianyuan Foundry	Adoption of furnace hot-air cupola instead of cool-air copula	66.16	1.375	Commercial loan	
					Entrustment Loan	
					Self-Funding	55.16
					Financial Assistance	
2	Dalian Baolong Corporation	Adoption of intermediate frequency-conversion induced furnace instead of cool-air cupola.	114.64	1.375	Commercial loan	
					Entrustment Loan	
					Self-Funding	103.64
					Financial Assistance	
3	Dalian Jinze Corporation	With one 1.5t frequency-conversion intermediate-frequency furnace instead of existing 3 small-sized furnaces	232.02	2.000	Commercial loan	
					Entrustment Loan	
					Self-Funding	216.02
					Financial Assistance	
4	Dalian Jinzhoumaolong Industry Co., Ltd	Cupola replaced by medium-frequency induction furnace	114.64	1.375	Commercial loan	
					Entrustment Loan	
					Self-Funding	103.64
					Financial Assistance	

No.	TVEs	Proposed Technical Renovation	Project		
			Total (RMB ¥10,000)	GEF (US\$10,000)	Others (RMB ¥10,000)
5	Dalian Qianbao Iron Casting Co., Ltd	old cupola and furnace replaced by 2.5t frequency conversion induction furnace with medium-frequency	267.94	1.375	Commercial loan
					Entrustment Loan
					Self-Funding 256.94
					Financial Assistance
6	Dalian Yongxin Precision Steel Casting Co., Ltd	Renovate 0.4t electric induction furnace from capacity adjustment into frequency conversion	74.64	1.250	Commercial loan
					Entrustment Loan
					Self-Funding 64.64
					Financial Assistance
7	Dalian Far-east Precision Casting Co., Ltd	Renovate 0.25t electric induction furnace from capacity adjustment into frequency conversion	56.14	1.250	Commercial loan
					Entrustment Loan
					Self-Funding 46.14
					Financial Assistance
8	Dalian Fengming Alloy and Steel Casting Co., Ltd	0.25t furnace replaced by 3t induction furnace with medium frequency and 3 bridge cranes	330.49	2.000	Commercial loan
					Entrustment Loan
					Self-Funding 314.49
					Financial Assistance
Total			1256.67	12	

3、Anticipated Results

No.	TVEs	Start-end Date	Financial Evolution				Anticipated Results				Remarks (Energy Saving Percentage)	
			Payback Period	IRR	NPV	Cost of energy saving	Production After Renovation	Energy Use/Unit Product	Energy Savings (tce/a.)	CO ₂ Emission Reduction (t/a.)		
1	Dalian Tianyuan Foundry	2006-4-1/2006-9-31	1.59	year			3,000	0.194	t castings/a.	667.36	1,663.72	53.42%
			906.8	%	¥10,000							
			(1989.83)	RMB/tce								
2	Dalian Baotong Corporation	2006-4-1/2006-8-31	5.71	year			1,400	0.360	t castings/a.	69.91	174.28	12.18%
			19.26	%	¥10,000							
			103.37	RMB/tce								
			(1083.02)									
3	Dalian Jinze Corporation	2006-4-1/2006-8-31	7.85	year			3,000	0.220	t castings/a.	515.30	1,284.64	43.84%
			11.41	%	¥10,000							
			16.96	RMB/tce								
			131.62									
4	Dalian Jinzhoumaolong Industry Co., Ltd	2006-4-1/2006-8-31	6.53	year			1,500	0.310	t castings/a.	87.34	217.73	15.81%
			15.48	%	¥10,000							
			70.67	RMB/tce								
			(962.76)									

Letter of Confirmation

August 31, 2006

To whom it may concern,

This letter is for the undersigned, on behalf of the plant, Dalian Tianyuan Foundry, to confirm that under "Energy Conservation and Greenhouse Gas Emissions Reduction in Chinese Township and Village Enterprises (TVEs) – Phase II" of UNIDO, the technical renovation project of energy efficiency of the plant, which is supported by engineering technical assistance of CECIC Blue-sky Consulting & Management Co. Ltd, has been completed on time and put into operation.

The total investment is RMB 647,000 including GEF fund US\$13,750 and co-financing RMB 537,000.

The actual examinations show that the renovation brings about energy savings 667.36 tce and CO₂ emission reduction 1663.72 ton. These are accordance with the criteria stipulated in the TOR of Contract.

The project has also been reviewed and approved by the local governmental departments.

Signature of the legal representative:



Letter of Confirmation

August 31, 2006

To whom it may concern,

This letter is for the undersigned, on behalf of the plant, Dalian Baotong Corporation, to confirm that under "Energy Conservation and Greenhouse Gas Emissions Reduction in Chinese Township and Village Enterprises (TVEs) – Phase II" of UNIDO, the technical renovation project of energy efficiency of the plant, which is supported by engineering technical assistance of CECIC Blue-sky Consulting & Management Co. Ltd, has been completed on time and put into operation.

The total investment is RMB 1,196,000 including GEF fund US\$13,750 and co-financing RMB 1,086,000.

The actual examinations show that the renovation brings about energy savings 69.91tce and CO₂ emission reduction 174.28 ton. These are accordance with the criteria stipulated in the TOR of Contract.

The project has also been reviewed and approved by the local governmental departments.

Signature of the legal representative:



Letter of Confirmation

August 31, 2006

To whom it may concern,

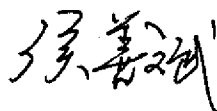
This letter is for the undersigned, on behalf of the plant, Dalian Jinze Corporation, to confirm that under "Energy Conservation and Greenhouse Gas Emissions Reduction in Chinese Township and Village Enterprises (TVEs) – Phase II" of UNIDO, the technical renovation project of energy efficiency of the plant, which is supported by engineering technical assistance of CECIC Blue-sky Consulting & Management Co. Ltd, has been completed on time and put into operation.

The total investment is RMB 2,371,800 including GEF fund US\$20,000 and co-financing RMB 2,211,800.

The actual examinations show that the renovation brings about energy savings 515.3 tce and CO₂ emission reduction 1,284.64 ton. These are accordance with the criteria stipulated in the TOR of Contract.

The project has also been reviewed and approved by the local governmental departments.

Signature of the legal representative:



Letter of Confirmation

August 31, 2006

To whom it may concern,

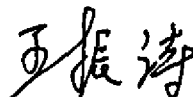
This letter is for the undersigned, on behalf of the plant, Dalian Jinzhoumaolong Industry Co., Ltd, to confirm that under "Energy Conservation and Greenhouse Gas Emissions Reduction in Chinese Township and Village Enterprises (TVEs) – Phase II" of UNIDO, the technical renovation project of energy efficiency of the plant, which is supported by engineering technical assistance of CECIC Blue-sky Consulting & Management Co. Ltd, has been completed on time and put into operation.

The total investment is RMB 1,146,400 including GEF fund US\$13,750 and co-financing RMB 1,036,400.

The actual examinations show that the renovation brings about energy savings 87.34 tce and CO₂ emission reduction 217.73 ton. These are accordance with the criteria stipulated in the TOR of Contract.

The project has also been reviewed and approved by the local governmental departments.

Signature of the legal representative:



Letter of Confirmation

August 31, 2006

To whom it may concern,

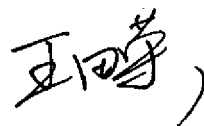
This letter is for the undersigned, on behalf of the plant, Dalian Qianbao Iron Casting Co., Ltd, to confirm that under “Energy Conservation and Greenhouse Gas Emissions Reduction in Chinese Township and Village Enterprises (TVEs) – Phase II” of UNIDO, the technical renovation project of energy efficiency of the plant, which is supported by engineering technical assistance of CECIC Blue-sky Consulting & Management Co. Ltd, has been completed on time and put into operation.

The total investment is RMB 2,680,800 including GEF fund US\$13,750 and co-financing RMB 2,570,800.

The actual examinations show that the renovation brings about energy savings 106.44 tce and CO₂ emission reduction 265.36 ton. These are accordance with the criteria stipulated in the TOR of Contract.

The project has also been reviewed and approved by the local governmental departments.

Signature of the legal representative:



Letter of Confirmation

August 31, 2006

To whom it may concern,

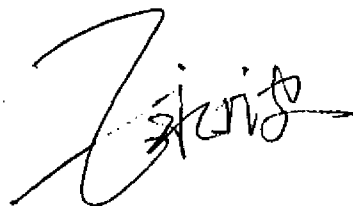
This letter is for the undersigned, on behalf of the plant, Dalian Yongxin Precision Steel Casting Co., Ltd, ~~to confirm that~~ under "Energy Conservation and Greenhouse Gas Emissions Reduction in Chinese Township and Village Enterprises (TVEs) – Phase II" of UNIDO, the technical renovation project of energy efficiency of the plant, which is supported by engineering technical assistance of CECIC Blue-sky Consulting & Management Co. Ltd, has been completed on time and put into operation.

The total investment is RMB 630,000 including GEF fund US\$12,500 and co-financing RMB 530,000.

The actual examinations show that the renovation brings about energy savings 85.31 tce and CO₂ emission reduction 211.67 ton. These are accordance with the criteria stipulated in the TOR of Contract.

The project has also been reviewed and approved by the local governmental departments.

Signature of the legal representative:



Letter of Confirmation

August 31, 2006

To whom it may concern,

This letter is for the undersigned, on behalf of the plant, Dalian Far-east Precision Casting Co., Ltd, to confirm that under "Energy Conservation and Greenhouse Gas Emissions Reduction in Chinese Township and Village Enterprises (TVEs) --Phase II" of UNIDO, the technical renovation project of energy efficiency of the plant, which is supported by engineering technical assistance of CECIC Blue-sky Consulting & Management Co. Ltd, has been completed on time and put into operation.

The total investment is RMB 510,000 including GEF fund US\$12,500 and co-financing RMB 410,000.

The actual examinations show that the renovation brings about energy savings 32.84 tce and CO₂ emission reduction 81.88 ton. These are accordance with the criteria stipulated in the TOR of Contract.

The project has also been reviewed and approved by the local governmental departments.

Signature of the legal representative:

A handwritten signature in black ink, appearing to be a stylized name or initials, located to the right of the signature line.

Letter of Confirmation

August 31, 2006

To whom it may concern,

This letter is for the undersigned, on behalf of the plant, Dalian Fengming Alloy and Steel Casting Co., Ltd, to confirm that under "Energy Conservation and Greenhouse Gas Emissions Reduction in Chinese Township and Village Enterprises (TVEs) – Phase II" of UNIDO, the technical renovation project of energy efficiency of the plant, which is supported by engineering technical assistance of CECIC Blue-sky Consulting & Management Co. Ltd, has been completed on time and put into operation.

The total investment is RMB 3,304,900 including GEF fund US\$20,000 and co-financing RMB 3,144,900.

The actual examinations show that the renovation brings about energy savings 226.01 tce and CO₂ emission reduction 563.43 ton. These are accordance with the criteria stipulated in the TOR of Contract.

The project has also been reviewed and approved by the local governmental departments.

Signature of the legal representative:

