

Report and Recommendation of the President to the Board of Directors

Project Number: 45923 May 2012

Proposed Loan and Administration of Loan Provincial Solar Power Project (Thailand)

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Asian Development Bank

CURRENCY EQUIVALENTS

(as of 1 April 2012)

Currency Unit	_	baht (B)
B1.00	=	\$0.03
\$1.00	=	B31

ABBREVIATIONS

ADB	_	Asian Development Bank
BCP	_	Bangchak Petroleum Public Company Limited
BSE	_	Bangchak Solar Energy Company Limited
CTF	_	Clean Technology Fund
EPC	_	engineering, procurement, and construction
kWh	_	kilowatt-hour
MW	_	megawatt (alternating current)
O&M	_	operation and maintenance
PEA	_	Provincial Electricity Authority
PPA	_	power purchase agreement
SPP	_	small power producer
VSPP	-	very small power producer

NOTE

In this report, "\$" refers to US dollars.

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PROJECT AT A GLANCE

1. Project Name: Provincial Solar Power Project					2. Project Number:45923					
3. Country: Tha	iland	4. Department/Division:		ion:	Private Sector Operations Department					
		Private Sector Infrastructure 2								
5. Sector Class	ification:						<u></u>			
		Sectors			mary		Subsector	-		
		Energy					Renewabl	e energy g	eneration	
6.Thematic Clas	ssification:									
		Themes		Pri	mary		Subtheme	-		
		Econon	nic growth						infrastructur	e
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		Private	sector				Private se	ctor investi	ment	
6a. Climate Cha	ango Impact:	develop	ment	6h	Gondor	r Main	streaming			
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Mitigation				F	ffective c	nender	^r mainstrea	mina		
Not applicable		v				,				
				S	ome gen	der el	ements			
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				N	o gende	r elem	ents			
7. Targeting Cla	assification:				Location					
	Tar	geted Inter	vention		ural					
	Geographic		Income							
General	dimensions of inclusive	Millenniu developm			Urban					
Intervention	growth	goals	level							
	0				ational			High		
				R	egional					
9 Nonsovereig	n Operation	Dick Dati								
9. Nonsovereign Operation Risk Rating : NSO6										
10. Safeguard Categorization:										
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			ntary resettlemen	t	C C					
		Indige	nous peoples		L.					
11. ADB Financ	;ing:									
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Fi	nancier		Ca	tego	rv			Amount (\$million)	
		Loan								
Local Thailan				Loan						
Bank										
			\$37.8n	nillion						
13. Counterpart	t Financing:	Not Applic	able				•			
14. Aid Effectiv	eness: Not A	pplicable								
P										

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on (i) a proposed loan of up to B780 million or its equivalent in US dollars and (ii) the proposed administration of a loan to be provided by the Asian Development Bank (ADB) Clean Technology Fund (CTF) of up to \$15 million or the equivalent of 10% of project costs, whichever is less, both to Bangchak Solar Energy Company Limited for the Provincial Solar Power Project in Thailand.

II. THE PROJECT

A. Project Identification and Description

1. **Project Identification**

2. The project is part of the corporate strategy of Bangchak Petroleum Public Company Limited (BCP) to expand its operations into renewable energy through limited-recourse project financing to become carbon neutral. ADB provided financial assistance to BCP's first, 38-megawatt (MW) solar power project in 2010 on a corporate finance basis.¹ The first project is expected to become fully operational by July 2012 and play an important demonstration role as one of the first utility-scale solar power plants in Thailand.² BCP plans to develop an additional 80 MW of solar power capacity under its subsidiary, the Bangchak Solar Energy Company Limited (BSE), to become the largest solar power company in Thailand.

3. If approved, the project will be the first time ADB mobilizes CTF cofinancing for a private sector project.³ The CTF provides scaled-up financing to demonstrate, deploy, and transfer low-carbon technologies with significant potential to avoid greenhouse gas emissions over the long term. It is channeled and administered through multilateral development banks, including ADB, and is one of the largest funds available to help developing countries fill gaps in financing climate change mitigation.

4. ADB will build on its recent experience to play a crucial role in helping BCP achieve its first limited-recourse project financing for renewable energy. Project finance is a logical next step as it is the most appropriate form of financing for renewable power projects, despite its complexity. Project finance can strengthen the financial viability of clean energy projects and optimize their cash flow through longer tenors and advantageous debt sizing. The project will be made possible by the confluence of three main factors: (i) BCP's strategic focus and commitment to renewable energy; (ii) the Government of Thailand's support through a strong public–private partnership regulatory and legal framework combined with a sufficient tariff regime; and (iii) ADB's long-term, fixed-rate financing in local currency combined with the expected CTF cofinancing, which reduces the additional costs and risks associated with investments in solar power.

5. As of January 2012, Thailand's installed power generation capacity was 31,447 MW. Generation depends heavily on conventional fuels, with 64% produced by natural gas and 22% produced by coal and lignite. Natural gas has traditionally been Thailand's reliable and low-cost source of energy, but growing demand and dwindling reserves in the Gulf of Thailand mean the

¹ ADB. 2010. Report and Recommendation to the President to the Board of Directors: Proposed Loans and Technical Assistance for the Bangchak Solar Power Project. Manila (Loan 2628-THA and EI 7311-THA).

² The project consists of two plants with a capacity of 8 MW and 30 MW. The commercial operations date was delayed by heavy flooding in 2011.

³ For information on the CTF, the Climate Investment Funds website can be accessed at <u>http://www.climateinvestmentfunds.org</u>.

country must begin the transition toward secure alternative sources. Fortunately, Thailand has abundant renewable energy sources: biomass, biogas, mini-hydro, solar, and wind. Using these domestic sources of renewable energy can boost Thailand's energy security, save foreign exchange, and protect the country from global price fluctuations. As part of its strategy to diversify the energy mix and promote renewable energy, the government prepared the Alternative Energy Development Plan, 2012–2021, which the cabinet approved on 30 December 2011, and set a new target of generating 25% of primary commercial energy from renewable energy sources by 2021. This would reduce carbon dioxide emissions by 76 million tons per year. This target includes 9,201 MW of renewable energy capacity by 2021, of which 2,000 MW is solar. As of 2011, only 169 MW of solar power capacity had reached commercial operation. To reach the target, the plan will encourage private sector development and the promotion of new technologies.

6. To complement its renewable energy strategy, the Ministry of Energy decentralizes power generation mainly by supporting the country's small power producer (SPP) and very small power producer (VSPP) programs, which are public–private partnerships that buy renewable energy from power plants to provide clean electricity to the grid. The SPP program allows private developers to build, own, and operate 10–90 MW power projects and enter into power purchase agreements (PPAs) with the Electricity Generating Authority of Thailand. Under the VSPP program, producers of up to 10 MW may sell power to the Metropolitan Electricity Authority or the Provincial Electricity Authority (PEA). Renewable energy SPPs and VSPPs are eligible for a feed-in tariff (or "adder") in addition to the wholesale electricity price.

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2. The Borrower and Sponsor

7. The project will be developed and operated by BSE, a special-purpose company incorporated in Thailand that is 100% owned by BCP. BCP is a leading integrated oil refining and distribution company in Thailand with a long track record of adhering to principles of good corporate governance and strong commitment to the environment and social responsibility. BCP owns and operates an oil refinery in Bangkok with a capacity of 120,000 barrels per day. BCP's retail business consists of a network of over 1,000 service stations, making BCP the third-largest gasoline distribution company in Thailand and the leader in green fuels such as gasohol and biodiesel. BCP has become a role model in Thailand for its success in developing internal mechanisms that enhance transparency and accountability, including comprehensive reporting on environmental and social indicators.⁴ BCP has initiated a proactive zero-carbon strategy that tracks and monitors its carbon footprint companywide and implements strategies to offset carbon emissions with the objective of reaching zero emissions.

8. BCP's major shareholder is the national oil company, PTT Public Company Limited, which owns 27%. Other shareholders are the Ministry of Finance (10%) and the public (63%) investing through the Stock Exchange of Thailand. In 2011, BCP generated B158.6 billion in revenue and net income of B5.6 billion. Shareholders' funds are B29.9 billion and total assets B61.6 billion. BCP has a corporate rating from TRIS Rating Company Limited of A–/stable.⁵

⁴ BCP's corporate social responsibility reporting comprises full disclosure of its resource use and environmental footprint, as well as the annual publication of environmental management accounting, which counts carbon dioxide emissions and other factors as costs to BCP. It publicizes its emissions and accident rates to the public on billboards and at information centers. BCP has won numerous awards for its high standards of corporate governance and corporate social responsibility.

⁵ See Implementation Arrangements (accessible from the list of linked documents in Appendix 2) for more information on BCP.

10. ADB's review of BSE, a wholly owned subsidiary of BCP incorporated in Thailand to operate solar projects, did not give cause to believe that it was established or is being used to evade taxes across borders, launder money, or finance terrorism in the jurisdictions involved.

B. Development Impact, Outcome, and Outputs

1. Impact

11. The project's impact will be the diversification of Thailand's energy mix through the addition of renewable energy capacity⁶, helping the country progress towards its clean energy targets.⁷ To achieve sustainable long-term economic growth, Thailand is promoting alternative sources of energy for power generation such as solar, and is beginning the transition to a low-carbon economy. Solar is a secure, reliable, and sustainable source of electricity that diversifies the country's energy mix, strengthening energy security and reducing reliance on fossil fuel.

13. The project also contributes to the acceleration and expansion of private sector investment in clean energy infrastructure in Thailand. It is expected that the successful implementation of the project and viable returns will attract other private sector investors in solar energy projects.

2. Outcome

14. The project's outcome is the demonstrated viability and sustainability of a large solar project in the private sector. The amount of carbon dioxide emissions avoided is an indicator for the outcome, in addition to the usual financial and operational indicators.

3. Output

15. The output is the installation and operation of 32 MW of solar power generation.⁸

C. Alignment with ADB Strategy and Operations

1. Consistency with Strategy 2020

16. ADB's Strategy 2020 supports development that is environmentally sustainable and supported by the private sector to meet growing energy demand in the region, capitalizing on ADB's operating strengths in infrastructure development, finance, and other areas.⁹ The strategy supports the expansion of environment-friendly technologies for clean and efficient energy generation and use, as well as a larger role for the private sector in infrastructure financing through public–private partnerships.

2. Consistency with the Country Strategy

⁶ With this project of 32 MW, ADB will have contributed to 125 MW of solar energy capacity in Thailand. Earlier projects are Natural Energy Development Limited (55 MW) and Bangchak (38 MW).

⁷ The government has established clean energy targets of 2,000 MW of solar power by 2021 and 25% of primary commercial energy from renewable sources by 2021.

⁸ The design and monitoring framework is in Appendix 1.

⁹ ADB. 2008. Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank, 2008–2020. Manila.

ADB's country partnership strategy for Thailand, 2007-2011 has three core strategic 17. areas: infrastructure, environmental sustainability, and capital markets.¹⁰ The government's Alternative Energy Development Plan, approved by the cabinet on 30 December 2011, notes the immense energy potential of solar radiation in Thailand and the energy imports that can be avoided through its use, with private sector investment. The project supports the government's long-term objective for the Thailand Clean Technology Fund Investment Plan to utilize CTF resources to support renewable energy projects in the private sector.¹¹

Consistency with the Energy Policy 3.

18. The project is consistent with ADB's Energy Policy, which emphasizes investments in energy efficiency, renewable energy projects, and wider access to energy.¹² In 2013, ADB will raise its clean energy investment target to \$2 billion per year from the present \$1 billion to accelerate low-carbon growth and reduce regional greenhouse gas emissions. The policy underscores ADB's continued financial and technical support for projects that qualify for carbon credits under the Clean Development Mechanism of the Kyoto Protocol. Further, under the Asia Solar Energy Initiative, ADB is committed to achieving 3,000 MW of new solar power projects by 2013, providing up to \$2.25 billion in financing and leveraging an additional \$6.75 billion.

4. **Lessons from Previous Operations**

19. In 2010, ADB approved financing for two solar power projects in Thailand; the Natural Energy Development Solar Power Project¹³ and the Bangchak Solar Power Project (footnote 1). Both projects will play important demonstration roles in Thailand's nascent solar power industry. The first Bangchak Solar Power Project was affected by floods in 2011, illustrating the importance of climate-proofing projects. The project's civil works will ensure that physical and hydrological design assumptions take into account the changes predicted for precipitation patterns and the severity and frequency of floods due to climate change.

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D. **Implementation Arrangements**

20.	Table 3 summarizes the implementation arrangements (f	footnote 9).
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Aspects	Arrangements			
Regulatory framework	The project is being developed as a public–private partnership under Thailand's Very Small Power Producer program, which utilizes renewable energy from private sector power plants with capacity of up to 10 MW to provide clean electricity to the grid.			
Management	The project will be developed and managed by BSE, a special-purpose company incorporated in Thailand that is 100% owned by BCP. BCP is a leading integrated			

Table 3: Summary of Implementation Arrangements

¹⁰ ADB. 2007. Country Partnership Strategy: Thailand, 2007–2011. Manila. The new country partnership strategy for 2012-2016 is under preparation.

¹¹ The CTF provides scaled-up financing to demonstrate, deploy, and transfer low-carbon technologies with significant potential to avoid greenhouse gas emissions over the long term. The CTF is part of the Climate Investment Funds implemented by multilateral development banks to bridge the financing and learning gap until the next international climate change agreement. ¹² ADB. 2009. *Energy Policy.* Manila.

¹³ ADB. 2010. Report and Recommendation to the President to the Board of Directors: Proposed Loan and Administration of Grant for the Solar Power Project (Thailand). Manila (EI 7314-THA).

Aspects	Arrangements
	oil refining and distribution company in Thailand committed to achieving zero carbon emissions companywide. It has managed the construction and operation of the Bangchak solar power project. Its corporate rating from TRIS Rating Company Limited is A-/stable.
Implementation period	First quarter 2012–second quarter 2013 Construction period of 9–12 months
Construction arrangements	CONFIDENTIAL INFORMATION DELETED
Contractor	CONFIDENTIAL INFORMATION DELETED
Operations arrangements	
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Operation and maintenance	O&M for solar power is relatively simple, consisting of cleaning the panels, regular inspections, minor repairs, measurements, data verification, reporting, and site security. The O&M services will be undertaken by BSE with an option to outsource O&M services to the consortium. The project will benefit from extended inverter and photovoltaic panel warranty coverage, which exceeds the full term of the debt.
Relevant parties	Revenue offtake is supported by PEA, Thailand's state-owned distribution utility responsible for all distribution and retail electricity sales outside the Greater Bangkok area.
Performance Monitoring	BSE will submit quarterly unaudited financial statements, annual audited financial statements, and semiannual environmental and social monitoring reports to ADB during construction, annual thereafter. The performance indicators are included in the design and monitoring framework (Appendix 1).

ADB = Asian Development Bank, BCP = Bangchak Petroleum Public Company Limited, BSE = Bangchak Solar Energy Company Limited, EPC = engineering, procurement, and construction, MW = megawatt, O&M = operation and maintenance, PEA = Provincial Electricity Authority, PPA = power purchase agreement. Source: Asian Development Bank.

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III. THE PROPOSED ADB ASSISTANCE

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IV. POLICY COMPLIANCE

A. Safeguards and Social Dimensions

26. In compliance with ADB's Safeguard Policy Statement (2009), the project is classified as category B for environment, category C for involuntary resettlement, and category C for indigenous peoples. The potential environmental and social impacts of the project have been identified and effective measures to avoid, minimize, mitigate, and compensate for adverse impacts are incorporated in the initial environmental examination reports prepared for phases 2A and 2B. The institutional capacity and commitment of the BSE to manage the project's social and environmental impacts are deemed adequate and described in the environmental management plan included in initial environmental examination reports. The sites where phases 2A and 2B will be constructed are already owned by the BSE, acquired on a willing-seller, willing-buyer basis. The project transmission lines are expected to have a short-term impact during construction and insignificant environmental impacts during remaining life of the project. During construction, 600 workers will be engaged, mainly as skilled and unskilled laborers. The BSE and its contractors will comply with ADB's Social Protection Strategy and report annually to ADB on their compliance with national labor laws and adherence to internationally recognized core labor standards.¹⁴ Several public hearings and information dissemination activities involved

¹⁴ ADB. 2003. Social Protection Strategy. Manila (adopted in 2001).

stakeholders to ensure public participation. These activities were confirmed during a due diligence site visit and found to accord with ADB requirements. On gender classification, the project has been categorized as having no gender element.¹⁵

B. Anticorruption Policy

27. The BSE was advised of ADB's policy of implementing best international practice relating to combating corruption, money laundering, and the financing of terrorism. ADB will ensure that the investment documentation includes appropriate provisions prohibiting corruption, money laundering, and the financing of terrorism, and remedies for ADB in the event of noncompliance.

C. Investment Limitations

28. The proposed loan lies within the country, industry, group, and single project exposure limits for nonsovereign investments.

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D. Assurances

29. Consistent with the Agreement Establishing the Asian Development Bank (the Charter),¹⁶ the Government of Thailand will be requested to confirm that it has no objection to the proposed assistance to the BSE. ADB will enter into suitable finance documentation, in form and substance satisfactory to ADB, following approval of the proposed assistance by the Board of Directors.

V. RECOMMENDATION

30. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve

- (i) a loan of up to B780,000,000 or its equivalent in US dollars from ADB's ordinary capital resources to Bangchak Solar Energy Company Limited for the Provincial Solar Power Project in Thailand; and
- (ii) the administration by ADB of a loan to be provided by ADB's Clean Technology Fund of up to \$15,000,000 or the equivalent of 10% of project costs, whichever is less, to Bangchak Solar Energy Company Limited for the Provincial Solar Power Project in Thailand

with such terms and conditions as are substantially in accordance with those set forth in this report, and as may be reported to the Board.

Haruhiko Kuroda President

28 May 2012

¹⁵ Summary Poverty Reduction and Social Strategy, and Safeguards and Social Dimensions Summary (accessible from the list of linked documents in Appendix 2).

¹⁶ ADB. 1966. Agreement Establishing the Asian Development Bank. Manila.

	Performance Targets and	Data Sources and/or	
Design Summary	Indicators with Baselines	Reporting Mechanisms	Assumptions and Risks
Impacts Diversified energy mix through the addition of renewable energy capacity in Thailand	At least 1,500 MW of solar energy capacity installed by 2020	Statistics and information disclosed by the Ministry of Energy, Thailand	Assumptions Stable and consistent regulatory policies for the renewable energy sector including solar energy
Increased private sector participation in solar power production	At least five additional private sector solar power projects commissioned by 2020	Statistics and information disclosed by the Ministry of Energy, Thailand	Viable tariffs for solar power Risk Demand from PEA lower than expected
Outcome Demonstrated viability and sustainability of large private sector solar farms	60,000 megawatt-hours of solar power delivered to the offtaker per annum, on average, during the first 10 years of operation (2013– 2023)	BSE technical reports	Assumptions Plant achieving forecasted availability Offtakers complying with their purchase and payment commitments
	38,000 tons of carbon dioxide equivalent emission avoidance per annum, on average, during the first 10 years of operation (2013– 2023)	BSE reports on operations	Viable tariff rates for solar power over the operating life of the project Risk
	Project financial internal rate of return exceeding the weighted average cost of capital of 6.5%	Annual audited financial reports; operations reports	Reduced efficiency Deficient operation and maintenance
	Project economic internal rate of return exceeding 10%	Financial reports; operations reports; sector reports	
	Over 80 people full time equivalent permanently employed from commercial operations date	Sex-disaggregated employment data to be collected from BSE	

DESIGN AND MONITORING FRAMEWORK

	Performance Targets and	Data Sources and/or			
Design Summary	Indicators with Baselines	Reporting Mechanisms	Assumptions and Risks		
Output			Assumption		
Installation and	32 MW of solar power	Bangchak Petroleum			
operation of two large solar power generating facilities	capacity commissioned by the first quarter of 2013	Public Company Limited annual reports	Project agreements adhered to as agreed by third parties		
with combined capacity of 32 MW		PEA disclosure as offtaker	Risk		
	Over 100 people (full time equivalent), employed during construction	BSE reports on operations	Noncompliance with engineering, procurement, and construction contractual obligations		
	Local purchase of goods and services amounting to over B1,000 million from the construction of phases 2A and 2B	Sex-disaggregated employment data to be collected from BSE			
Activities with Milesto	ones		Inputs		
1.1.Construction w1.2.Loan agreement1.3.Commissioning	ADB: B780 million (\$25.2 million)				
1.4. Commissioning	CONFIDENTIAL INFORMATION DELETED				
ADB = Asian Development Bank, BSE = Bangchak Solar Energy Company Limited, MW = megawatt, PEA = Provincial Electricity Authority.					

Provincial Electricity Authority. Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

http://www.adb.org/Documents/RRPs/?id=45923-01-4

- 1. Sector Overview
- 2. Details of Implementation Arrangements
- 3. Contribution to the ADB Results Framework
- 4. Financial Analysis
- 5. Economic Analysis
- 6. Country Economic Indicators
- 7. Summary Poverty Reduction and Social Strategy
- 8. Environmental and Social Safeguards Summary

Supplementary Documents

- 9. Renewable Energy Incentives
- 10. Financial Analysis Statements
- 11. Initial Environmental Examination (Bangchak Solar Energy Company Limited Solar Power Plant at Ayutthaya)
- 12. Initial Environmental Examination (Bangchak Solar Energy Company Limited Solar Power Plant at Chaiyaphum)
- 13. Details of Very Small Power Producer Procurement

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