

PEREZ-GUERRERO TRUST FUND Project

Training Plan for Popularizing the Clean Burning Technology of Environment Protection

Boiler

INT-09-K08

Final Report

Submitted by

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G77 PGTF Project Final Report

Introduction

The project “Training Plan for Popularizing the Clean Burning Technology of Environment Protection Boiler” submitted by JIANGXI ASSOCIATION FOR INTERNATIONAL ECONOMIC COOPERATION, JIANGXI JIANGLIAN ENERGY & ENVIRONMENT CO., LTD(JIANGLIAN) and endorsed by China International Center for Economic and Technical Exchanges of the Ministry of Commerce.

Timeframe Change Explanation:

NA

Final implementing condition includes two major elements:

The beneficiaries of the Project are Electric entities in Thailand and Indonesia; participates; enterprises and inhabitants around power plants in the above countries.

The final outputs generated by this project are described as following:

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Action1: Giving 2 companies training courses on energy saving and environmental technology in Thailand, Indonesia.

Action2: Training report

Background

Particularly in many developing countries, basically low-efficiency high pollution chain boiler and pulverized coal fired boiler are used in coal-fired power plants which lead to high cost and high pollution. High price of electricity because of the high cost will highly influence the improving of the developing of local economy and the life of low income rural population. High emission of dust, NO_x and SO₂ etc. leads to high pollution of air and water (such as acid rain) in the region and seriously affects ecosystem.

Facing problems of lack of electricity and high pollution of power plants in recent years, the Chinese government had planned to use high efficiency and low pollution CFB boiler for the power plant instead of chain boiler and pulverized coal furnace.. Besides, coal-gangue fired boiler and biomass boiler are used more and more in power plants, blast furnace gas fired boilers are widely used in steel factories. Project cooperation entity JIANGLIAN has completed hundreds of chain boiler and pulverized coal furnace reconstruction projects successfully, promote the combined heat and power generation, developed advanced coal-gangue fired boiler and biomass boiler, invented and popularized

blast furnace gas fired boiler for steel factories. Up to now, JIANGLIANG has carried out many power plant projects with coal-gangue fired boiler and biomass boiler and is in the leading position of business in our country, capturing 70% of market share of the blast furnace gas fired power plants in China. JIANGLIAN has accumulated rich experiences on energy-saving and environmental protection technology. It can provide technical training programmes for other developing countries and transferring the technology to them, which will benefit the developing countries.

Popularizing the clean burning technology of Jiangxi's energy-saving and environment protection boiler, on the one hand, this technology can lower the cost of generation of electricity, reduce the pollution, on the other hand, it helps the inhabitants around the power plants to increase the income, reduce poverty and improve the quality of life.

Jianglian's experts group visited Thailand MKP to train clean burning technology of Jiangxi's energy-saving and environment protection boiler from March 12 to April 12, 2009 and from June 30 to August 4, 2009. And experts group visited Indonesia MGK to train clean burning technology of Jiangxi's energy-saving and environment protection boiler from May 25 to June 25, 2009 and from Oct. 6 to Nov. 6, 2009.

The Group Has Carried Out Training During Visiting Thailand MKP:

	Training Item	Class Hour	Training time
A	Baisc knowledge		
	1. Clean burning technology develop	2	Day 1
	2. Fuel combustion principle	2	Day 2
B	CFB boiler professional knowledge		
	3. boiler proper	4	Day 3
	4. boiler heating surface device	4	Day 5
	5. combustion device structure & operating principle	4	Day 7
	6. flue gas & air system	4	Day 9
	7. steam & water system device & operating principle	4	Day 11
	8. Ignition system	2	Day 13
	9. boiler start up	2	Day 14
	10. FSSS system	2	Day 15
	11. boiler operation & control	2	Day 16
	12. boiler stop & maintenance	2	Day 17
	13. boiler accident treatment	2	Day 18
	14. maintenance & test	4	Day 20
C	Turbine professional knowledge		
	Turbine proper	4	Day 22
	Turbine operation	2	Day 23

	Turbine maintenance	2	Day 24
D	Electrical professional knowledge		
	Generator operation & maintenance	4	Day 26
	Transformer operation & maintenance	4	Day 28
	HV/LV Switch operation & maintenance	4	Day 30
E	Control professional knowledge		
	PLC operation & maintenance	4	Day 32
	DCS operation & maintenance	4	Day 34
F	Fuel handling system professional knowledge		
	Fuel handling system operation & maintenance	4	Day 36
G	Ash handling system professional knowledge		
	Ash handling system operation & maintenance	4	Day 38
H	Water treatment system professional knowledge		
	Water treatment system operation & maintenance	4	Day 40
	Total		

Note: total 8 weeks training, 40 work days.

Training Report on Thailand MKP

MKP Company is a paper plant in Thailand; chain-grate boiler was used for power generation, the utilization efficiency of this boiler was lower, the efficiency can only reach 70%, the cost of power generation was very high. Because there was no desulfurization equipment, the emissions of NOX & SOX were very high, which polluted the environment. Unburnt slag (containing 20% carbon) for the past many years was accumulated. And a great quantity of papermaking sludge can not be processed.

In order to save the energy consumption and reduce the environmental pollution, Thailand MKP Company adopts advanced 35tph boiler system from JiangLian Company, which can save the energy, protect the environment, and other improvements can be seen as follows:

- a) Enhance the combustion technical knowledge, ability and experience for saving energy & environment protection;
- b) Train many personnel who master the combustion technology;
- c) Develop the cooperation for replacing high energy consumption & high pollution power generation technology and equipments

Thailand MKP Company can operate and maintain the advanced boiler system from JiangLian Company after the combustion technical training for energy saving & environment protection.

According to the test result of actual operation, boiler efficiency is 16% higher than original chain-grate boiler; the efficiency can reach 86%. 9811.2 tons of coal (4000kcal/kg) can be saved per year, the value is about 400,000 US dollars. Unburnt slag and papermaking sludge from chain-grate boiler can also be treated by JiangLian boiler. Because combustion technology for saving energy and environment protection is adopted, the emissions of NOX & SOX can be largely reduced.

This project can reduce the cost of electricity production, decrease the emission of pollutant and enhance the conscious of saving energy & environment protection.

The Group Has Carried Out Training During Visiting Indonesia MGK:

	Training Item	Class Hour	Training time
A	Baisc knowledge		
	1. Clean burning technology develop	2	Day 1
	2. Thermodynamic knowledge	2	Day 2
B	waste heat recovery boiler professional knowledge		
	3. boiler proper	4	Day 3
	4. boiler heating surface device	4	Day 5
	5. combustion device structure & operating principle	4	Day 7
	6. flue gas & air system	4	Day 9
	7. steam & water system device & operating principle	4	Day 11
	8. Ignition system	2	Day 12
	9. boiler start up	2	Day 13
	10. FSSS system	2	Day 14
	11. boiler operation & control	2	Day 15
	12. boiler stop & maintenance	2	Day 16
	13. boiler accident treatment	2	Day 17
	14. maintenance & test	4	Day 18
C	Turbine professional knowledge		
	Turbine proper	4	Day 20
	Turbine operation	2	Day 22
	Turbine maintenance	2	Day 23
D	Electrical		
	Generator operation & maintenance	4	Day 24
	Transformer operation & maintenance	4	Day 26
	HV/LV Switch operation & maintenance	4	Day 28
E	Control system		

	PLC operation & maintenance	4	Day 30
	DCS operation & maintenance	4	Day 32
F	Fuel handling system		
	operation & maintenance	4	Day 34
G	Water treatment system professional knowledge		
	operation & maintenance	4	Day 36
	Total		

Note: total 8 weeks training, 40 work days.

Training Report on Indonesia MGK

MGK Company is a gas fired power plant in Indonesia, the gas turbine was used for power generation originally, and the utilization ratio of the plant was low, only 30%, the cost of generation was high. Since the off-gas of 500 °C from gas turbine lots of energy was wasted, while the pollution was formed at the same time.

In order to save the energy and reduce the pollution, MGK adopted advance 6.6MW boiler generation system produced by JIANGLIAN, the waste heat of off-gas from gas turbine can be recovered by the boiler system, and the temperature of the gas can be reduced from 500°C to 150°C

Through the energy saving combustion technology training, MGK Company had a basic understanding of boiler system operation and maintenance. At the meanwhile:

- a) The intelligence, ability and experience on energy saving combustion technology had been enhanced;
- b) A group of technical person had been trained, and after the training, they can master the energy saving combustion technology.
- c) The replacement & upgrading of the facilities and generation technology with high energy consumption and high pollution had been increased.

Based on the test report, the efficiency of power plant increased 10%, achieved 40% after adding advance 6.6MW boiler generation system produced by JIANGLIAN, another 48,000,000 KWH can be generated with the waste heat recovery per year, and 30,000,000,000 USD benefit can be got additionally per year. That means, about 60,000 ton coal (4000kcal/kg) can be saved and the discharge of NOX & SOX produced by 60,000 ton coal can be eliminated every year.

With this project, the power generation cost and the pollutants discharge had been decreased, and consciousness on energy saving and environmental protection had be increased.

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