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INTEGRATED SAFEGUARDS DATA SHEET
CONCEPT STAGE

Date ISDS Prepared/Updated: 17/09/2007

I. BASIC INFORMATION

A. Basic Project Data

Country: China	Project ID: P102568
Project Name: Baotou Iron and Steel Energy Efficiency CDM Project	
Task Team Leader: Leiping Wang	
Estimated Appraisal Date: November, 2007	Estimated Approval Date: December, 2007
Managing Unit: EASTE	Lending Instrument: Carbon Fund
Sector: Energy	
Theme: Climate Change	
IBRD Amount (US$m.): 0.00 IDA Amount (US$m.): 0.00 GEF Amount (US$m.): 0.00 Other financing amounts by source: Borrower (US$ m): 109.00 109.00	

B. Project Objectives

The development objective of the proposed project is reduce GHG emissions by assisting the project owner, Baotou Iron and Steel Group Company (BISCO) in financing investments to improve energy efficiency, through the use of the clean development mechanism (CDM) sanctioned under the Kyoto Protocol. The key indicator is the annual delivery of emission reductions (ERs) to be verified by a third party authority according to a baseline data and annual measurements of actual reductions relative to those planned.

C. Project Description

The project would finance the purchase of about 2,500,000 tons of CO_{2e} emissions annually at around US$ 10.0/ton CO_{2e} through an Emissions Reduction Purchase Agreement (ERPA) under the Danish Carbon Fund facility. This fund would purchase the incremental CO2 that would be released into the atmosphere if the owner and beneficiary of the credits, BISCO, did not invest in the new technologies to reduce carbon emissions.

The reduced GHG emissions would result from BISCO's investment in the two components of the proposed project designed to reduce the use of coal-based electricity and associated CO2

emissions through replacement with waste heat generated in the production process of steel. BISCO would receive compensation from the Danish Carbon Facility for verifiable reductions associated with the project's two components: (i) installation of coke dry-quenching (CDQ) technology to recover waste heat from the hot coke unloaded from the coke-oven and harness that heat to operate steam turbines for electricity generation; and (ii) application of dry-type, top-gas recovery turbine units (TRT) to capture the superfluous pressure and energy, for use in electricity generation. In the absence of investment in these two components, BISCO would continue with the use of the current less efficient wet processes for coke quenching and TRT.

CDQ is an established technology of the modern coke-making process. Instead of water, the technology uses cold nitrogen gas to cool down the coke. In the process, the nitrogen gas heats up and this heat produces steam in a waste heat boiler, which in turn can operate turbines for producing electricity. After the heat exchange takes place, the cold nitrogen circulates to cool the next batch of coke. The dry-dust removing TRT technology would consist of a dry cloth-bag, cyclone dust-removal and decelerated centrifugal dust-removal facilities to reduce the amount of dust substantially, from 100mg/Nm^3 to 6.6 mg/Nm^3. This method of dust removal would replace the current wet TRT process, flushing with water, which causes considerable loss of superfluous pressure, that reduces the amount of electricity generation available from the waste heat and pressure.

BISCO, the project owner, is one of the top ten iron and steel producers in China. The company, established in 1954, has total assets valued at around US$ 4.63 billion and its gross revenue was about US$ 1.8 billion in 2005. The company's current steel production capacity is around 7 million tons and this is expected to increase to 15 million tons by 2010. The company's energy efficiency, measured by total energy consumption per ton of steel production, stood at around 892 kilogram of coal equivalent (kgce) in 2005, which is significantly lower than both international and domestic best practices.

Component 1: Installation of CDQ Technology (Capital Cost: US$ 64 million)

This component would replace the current CWQ technology used in BISCO's existing four coke ovens (Nos.5 -8), with CDQ technology and equip the two new coke ovens planned for commissioning in October 2007 (Nos. 9 and 10) with the new quenching technology as well. The project would install three sets of CDQ heat recovery boilers and steam turbine generators at the back of all six coke ovens to utilize the heat from red-hot coke for power generation. The total installed capacity of the three sets of power generators operating on recovered waste heat would be 3X15 MW with an expected net electricity generation of around 250 GWh per year. These generators would replace the same amount of electricity that BISCO otherwise would have to purchase from the coal-fired power plants of the power grid, thus resulting in reduced GHG emissions. This component would contribute to expected GHG reductions of 228,000 t CO_{2-e} per year for the duration of the project activity. The investment cost of this component is estimated at US$ 64 million and it is being financed by BISCO.

Background/Process Description

The process quenches coke with pure nitrogen gas[1] in a quasi-sealed quench chamber. Heated nitrogen is then circulated to a heat recovery boiler that raises steam to drive a turbine generator.

Conventional coke quenching is done in an open system with water. No heat/energy recovery is effected and substantial air pollution is incurred as the cooling water sprayed onto the coke vaporizes to steam entrains particulates and a variety of other pollutants (VOCs, H_2S, phenols, etc.) formed as by-products of the coking process.

Since there is direct contact between the hot coke and the nitrogen quench gas, any residual dust, VOCs etc. are transferred to the nitrogen quench gas. Build-up of these pollutants is controlled in three ways: (a) some nitrogen quench gas is purged during the charging of the hot coke at the top of the quench tower and the discharging of the cooled coke at the bottom of the tower, (b) introduction of small amounts of air into the nitrogen recirculation system to oxidize any residual VOCs and (c) bag house dust collectors which remove 99.6 per cent of the dust in the nitrogen recirculation system.

The CDQ system is far superior to the wet quench systems utilizing water spray where air pollutants are released in a completely uncontrolled manner. So in addition to the energy recovery benefits, there are unquestionable environmental benefits. Discharges of dust during the coke charging/discharging processes were the only environmental issue, and these emissions are far less than the releases experienced with wet quench operations.

There are no significant adverse environmental issues with the CDQ system: in addition to producing power, it significantly reduces air pollution. There may be minor issues of dust and noise during the installation, but these are of minor consequence

Component 2: Installation of TRT Technology (Capital Cost: US$45 million)

This component would install five sets of dry-soot removing facilities for existing TRT plants on five blast furnaces and a sixth dry-soot removing facility on a blast furnace that is to be commissioned in October 2007. The component would increase energy recovery from blast furnace top gas by 155 GWh per year. This additional power generation from waste heat would replace the same amount of electricity that BISCO otherwise would need to purchase from coal-fired power plants in the power grid, leading to expected GHG reductions of 135,000t CO2e per year. The total investment cost of this component is estimated at US$ 45 million and it BISCO would provide the financing.

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[1] The nitrogen gas is produced on-site at the air separation plant which produces pure oxygen for the steel making process and nitrogen as a by-product.

Background/Process Description

In this process, high pressure gas exiting from the blast furnace is sent through a turbine to drive a generator and convert the excess pressure into electrical energy. To protect the turbine, the dusty gas stream is first cleaned.

Wet and dry systems are available for cleaning dusty gas. *Both* systems, employ the same first two stages: (a) settling chamber to remove larger particulates, and (b) cyclone separator, to remove successively smaller particulates. Subsequently, the *wet* system, water sprays gas exiting the cyclone separator to reduce particulate levels to about 3 milligrams/Nm^3 (overall dust removal efficiency of about 99.99 percent). The dry system, feeds the gas exiting the cyclone separator to a bag-house system to reduce dust levels to about 1 milligram/Nm^3 (overall removal efficiency of about 99.996 percent). Both wet and dry systems produce an exit gas well within Chinese and World Bank dust emission standards. The dry system key advantage is that it produces about 10000 kW compared to 5500-6000 kW from the wet system.

There are no significant environmental issues with either wet or the dry systems since both result in a gas well within the emission standard (10 milligrams/Nm^3).

D. Project location (if known)

The CDQ and TRT project components are both located in the Baotou Iron and Steel complex in Baotou City of Inner Mongolia Autonomous Region, China

E. Borrower's Institutional Capacity for Safeguard Policies

The Borrower's capacity for implementing World Bank safeguard policies were reviewed by the Bank and regarded as satisfactory. Baotuo Iron and Steel Group Co. Ltd. has a corporate level Department of Environmental Protection and Production Safety. There are six divisions in the Department, three for environmental protection and three for production safety. The environmental protection divisions include: environmental protection management (seven staff members), resources/waste utilization (three staff members) and landscape activities (three staff members).

The environmental protection management division consists of seven staff: two managers and five professionals each with responsibility for different plant operations. One staff member is responsible for coke, iron, and sinter plant operations, another for rolling mills and steel production, the third for utilities and off-sites (water and gas supply, power etc.). The two other staff are responsible for rare earth production and iron mining operations. The chief responsibilities are to assure environmental measures are installed and operating in accordance with design and reporting any deficiencies to plant management for further action.

At the plant level there are three to four full time associate environmental protection engineers responsible for daily activities at each of the following operations (15-20 staff total): coking plants, iron production, steel production, sinter plant and mining operations.

The company maintains a laboratory for environmental monitoring. Water effluents are monitored three times per month at the coking plants and once per month at the steel mill. Other effluents are monitored either quarterly or annually. Air quality monitoring is performed semiannually at the coke plants and quarterly at the steel mill and blast furnaces. Solid wastes are monitored semiannually.

F. Environmental and Social Safeguards Specialists

Bernard Baratz, Environmental Specialist/Safeguards
Youxuan Zhu, Social Development Specialist/Safeguards

II. SAFEGUARD POLICIES THAT MIGHT APPLY

Safeguard Policies Triggered	Yes	No	TBD
Environmental Assessment (OP/BP 4.01)	X		
CDQ and TRT are in effect pollution control measures. Minor issues of dust and noise associated with installation are immeasurably small since they are both situated in a large, existing iron and steel complex where much larger sources of dust and noise are present.			
Natural Habitats (OP/BP 4.04)		X	
Forests (OP/BP 4.36)		X	
Pest Management (OP 4.09)		X	
Physical Cultural Resources (OP4.11)		X	
Indigenous Peoples (OP/BP 4.10)		X	
Involuntary Resettlement (OP/BP 4.12)		X	
Safety of Dams (OP/BP 4.37)		X	
Projects on International Waterways (OP/BP 7.50)		X	
Projects in Disputed Areas (OP/BP 7.60)		X	

Environmental Category: B

III. SAFEGUARD PREPARATION PLAN

A. Target date for the Quality Enhancement Review (QER), at which time the PAD-stage ISDS would be prepared:

This project is not subject to QERs.

B. For simple projects that will not require a QER, the target date for preparing the PAD-stage ISDS:

The target date for preparing the PAD-stage ISDS is November 20, 2007.

C. Time frame for launching and completing the safeguard-related studies that may be needed. The specific studies and their timing[2] should be specified in the PAD-stage ISDS.

N/A

IV. APPROVALS

Signed and submitted by:		
Task Team Leader:	Mr. Leiping Wang	11/15/2007
Environmental Specialist	Bernard Baratz (approval sent via email and IRISed	10/24/2007
Social Safeguard Specialist	Youxuan Zhu (approved sent via email and IRISed)	10/24/2007
Approved by:		
Regional Safeguards Coordinator:	Panneer Selvam	11/16/07
Comments:		
Sector Manager:	Junhui Wu	11/15/07
Comments:		

[2] Reminder: The Bank's Disclosure Policy requires that safeguard-related documents be disclosed before appraisal (i) at the InfoShop and (ii) in-country, at publicly accessible locations and in a form and language that are accessible to potentially affected persons.