Annual Environmental and Social Monitoring Report

Project Number: LN2678
16 August 2012 to 31 May 2013

THA: Bangchak Solar Power Project

Prepared by

Bangchak Petroleum Public Co., Ltd.

Asian Development Bank

ANNUAL ENVIRONMENTAL AND SOCIAL PERFORMANCE REPORT

BCP SOLAR POWER PROJECT

Reporting Period: 16 August 2012 to 31 May 2013
Report Completion Date: 13 June 2013

I. INTRODUCTION

A. Project Location

The Project is located on an area of about 480 rais[1] (76.8 ha) next to B terminal facility and biodiesel plant of Bangchak Public Company Limited (BCP) in Bang Pa-in District, Ayutthaya Province, about 50 kilometers (km) north of Bangkok.

B. Scope and Layout

The Project completed the construction of two adjacent solar power plants, one with 8 MW capacity and another with 30 MW capacity, with associated control instrument and equipment, and control buildings. The electricity output is currently fed directly into the existing 22/115 kV transmission lines passing the project site to an existing substation of the Provincial Electricity Authority, about 3.3 km away.

The Project as completed did not differ significantly from what had been proposed during the due diligence of the Project. Table 1 summarizes salient features of the completed facilities.

Table 1: Salient Technical Features of the Project area

Solar panels	Features
Number of panels	Approx. 157,200panels, poly-crystalline, photovoltaic (PV)
Dimensions of each panel	Rectangular, 2 m by 1 m
Inclination	15 degrees
Life Cycle	25 years
Loading Controllers (Inverter House)	31 stations
DC-AC Inverters	630 kW, 65 units
Transformers	• 40 MVA ,22/115kV 1 unit • 1,600 kVA, 315V/22kV 30 sets • 800 kVA, 315V/22kV 1 set • 500 kVA, 380V/22kV 1 set • 250 kVA, 380V/22kV 1set • 320 kVA, 380V/22kV 1 set
Substation	One 22 kV / 115 kV substation
Control building	2 buildings

The site infrastructure consists of flood protection dikes and drainage ditches surrounding the power plant site with drainage pumps and a storm water retention basin strategically located, and inspection roads. Figure 1 shows the layout of project facilities.

[1] Rai is the unit of land area used in Thailand. One rai is 1,600 square meters, thus one hectare is 6.25 rais.

Figure 1-Layout of Completed Project Facilities

C. Project Implementation

The project construction began on 16 August 2010. The 8 MW unit was completed and started commercial operations on 5 August 2011 while the construction of the 30 MW was on-going. However, on 15 October 2011 the project site was completely flooded and caused severe damages to all solar panels and inverters. Consequently, the 8 MW unit was out of operations and the construction of the 30 MW unit was suspended.

After the flood situation passed in late 2011, the Project was rehabilitated starting in November 2011 when the water retained on the site was pumped out and the site was cleared of damaged solar panels and equipment. All installed solar panels and inverters had to be replaced. New solar panels and inverters were installed starting in March 2012. The Project was able to start commercial operations of the 8 MW unit on 2 April 2012 followed 3.5 months later by the 30 MW unit on 16 July 2012. Table 2 summarizes project status of the two production units during the period from 16 August 2010 to present. The project completion was thus delayed by the flood by about one year compared to the original completion target of October 2011. As of the end of May 2013, the 8 MW unit has been in operations for about 13 months while the 30 MW for about 10 months.

Table 2-Project Status from 16 August 2010 to Present

Project Period	8 MW Unit	30 MW Unit
16 August 2010 to 4 August 2011	Construction	Construction
5 August 2011-14 October 2011	Commercial operation	Construction
January 2012 to 1 April 2012??	Rehabilitation	Rehabilitation
2 April 2012 to 15 July 2012	Commercial operations	Rehabilitation
16 July 2012 to present	Commercial operations	Commercial operations

D. Annual Environmental and Social Performance Report

This Annual Environmental and Social Performance Report (AESPR) is the first report of the Project. It has been prepared as required in Article 20.14 “Safeguards Reporting and Corrective Measures” of the Facility Agreement between ADB and BCP dated 12 October 2010. The AESPR covers the period from 16 August 2010 to 31 May 2013 consisting of about 23 months of project implementation and about 10 months of operations based on the 30 MW unit.

II. ENVIRONMENTAL AND SOCIAL MANAGEMENT

A. AESPR Preparer

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Signature:	
Report date:	13 June 2013

B. Environmental and Social Responsibility

Figure 2 shows an organization structure of Bangchak Solar Energy Company Limited (BSE).

The operation manager, Mr.Sutha who prepared this report, is responsible for environmental and social performance as well as safety of the solar energy plant under this Project (Bang Pa-in solar energy plant). Mr.Sutha is a licenced electrical engineer with a master degree.

The operation manager is assisted by two operation engineers and one maintenance engineer.

The EHS unit reporting to the managing director provides technical advice to all solar energy projects of BSE as well as conducts compliance *monitoring.*

C. Environmental and Social Management Plan Implementation

Table 3 presents the mitigation measures for the construction period taken from the IEE of the Project. As the Project is environmentally friendly and the construction involved only minor civil works, only few EHS issues were relevant. Consequently, mitigation measures for the Project are few and conventional.

During the construction period, the EPC contractor (Solartron Public Company Limited) was responsible for implementing the EMP for the construction period as presented in the IEE. The EPC contractor appointed a safety manager, Mr.Nathapon Songsri, to be responsible for implementing the EMP under the supervision of BCP.

During the operation, the operation manager is responsible for the EHS function as indicated above. The current operation manager has been in charge since the commercial operation dates.

In carrying out its environmental and social management, BSE strictly follows the policies of its mother company, BCP. An EHS manual used in BCP was adopted for use by project staff in carrying the EHS functions with some modifications to suit the nature of work of the Project.

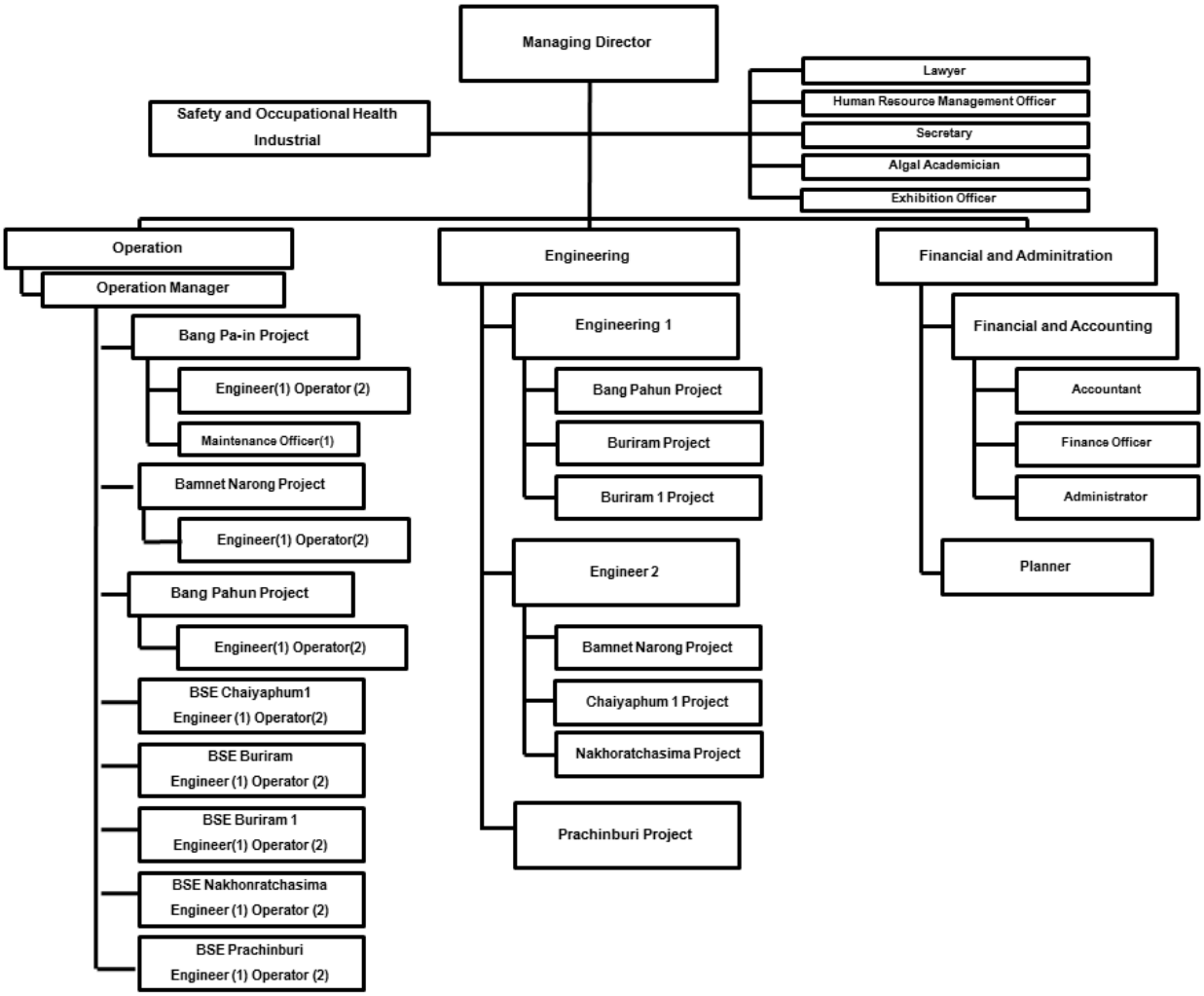
Managing Director
Lawyer
Human Resource Management Officer
Secretary
Algal Academician
Exhibition Officer
Safety and Occupational Health Industrial
Operation
Operation Manager
Bang Pa-in Project
Engineer(1) Operator (2)
Maintenance Officer(1)
Bamnet Narong Project
Engineer(1) Operator(2)
Bang Pahun Project
Engineer(1) Operator(2)
BSE Chaiyaphum1
Engineer (1) Operator(2)
BSE Buriram
Engineer (1) Operator (2)
BSE Buriram 1
Engineer(1) Operator (2)
BSE Nakhonratchasima
Engineer (1) Operator (2)
BSE Prachinburi
Engineer (1) Operator (2)
Engineering
Engineering 1
Bang Pahun Project
Buriram Project
Buriram 1 Project
Engineer 2
Bamnet Narong Project
Chaiyaphum 1 Project
Nakhoratchasima Project
Prachinburi Project
Financial and Adminitration
Financial and Accounting
Accountant
Finance Officer
Administrator
Planner

Figure 2-Organization Structure of BSE

Table 3-Mitigation Measures during Project Construction

IMPACTS	PROPOSED MITIGATING MEASURES	APPROXIMATE LOCAION	TIME FRAME	INSTITUTIONAL RESPONSIBILITY	
				IMPLEMENTATION	SUPERVISION
Air Quality: No gas emission	-	-	-	-	
Noise: Truck and Crane noises	- Not required due to working in remote area - Machines noise level not more than 85 dB(A) at avg. 8 hr	- In project site - Front main road	During land filling 4 months	EPC Contractor & BCP	BCP
Dust: No dust emission	-	-	-	-	
Water Quality: No emission	-	-	-	-	
Soil Contamination: No wastes	-	-	-	-	
Solid Wastes: No Solid wastes	-	-	-	-	
Risk and Hazards: No risk or hazard in construction if implemented per safety plan	-	-	-	-	
Occupational Health and Safety: - Working with trucks and piling cranes - Building Construction maximum 2 storey - High voltage work	- Provide Safety Manual - Provide Safety Plan - Supervision and Inspection - Protection gears	In project site	- Land filling and Civil work 11 months - Building construction 6 months - Commissioning 1 month	EPC contractor	BCP
Transportation of equipment and construction Materials: Falling earths from land filling truck	- Truck wheels cleaning - Road cleaning	Transport routes	During land filling 4 months	EPC contractor	BCP

III. COMPLIANCE WITH THE ENVIRONMENTAL AND SOCIAL REQUIREMENTS AS SPECIFIED IN THE FACILITY AGREEMENT

A. Compliance with Country Requirements

The Project fully complied with all relevant national EHS requirements during the construction. As the project construction involved minor civil works, EHS issues during construction were limited.

Before the project implementation, the Project conducted public hearing on 28 December 2009 as part of the IEE process to inform the public of the scope and nature of construction. The excerpt on the public hearing taken from the IEE is presented below for ready reference.

> *BCP in collaboration with the Bang Kasun Municipality organized a public consultation meeting on 28 December 2009. The meeting was participated by 115 persons, excluding 9 BCP staff. The participants consisted of: (i) 19 community leaders from villages located within a 2 km radius of the project site; (ii) 56 villagers; (iii) 38 representatives of central and local government offices; and (iv) 2 representatives from 2 NGOs. All the participants have no objection to the Project. The villagers and their leaders only enquired about project benefits to the local communities*

All permits required for the construction were obtained such as permits for land filling, construction, connection with the public road, groundwater extraction, factory operation, electricity generation, and generation of regulated energy. There were no public complaints and the construction passed all inspections by authorities concerned.

During operations, EHS issues are also limited. The Project has been fully complied with relevant EHS requirements. Table 4 summarizes all national requirements applicable to the Project.

Table 4-Status of Compliance with National EHS Requirements

Applicable National Requirements	Regulating Agency	Compliance Status
Groundwater consumption monitoring and reporting	Dept. of Groundwater Resources	Complied with
Prepare regulations and manuals related to work safety	Office of Workers' Welfare and Protection	Complied with. The rugulations andm manuals used by BCP are adoped for the Project.
Reports on performance of safety professionals	Office of Workers' Welfare and Protection	Complied with. This task was done by BCP for all affiliated companies.
Install fire protection system and periodically conduct fire drills	Office of Workers' Welfare and Protection	Complied with under the supervision of BCP.
Reporting on environmental conditions of work places	Office of Workers' Welfare and Protection	Complied with.
Conduct training on EHS	Office of Workers' Welfare and Protection	Complied with.
Conduct safety assessment and impact assessment of work environment, and prepare safety plan	Office of Workers' Welfare and Protection	Being carried out. Not critical issues for solar power plants using solar panels.

B. New or Emerging Environmental Issues

There are no new or emerging environmental issues or pending regulations that could affect environmental performance of project operations. Power plants using solar panels are still considered clean and safe energy in Thailand. Environmental impact assessment is not required for this type of energy projects.

C. Compliance with ADB's Safeguards Requirements

ADB's Safeguard Requirements 1: Environment is the only safeguard requirements relevant to the Project. As the Project generates electricity from solar energy using solar cells, the Project is environmentally friendly. Its construction involved only minor civil works and it has no wastewater and gaseous emissions, the Project's EHS issues are very few. Consequently, mitigation measures and monitoring activities for the Project are minimal.

The Project fully complies with all ADB's safeguard requirements applicable to the Project. Table 5 is the Environmental Monitoring Plan for the Project. During the construction, the EPC contractor implemented all necessary measures to mitigate environmental impacts, albeit their small magnitudes. No significant impacts were found during the construction period. This situation would be expected because the construction was minor civil works.

Table 5 Environmental Monitoring Plan for BCP Solar Power Project

Issues	Project stage	Parameters	Standard	Location	Frequency	Institutional responsibility	
						Implementation	Supervision
Noise	Construction	Noise levels in dB(A)	National/World Bank/IFC standards	- Project site	At the start of concerned activities	EPC Contractor & BCP	BCP
				- Front main road	3 times total		
Other issue related to physical works	Construction	e.g. As specified in contractors' plan	e.g. As specified in contractors' plan	Project site	Monthly	EPC Contractor	BCP
Occupational Health and Safety	Construction	e.g. As specified in OHS plan	Applicable standards	Project site	Weekly	EPC Contractor	BCP
	Operation	e.g. As specified in OHS plan	Applicable standards	Project site	Weekly	EPC Contractor	BCP

IV. ENVIRONMENTAL AND SOCIAL PROGRESS OF PROJECTS UNDERWAY

This section prescribed by ADB in the AESPR's outline is not applicable to this Project as it was already completed.

V. SUMMARY OF SAFETY PERFORMANCE AND ANY CORRECTIVE ACTIONS

A. Worker's Health and Occupational Safety

During the construction, the Project strictly supervised the EPC contractor in implementing all measures to ensure health and occupational safety of workers. All construction workers had received training on the process for safety and occupation health management in the construction. The workers were provided with protective equipment such as safety helmets and boots. Consequently, throughout the construction period, including the rehabilitation period, there were no major construction accidents which caused the work stoppage or damages to properties.

By its nature, operations in a solar energy plant using solar panels are clean and safe. Nevertheless, the Project strictly enforces all relevant ESH rules in operations. To date, the Project has no major accidents related to the power plant operations.

B. Accidents, Fires and Other Emergencies

There have been no accidents, fires and other emergencies related to the project construction and operations. The only emergency is the flood in October 2012 which caused extensive damage to the installed project facilities. The flood, which covered part of Bangkok and several provinces in the central area, was a 100-year flood and exceeded the capacity of the flood protection system constructed as part of the Project. It lasted for about 2 months. After that BLCP engaged a consulting firm to study and design a new flood protection system which could cope with 100-year floods. The new flood dikes and pumping system were completed before the COD of the 8 MW unit and the 30 MW unit.

VI. SUSTAINABLE DEVELOPMENT INITIATIVES AND COMMUNITY RELATIONS

During the flood, the Project provided relief assistance to nearby communities. Since its operation, the Project has participated in events organized by the nearby communities and has launched some community development activities, such as buying used cooking oils, and donation of eye glasses.

Buying of Used Cooking Oils-This activity is carried out by BLCP and its affiliated companies. The Project buy used cooking oils from the nearby companies. The oils are used as feed stock for the production of biodiesel. This activity supports environmental and renewable energy policies of BLCP.

Donation of Eye Glasses-This CSR activity is carried out by BLCP and its affiliated companies in collaboration with the Electricity Generating Authority of Thailand. Its objective is to help poor people in the nearby communities with visual problem. The activity provides at

no cost the help seekers with visual acuity measurement and eyeglasses specifically made to suit their visual acuity.