



Report and Recommendation of the President to the Board of Directors

Project Number: 44931
September 2010

Proposed Loans and Technical Assistance Bangchak Solar Power Project (Thailand)

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Asian Development Bank

CURRENCY EQUIVALENTS

(as of 1 September 2010)

Currency unit	–	baht (B)
B1.00	=	\$0.03
\$1.00	=	B31.27
Currency unit	–	yen (¥)
¥1.00	=	\$0.012
\$1.00	=	¥84.21
Currency unit	–	Hong Kong dollar/s (HK\$)
HK\$1.00	=	\$0.13
\$1.00	=	HK\$7.77

ABBREVIATIONS

ADB	–	Asian Development Bank
BCP	–	Bangchak Petroleum Public Company
CDM	–	Clean Development Mechanism
CER	–	certified emission reduction
CMI	–	Carbon Market Initiative
CO ₂	–	carbon dioxide
CSR	–	corporate social responsibility
DMC	–	developing member country
DSCR	–	debt service coverage ratio
EBITDA	–	earnings before interest, taxes, depreciation, and amortization
EGAT	–	Electricity Generating Authority of Thailand
EIRR	–	economic internal rate of return
EPC	–	engineering, procurement, and construction
EPPO	–	Energy Policy and Planning Office
FIRR	–	financial internal rate of return
GHG	–	greenhouse gas
GRM	–	gross refining margin
MEA	–	Metropolitan Electricity Authority
NEPC	–	National Energy Policy Council
PDP	–	power development plan
PEA	–	Provincial Electricity Authority
PPA	–	power purchase agreement
PQI	–	product quality improvement
PTT	–	PTT Public Company Limited
RPS	–	renewable portfolio standard
S&P	–	Standard & Poor's
SPP	–	small power producer
VSPP	–	very small power producer
WACC	–	weighted average cost of capital

WEIGHTS AND MEASURES

bpd	–	barrel per day
GWh	–	gigawatt-hour
GW	–	gigawatt
kWh	–	kilowatt-hour
MW	–	megawatt
MWh	–	megawatt-hour

NOTES

- (i) The borrower's fiscal year (FY) ends on 31 December.
- (ii) In this report, "\$" refers to US dollars.

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FINANCING AND PROJECT SUMMARY

Borrower	Bangchak Petroleum Public Company (BCP)
Classification	Targeting classification: General intervention Sector (subsector): Energy (renewable energy) Themes (subthemes): Economic growth (widening access to markets and economic opportunities); environmental sustainability (global and regional transboundary environmental concerns); private sector development (private sector investment) Climate change: Climate change mitigation Location impact: National (high) Partnership: Mizuho Bank
Environmental and Social Safeguards Classification	Environment: B Involuntary Resettlement: C Indigenous Peoples: C
Project Description	Construction of two solar power generation plants (a 9.43-megawatt [MW] and 34.5 MW plant) in the Ayutthaya province of Central Thailand. The project is sponsored by BCP and will be financed on a corporate basis.
Implementation Arrangements	BCP will use multicrystalline photovoltaic technology produced by Suntech Power. Suntech Power, in a consortium with local contractor Solartron, will implement the project through a date-certain, fixed-price engineering, procurement, and construction contract with liquidated damages for non-timely completion and performance warranty for the photovoltaic modules. PB Power is acting as the owner's engineer and project management consultant through completion. Suntech Power is listed on the New York Stock Exchange and is one of the largest solar panel manufacturers in the world, with installed capacity just under 2 gigawatts (GW).
Proposed Asian Development Bank (ADB) Assistance	CONFIDENTIAL INFORMATION DELETED Technical assistance. The proposed \$400,000 capacity development technical assistance (TA) aims to support the implementation of carbon neutral strategies within private sector energy companies in developing member countries. The TA will include (i) the development and implementation of a system to determine, track, and monitor BCP's carbon footprint on a company-wide basis and implement strategies to offset carbon emissions with an objective of reaching zero emissions within a set time frame; (ii) training of staff on implementation of the zero-carbon-footprint strategy; (iii) establishment of assessments of the carbon life cycle of BCP products (i.e., gasoline, ethanol, fuel oil, etc.) in accordance with generally accepted standards; (iv) creation of a simulation model to assess new products and investments with regard to emissions and potential for offsetting of emissions; (v) establishment of a business-as-usual greenhouse gas emissions baseline as a reference case;

and (vi) dissemination of knowledge in carbon tracking and reduction strategies through seminars and training for other energy companies in the region.

Impact, Outcome, and Benefits

The project's impact will be the (i) diversification of Thailand's energy mix through the addition of renewable energy capacity, helping the country achieve its target of 20.3% of primary commercial energy coming from alternative energy by 2022; and (ii) demonstrational impact of the feasibility of a large-scale private sector solar power generation project. The project's outcomes are (i) increased supply of clean energy sourced from solar power, and (ii) reduction of carbon dioxide emissions. The output is the installation and operation of two (a 34.5 MW and a 9.43 MW) solar power generating facilities.

Borrowers

BCP is a leading integrated oil refining and marketing company in Thailand with a long track record for adhering to the principles of good corporate governance, and strong commitment to the environment, social responsibility and rural development. BCP's major shareholder is the national oil company, PTT Public Company Limited (PTT) (formerly Petroleum Authority of Thailand), which owns 29.7%; the remaining shareholders are the Ministry of Finance (11.2%) and the public (59.1%).

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Justification and ADB Value-Added

The justification for ADB's assistance for the project is based on the value that ADB can add to the project and its development impact and demonstration effects. The project merits ADB's support because (i) ADB's assistance will play a crucial role in helping the project secure appropriate long-term financing, which is a necessary condition for the viability of a solar project, while the long-term local currency loan and the proposed pre-financed CERs from ADB's Future Carbon Fund help to increase the viability of a power generation plant that has high upfront investment costs, but no ongoing fuel cost; (ii) ADB's innovative risk participation structure has a catalytic effect as it enables an international commercial bank to participate in long-term financing for solar projects in Thailand; (iii) the project will play a pioneering role in demonstrating the commercial viability of large-scale private sector solar farms, a model that can then be replicated by other private sector investors in the region; (iv) ADB assistance for the project is consistent with ADB's country partnership strategy for Thailand 2007–2011 and country operations business plan; and (v) ADB's TA will support BCP and other energy companies to develop and implement carbon neutral strategies, track their carbon footprint, align corporate, strategic, and environmental objectives, and monitor and comply with carbon reduction targets. By training industry participants and disseminating knowledge on zero-carbon strategies, ADB will help to reduce the energy companies' environmental impact and enhance their long-term sustainability in

the context of evolving global efforts and regulatory frameworks to reduce carbon emissions.

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on the Bangchak Solar Power Project.

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2. The report also describes a proposed capacity development technical Assistance (TA) of up to \$400,000 to support the implementation of carbon neutral strategies of BCP and other private sector energy companies in developing member countries (DMCs). If the Board approves the proposed loans, I, under the authority delegated to me by the Board, will approve the TA. If approved, the project will constitute ADB's fourth private sector investment in Thailand. The design and monitoring framework is presented in Appendix 1.

II. BACKGROUND AND RATIONALE

A. Project Identification and Selection

3. Solar energy is an abundant resource throughout Thailand. The project will play a pioneering role in demonstrating the commercial viability of large-scale private sector solar farms, a model that can then be replicated by other private sector investors in the region.

4. This transaction and its potential demonstrational impact is made possible by a number of unique transaction factors. The challenges that often accompany large-scale solar projects are mitigated by (i) BCP's strategic focus on renewable energy projects and its balance sheet strength; (ii) the Government of Thailand's commitment to clean energy through a supportive feed-in tariff; (iii) regulatory stability; (iv) a reduction in the cost of photovoltaic material, due to supply-capacity buildup in the solar industry; and (v) experience gained by the industry worldwide. Moreover, the viability of the project is bolstered by ADB's combination of financial products, including ADB's long-term baht loans, its role in mobilizing commercial bank funding through the risk participation, and the proposed availability of pre-financed certified emission reductions (CERs) from ADB's Future Carbon Fund. ADB's long-term local currency loan gives BCP the tenor it needs to fund a power generation plant that has a long asset life and high upfront investment costs, but no ongoing fuel costs. In addition, the innovative risk sharing mechanism allows ADB to extend the tenor of the cofinanced tranche and assists in attracting commercial banks, which have limited experience in financing clean energy projects in Thailand.

5. BCP has chosen ADB as a strategic partner to expand into solar power because of ADB's proven experience in financing renewable energy combined with its strong mandate, reputation and commitment to facilitating the transition by DMCs to low-carbon economies. In addition, BCP and ADB share the long-term objective of achieving low-carbon growth while adhering to best-practice environmental standards. For BCP, ADB is a potential long-term partner in reaching its carbon neutral goal. As a creditor and investor, ADB strongly supports companies that have sound corporate governance structures and sustainable development policies, an area in which BCP has become a prominent leader within Thailand. The alignment in values between ADB and BCP supports the formation of a long-term partnership that would include future clean energy projects.

B. Sector Overview

6. Thailand is one of the largest electricity consumers in Southeast Asia. As of December 2009, installed power generation capacity in Thailand was 29,211 megawatts (MW), 71% of which was sourced from natural gas and 19% from coal and lignite. Its recent energy policy has stressed the importance of diversifying and securing sources of fuel for power generation. Overreliance on natural gas, coupled with exposure to oil price volatility, has magnified the country's political and economic risk. Thailand continues to depend on imports, because domestic demand for commercial primary energy outpaces the discovery of indigenous oil and gas. Supplementary Appendix A reviews Thailand's power sector in detail.

7. Thailand's growth rates in energy consumption are much higher than its respective GDP growth rate. Moreover, energy consumption gives rise to over 50% of the country's greenhouse gas (GHG) emissions.¹ If unchecked, Thailand's rapidly growing energy consumption will invariably increase the economy's carbon intensity. In its most recent Power Development Plan (2010), published in April 2010, the Electricity Generating Authority of Thailand (EGAT) projected an average growth rate of 4.22% in energy demand and a 4.19% annual average increase in peak demand between 2008 and 2030.²

8. 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 the strategy of diversifying the energy mix and promoting renewable energy, the government has prepared an Alternative Energy Development Plan³ (2008–2022) and set a target of 20.3% for primary commercial energy from renewable energy sources by 2022. This implies a renewable energy capacity of 5,608 MW by 2022, a significant increase from the present 1,754 MW;⁴ this can be achieved only with concerted efforts from the regulator, the private sector sponsors and financial institutions.

9. To complement its renewable energy strategy the Ministry of Energy is advocating decentralized power generation, mainly by supporting the country's small power producer (SPP) and very small power producer (VSPP) programs. The SPP program allows private developers to build, own, and operate 10 MW–90 MW power projects and enter into power purchase agreements (PPAs) with EGAT. Under the VSPP program producers of up to 10 MW may sell power to the Metropolitan Electricity Authority and the Provincial Electricity Authority (PEA). The country's 161 VSPPs contribute just over 1% of total power generation, while the more than 60 SPPs account for 8% (footnote 2). Renewable energy SPPs and VSPPs can receive higher tariffs through an “adder” (feed-in) tariff in addition to the normal tariff. Solar energy projects receive a fixed adder subsidy of B8 per kilowatt-hour (kWh) for 10 years from the start of commercial operations.⁵ Supplementary Appendix B discusses Thailand's renewable energy policies and incentives at greater length.

¹ ADB. 2009. *Building a Sustainable Energy Future: The Greater Mekong Subregion*. Manila.

² EGAT. 2010. *Summary of Thailand Power Development Plan 2010–2030*. Bangkok.

³ Department of Alternative Energy Development and Efficiency. 2009. *The Alternative Energy Development Plan (2008–2022)*. Bangkok.

⁴ This target comprises biomass, 3,700 MW; biogas, 120 MW; waste to energy, 160 MW; wind, 800 MW; small hydro, 328 MW; and solar, 500 MW.

⁵ For new projects, the government is considering to reduce the adder to B6.5/kWh. This change will not affect the proposed project.

10. Over the past two decades, solar power has become increasingly attractive economically. Grid-connected solar photovoltaic generation systems are the fastest growing in the world: cumulative installed capacity grew by 50% yearly in 2006 and 2007 to 7.8 gigawatts (GW) by the end of 2007.⁶ According to the *Annual Energy Outlook 2009*,⁷ the capacity costs in 2030 of new plants using solar photovoltaics will be 37% lower than in 2009. At the same time, it will cost more to generate electricity from conventional sources, meaning electricity prices will increase in places that rely significantly on gas-fired power plants (e.g., Thailand). The cost of solar energy and conventional power generation are expected to approach grid parity by 2020–2022; as a result, global installed solar capacity in 2020 could be 20–40 times what it is today.

11. The project will be one of the first few to demonstrate the capacity of large-scale solar projects to meet power needs in Thailand.⁸ After large-scale private sector solar farms are shown to be feasible, other private sector investors can replicate the model in Thailand and other DMCs. Small-scale solar power has been used for many years, mainly to provide energy to communities with no access to the national power grid. There are 32 grid-connected solar rooftop projects with a generating capacity of 0.14 MW, and many small off-grid solar VSPP projects producing a total of 32 MW. In addition, a few small solar farms, sponsored by EGAT and the private sector, have a generating capacity of less than 2.2 MW.⁹ Thailand's Alternative Energy Policy projects solar power to grow from 34 MW to 500 MW by 2022 (footnote 3).

C. Alignment with ADB Strategy and Operations

1. Consistency with ADB's Strategy 2020

12. ADB's Strategy 2020 supports environmentally sustainable, private sector-assisted development in meeting the growing energy demand in the region, and capitalizes on ADB's operating strengths in infrastructure development and finance, among other areas.¹⁰ The strategy supports the expansion of environmentally friendly technologies, specifically for clean and efficient energy generation and use, and a larger role for the private sector in infrastructure financing through public–private partnerships.

2. Consistency with the Country Strategy

13. The country partnership strategy for Thailand 2007–2011 is directed at three core strategic areas—infrastructure, environmental sustainability, and capital markets.¹¹ The government's Alternative Energy Development Plan, approved by the Cabinet on 28 January 2009, notes the immense potential energy in Thailand's solar radiation and the savings on energy imports that can be made through its use, with private sector investment.

3. Consistency with the Energy Policy

⁶ Renewable Energy Policy Network for the 21st Century (REN21). 2008. *Renewables 2007: Global Status Report*. Paris (REN21 Secretariat; Washington, DC: Worldwatch Institute).

⁷ Energy Information Administration. 2009. *Annual Energy Outlook 2009*. Washington, DC.

⁸ ADB is also supporting a solar power project with 73 MW gross capacity to be constructed in Lopburi province in central Thailand. See ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kingdom of Thailand for the Solar Power Project*. Manila.

⁹ Petchaburi, 2.144 MW; Chachoengsao, 1.644 MW; Udon Thani, 1.563 MW; and Ang Thong, 1.136 MW.

¹⁰ ADB. 2008. *Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank, 2008–2020*. Manila.

¹¹ ADB. 2007. *Country Partnership Strategy: Thailand, 2007–2011*. Manila.

14. The project is consistent with ADB's Energy Policy,¹² which emphasizes investments in energy efficiency and renewable energy projects, and in wider access to energy. In 2013, ADB will raise its clean energy investment target to \$2 billion a year from the present \$1 billion, in a bid to accelerate low-carbon growth and reduce regional GHG 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. The proposed project is expected to benefit from the prefinancing of CERs by ADB's Carbon Market Initiative (CMI). The CMI team has been working on the Clean Development Mechanism component with the project sponsors, in parallel with the ADB loan discussions.

4. Consistency with the Asia Solar Energy Initiative

15. The project is consistent with the ADB Asia Solar Energy Initiative. The realization of benefits from Asia and the Pacific's massive solar power potential has been prevented by barriers such as high upfront capital costs and unfavorable financing terms that have the risk of creating a "Solar Divide".¹³ In 2010, ADB announced the Asia Solar Energy Initiative, which plans to provide \$2.25 billion in financial assistance to realize 3,000 MW of solar power in DMCs by 2013. The proposed project is consistent with this initiative as it bridges the Solar Divide through an innovative risk participation arrangement that stretches the corporate finance tenor needed by solar projects.

III. THE PROJECT

A. Project Description

1. The Borrower

16. The project is sponsored by Bangchak Petroleum Public Company (BCP), a leading integrated oil refining and marketing company in Thailand. BCP was established in 1985 and is listed on the Thai stock exchange. BCP owns and operates an oil refinery located in Bangkok with a capacity of 120,000 barrels per day (bpd) representing 11% of Thailand's refining capacity. Its retail business consists of a network of 507 standard service stations and 546 community service stations, representing 19% of the market share among refineries and 14% among oil marketing companies. BCP's major shareholder is the national oil company, PTT Public Company Limited (PTT) (formerly Petroleum Authority of Thailand), which owns 29.7%; other shareholders are the Ministry of Finance (11.2%) and the public (59.1%). BCP receives financial and business support from PTT, including credit lines, and crude supply and refinery product off-take agreements (covering 30% of BCP's wholesale sales). The project will be developed and financed on a corporate finance basis on BCP's balance sheet. The project is being developed as part of BCP's strategy to focus and increase participation in the renewable energy sector, and move into cleaner and higher value-added fuels.

17. Within Thailand, BCP has become a role model for good corporate governance and success in developing internal mechanisms that enhance transparency, accountability, and commitment to the environment and social responsibility. BCP's corporate social responsibility (CSR) reporting is exemplary, with full disclosure of its resource use and environmental footprint, and annual publication of environmental management accounting that accounts for carbon dioxide emissions and other factors as a cost to BCP. It also publishes its emissions and accident rates to the public on billboards and at information centers. BCP has won the Stock

¹² ADB. 2009. *Energy Policy*. Manila.

¹³ ADB. 2010. *ADB Calls for Asia and Pacific to Make Transition to Solar Power*. Manila (6 July).

Exchange of Thailand's Corporate Social Responsibility Award for 3 consecutive years. BCP's high standards of corporate governance have been publicly recognized through several recent awards such as the Board of the Year for Exemplary Practices (3 consecutive years), Audit Committee of the Year, Board with Consistent Best Practices, Top Corporate Governance Report Award (4 consecutive years), and the Investor Relations Excellence Reward.¹⁴

18. BCP has invested heavily in a refinery upgrade project costing B14.5 billion ("Green Refinery"), which has recently been commissioned, and the project is expected to significantly improve BCP's profitability and market competitiveness. BCP has identified renewable energy as a key source of future growth. Consistent with the government's national strategy to reduce reliance on imported crude oil and encourage the use of cleaner fuels, BCP has invested in biodiesel production and gasohol marketing facilities. Both bio-diesel and gasohol use agricultural crops (e.g., palm oil, coconut, and rapeseed) as feedstock and reduce Thailand's reliance on imported crude oil. BCP has adopted the long-term goal of becoming a "zero global warming impact company", and has taken active steps to deliver a GHG reduction target of 460,000 tons per annum by 2012.¹⁵

19. BCP has historically received strong support from the government, which provided short-term liquidity support (through state-owned banks) during 1999–2004 due to financial distress resulting from the financial crisis and excessive levels of debt; the government was later instrumental in facilitating a B19.5 billion debt restructuring at BCP. Lenders were repaid early at par in this restructuring. BCP has returned to full financial stability, evidenced by its successful B14 billion refinancing during 2008 and an undrawn credit facility of B15.2 billion. Supplementary appendix C provides details on the borrower and the industry.

BCP is valued as a vehicle for rural development, and its network of 546 community service stations is managed by local co-operatives that retail local produce. As a result, the government and the Thai public have historically held a favorable view of BCP, both as an important industrial asset and in terms of its social mission. There are more than 500 community organizations that work with Bangchak to strengthen the economy and provide benefits to over 1 million agricultural families in Thailand. BCP has also promoted conservation and environmental awareness in Thailand.

20. As a refining and marketing company, BCP is exposed to changes in market refining margins, the price of crude oil, and any adverse price controls on retail fuel prices in Thailand. BCP is mitigating these risks through a recently commissioned upgrade to a complex refinery, brand building in its marketing business, and diversification into biofuels and renewable energy. Management projections indicate new business resulting from diversification is expected to generate 30% of the group's earnings before interest, taxes, depreciation, and amortization (EBITDA). BCP is already enjoying some synergies with its new business, such as a higher market share in its downstream activities due to the inclusion of biodiesel and gasohol in its product mix.

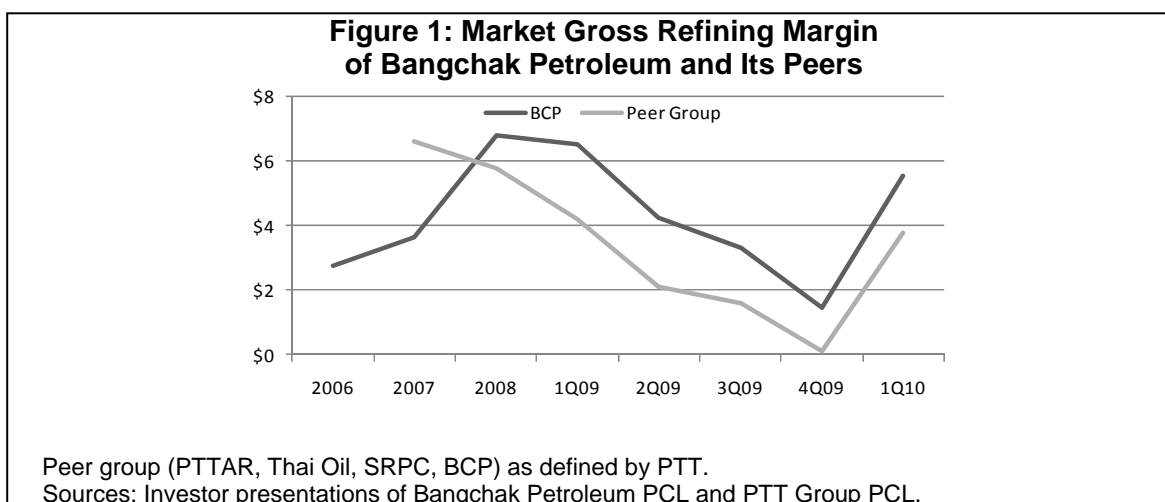
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¹⁴ Awards received from institutions such as the Thai Institute of Directors Association, Stock Exchange of Thailand, Board of Trade of Thailand, Federation of Thai Industries, Thai Bankers' Association, Thai Listed Companies Association, Federation of Thai Capital Market Organization, and Finance & Banking Magazine.

¹⁵ Measured as the incremental saving on the business-as-usual scenario of just under one million tons of GHG emissions from the existing business.

21. More than 80% of Thailand's refining sector is controlled by PTT and its affiliates (including BCP). Gross refining margins (GRMs) are driven by the level of excess sector capacity, technology (i.e., product mix), the relative demand and supply of refining products and the economic cycle, as well as increases in the price of crude oil. BCP's refining margins have historically been weaker than those of complex refineries, but are competitive within BCP's peer group. BCP has completed its upgrade to a complex refinery in 2009, which is expected to increase its GRM. BCP also has a strong retail business with \$2.50–\$3.00 a barrel margins. Figure 1 shows the market gross refining margin of Bangchak Petroleum PCL and its peers.

22. 1,000 bpd of new capacity is expected to be constructed during 2010 in the Asia-Pacific region, mainly in India, Pakistan, and the People's Republic of China. This is however less than the 2,500 bpd in new capacity additions experienced during 2009, which was a down year for market gross margin. Global excess capacity and GRM are shown in Figure 2.



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23. BCP's major shareholder, PTT, is rated AAA/stable (national rating) by Fitch, and BBB+/negative (international rating) by Standard & Poor's (S&P), in line with the sovereign rating, and A3/negative (international) by Moody's, one notch better than the sovereign rating. The ratings reflect the Ministry of Finance's 51% and the state Vayupak equity fund's 15% stakes in PTT, the extremely high government support (S&P), as well as the strategic importance of PTT's assets (Moody's). PTT was established in 2001 as a result of the corporatization of its predecessor, the Petroleum Authority of Thailand, founded in 1979. It is Thailand's only fully integrated oil, gas and petrochemicals company, the monopoly owner of Thailand's gas transmission and distribution network, and the majority owner of the PTT Exploration and Production Public Company Limited, a leading exploration and production company. PTT has stakes in several refining businesses, including Thai Oil and BCP. Its primary business activities are the procurement, transmission, processing, marketing and distribution of natural gas and gas products; and the exploration, development and production of natural gas, condensate and crude oil through the PTT Exploration and Production Public Company Limited.

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24. Several economic and institutional links exist between PTT and BCP beyond PTT's shareholding in BCP. PTT is the sole crude procurement agent for BCP (contracted through 2021) and in 2009 sold B68.1 billion of raw material to BCP. BCP in turn sold B10.9 billion worth of refinery product to PTT. PTT has further never actively decreased its investment in BCP and in 2006 funded BCP's refinery upgrade program through common equity and convertible bonds worth B4,515 million, substantially increasing its shareholding. PTT and BCP frequently coordinate the implementation of government regulation in fuel markets, and four directors at BCP presently hold or have held board memberships or senior executive roles at PTT.

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2. Expected Project Outputs and Outcome

25. The project's output is the installation and operation of two utility-scale, solar power-generating facilities. The project is a pioneer in the early demonstrational phase of Thailand's utility-scale solar industry. Following successful implementation, other DMCs may adopt similar policy and incentive mechanisms for developing domestic utility-scale solar projects that will provide the necessary conditions for private sector investment.

26. The project's outcome is the demonstration of the profitability and sustainability of a large-scale solar power farm. The project will demonstrate that utility-scale solar power, with a sound policy framework, is a financially viable and environmentally sustainable source of energy that can be used in DMCs. The project will diversify the country's energy mix; increase energy security; reduce reliance on fossil fuels; lower exposure to commodity and exchange rate risk; and decrease energy waste products, GHG emissions, and air pollutants. The reduction in carbon dioxide emissions is a key outcome indicator, and is estimated by BCP to average approximately 30,000 tons per annum by 2012. The design and monitoring framework is presented in Appendix 1.

B. Development Impact

1. Contribution to Economic Growth and Poverty Reduction

27. The project's contribution to economic growth and poverty reduction will result from the demonstration effect of the feasibility and sustainability of a large-scale private sector solar farm, a model that can be replicated by other private sector investors in Thailand and in other DMCs. The project and its anticipated replication will diversify Thailand's energy mix by adding renewable energy capacity. The government gives tax incentives to all renewable energy projects in consideration of their anticipated economic and energy-related benefits. The project will also help the country meet its target of producing 20.4% of primary commercial energy from renewable sources by 2022, including through 500 MW of solar power capacity; the project represents 9% of the required solar power generation capacity.

2. Private Sector Development

28. Solar energy holds the most potential of all renewable energy sources in Thailand, with the potential for more than 50,000 MW of installed capacity.¹⁶ The project will help establish the commercial viability of grid-connected large-scale solar farms, and advance a model that can be replicated by other private sector investors throughout the region. The project will also

¹⁶ Department of Alternative Energy Development and Efficiency. 2008. Fifteen-Year Alternative Energy Plan of Thailand (draft).

demonstrate that an energy company within a DMC can significantly reduce its carbon footprint by incorporating renewable energy into its operations without affecting the strength of its core business. Achieving Thailand's target of 500 MW of solar power capacity by 2020 will require strong private sector participation to mobilize an investment of approximately B63,320 million (\$1.9 billion) into solar generation projects.

29. The project requires no fuel, thereby reducing dependence on foreign supplies and mitigating commodity price and exchange rate risks. Such projects reduce Thailand's exposure to world market fluctuations and increase the strength and resilience of the Thai economy. Overdependence on foreign fuels can derail economic growth in high commodity-price cycles and disrupt poverty alleviation goals.

3. Economic Sustainability

30. The project's quantifiable economic benefits include the (i) value of power as an input to economic activity; and (ii) the premium for solar power, which includes economic externalities and the environmental and social advantages of clean energy. The project has substantial environmental advantages. Solar power plants produce electricity without energy waste, pollution, GHG emissions, or noise. Improved air quality, noise reduction, and a lower carbon footprint provide healthier and more sustainable living conditions for the poor. The economic costs associated with grid interconnection are minimal, as the project is adjacent (200 meters) to the grid. The calculated economic internal rate of return is 12%, which is higher than the social discount rate of 10%.¹⁷

C. Environment and Social Dimensions

1. Environment

31. The project has been classified as category B with respect to environment impact because it is unlikely to create any significant environmental impact during construction and operation. Solar power projects are relatively clean, and an environmental impact assessment is not legally required for this type of project in Thailand. However, BCP held a public consultation meeting on 29 December 2009.

32. The project is judged to be environmentally feasible as it would create only minor and transient environmental disturbances during construction, which could be effectively mitigated using established conventional measures and good construction management. The engineering, procurement, and construction (EPC) contractors have been contractually required to implement the best practicable mitigation measures. Their environmental, occupational health and safety performance will be closely monitored during construction by BCP's project management team.

33. Potential impacts during operation are visual and reflection of sunlight. These are not significant issues for the project considering: (i) the project site and the surrounding areas provide no significant aesthetic value, and (ii) solar photovoltaic panels are designed to absorb sunlight and minimize reflection of sunlight. After the end of their useful life, the solar photovoltaic panels will be dismantled and recycled by the supplier.

¹⁷ Multilateral Development Banks and Evaluation Cooperation Group. 2006. *MDB-ECG Good-Practice Standards for Private Sector Investment Operations (Third Edition)*. Manila.

2. Social Dimensions

34. The project site is located in Bang Pa-in district in Ayutthaya province, about 60 kilometers northeast of Bangkok. The land required covers about 63.4 ha formerly used for rice growing. As the project site is low lying, a flood protection system will be constructed using earthen dikes around the site and a pumped drainage system. There will be no involuntary resettlement issues as the land is owned by BCP and is not occupied. The purchase of the land by BCP 15 years ago was on a “willing buyer–willing seller” basis. On power evacuation, the construction and right of way (200 meters) will be the responsibility of PEA. There is no impact on indigenous peoples as the area is vacant. The project site is not part of any land used, claimed, owned by any indigenous people group. The construction of solar power generation facility will likewise not affect any indigenous people in the area.

35. Consultation activities relevant to the project have been undertaken mainly in the context of the environmental assessment process. BCP held five public consultation meetings between August and December 2009 during which environmental issues were discussed. BCP will continue this proactive engagement with various stakeholders including the local community, its employees and other workers during project construction and operations.

36. BCP complies strictly with all relevant laws and regulations and adheres to Thailand's core labor standards. All of its 936 employees and the employees of its contractors are more than 20 years old. There is no discrimination concerning privileges and rights on the basis of gender, ethnicity or religion. BCP has a labor union, which about 20% of the workforce has joined. Its staff turnover rate has declined from 6.36% in 2005 to 3.23% in 2009. In line with changing social, economic, and business circumstances, BCP has instituted more extensive welfare benefits for employees and their families than required by the law, including medical expenses for employees, health insurance schemes for employees and their families (including parents), a provident fund, child tuition, housing loans, assurance and accident insurance policies for employees, infirmaries, physical examinations, hygienic canteens, and employee shuttle buses. The project will generate approximately 50 jobs during construction and approximately 10 technical and 40 maintenance jobs during operations.

37. Due diligence indicates BCP is active in community participation and social development undertaken under its CSR program. Its CSR projects focuses on involving and supporting communities and schools around its refinery complex in sporting events, informal education, family strengthening, energy conservation, environmental management, cultural conservation, and community safety. Activities supported by BCP include: provision of scholarships to students; renovation of temples, a community library and children's playground; a mangrove plantation in Samutprakarn province; and optometric services. In addition, BCP supports community development in some provinces by helping to sell community products in its service stations nationwide. For this project, BCP is expected to implement similar CSR initiatives, engage with local communities and establish grievance redress mechanisms, especially during project construction and as part of the environmental management plan.

3. Corporate Environmental and Social Management System

38. The project's environmental, social, occupational health and safety aspects will be managed under BCP's existing environmental management system, which have been found satisfactory by ADB. BCP is highly regarded in Thailand for its environmental, health and safety, and social performance, and has International Organization for Standardization (ISO) accreditation (ISO:14001); its environmental laboratory has ISO and International

Electrotechnical Commission (IEC) 17025 accreditation. In practice, BCP operations adhere to the Occupational Health and Safety Management System (OHSAS/TIS)18001 standard for health and safety and the ISO 14001 environmental management system for its refinery complex, Bang Pa-in terminal and the biodiesel plant. The environmental, occupational health and safety aspects of the project are simple, and could be easily handled within the corporate policy and operational framework.

39. BCP has its environmental management system audited annually. The latest audit was on 30 June 2010 by AJA Registrars Limited. The environmental management system was found to be efficient and adequate, with no corrective action needed.

D. Implementation Arrangements

1. Power Purchase Agreements

40. The project's gross generating capacity will be 44.5 MW, to be sold to EGAT under the SPP program for 30 MW (net) and to the PEA under the VSPP program for 8 MW (net). Under the PPA with EGAT, EGAT has committed to buy all generated electricity from the project up to 30 MW at the regulated PEA wholesale rate plus the adder incentive for solar projects. The adder incentive (feed-in tariff) of B8 per kWh is applicable for 10 years from the commercial operations date. The EGAT PPA will have an initial term of 5 years, with automatic extensions on a continual basis, unless BCP terminates the PPA or either party terminates following a breach of the PPA (by the other party) that is not resolved. This PPA is expected to be EGAT's standard PPA for all similar SPPs, and the risk of non-renewal or renegotiation should be minimal because EGAT is obligated to renew the PPA without amendment, unless BCP is in breach of the agreement. Under the PPA with PEA, PEA will commit to buy all generated electricity from the project up to 8 MW at the regulated PEA wholesale rate plus adder incentive of B8 for 10 years from commercial operations date. The PEA PPA will have an initial term of 5 years, with automatic extensions on a continual basis, unless BCP terminates the PPA or either party terminates following a breach of the PPA (by the other party) that is not resolved. The PPA is expected to be PEA's standard PPA applied to other VSPPs. EGAT and PEA are considering a gradual reduction in the adder for application to future solar projects.¹⁸

41. Thailand's non-firm SPP and VSPP programs were among the first power solicitation programs in Asia open to private sector participation in renewable energy generation projects up to 90 WM capacity. Thailand modeled elements of these two programs after the Public Utility Regulatory Policies Act of the United States, which was established to promote greater use of renewable energy. The process for rewarding prospective producers under these two programs is competitive, controlled, and transparent. To ensure transparency, the public has equal access to the regulations of the two programs (including procedures, eligibility criteria, bid security requirements, conditions, and evaluation measures) as well as access to the standard PPAs and pricing mechanisms, which are evenly applied and awarded to successful producers. The transparent pricing mechanism for non-firm power producers is determined by EGAT's short-run avoided energy cost plus an additional adder payment (baht/kWh), which is fixed and awarded to all successful applicants.

42. The awards of the BCP PPAs (by EGAT on 10 August 2010 and by PEA on 23 June 2010) were made transparently through an application process, in accordance with all

¹⁸ For new projects, the government is considering reducing the adder to B6.5/kWh. This change is not expected to affect the proposed project.

applicable procedures under regulations of EGAT, EPPO and PEA. EGAT and PEA received applications from BCP for the PPAs in accordance with predefined and publicly available criteria. In processing of applications, one step was to determine interconnection capacity of existing transmission lines and substations. If the application satisfied minimum criteria, a letter of approval would be issued by EGAT or PEA, requiring the posting of a security bond by the applicant. After details of land rights and other details were confirmed, a PPA specifying a scheduled commercial operation date would be approved. In the case of solar projects, land for the project is usually under title deed, and there is no need to seek consents of occupants of the land. The BCP PPAs were approved and signed under standard terms and conditions. The BCP PPAs were awarded through a process which complied with applicable provisions of ADB's Procurement Guidelines. Under the project, financing of downstream procurement is also contemplated for purchase of eligible goods and services under suitable procedures acceptable to ADB.

43. The programs are initiated periodically when a power utility (either EGAT for the SPP or PEA for the VSPP program) makes a public announcement offering to purchase electricity from prospective power producers. The announcement specifies the total amount of power to be awarded, dates and procedures (with sufficient time periods for submission and review), as well as the required documents—including details of the proposed power plant design and construction, project site specifics, and project company experience and background—to be provided with each proposal. Proposals are evaluated based on predefined and publicly available criteria such as technical, engineering and interconnection aspects, financial capacity, environmental impacts, and local consent and benefits. The power utility announces the results of its evaluation of each project 90 days following the closing date for submission of proposals. The regulations also provides a mechanism for participants to file a petition or appeal to the Energy Policy and Planning Office, whose goal is to obtain national and international recognition as an organization that adheres to the principles of transparency.

44. EGAT was established in 1969 as a state enterprise by the Electricity Generating Authority of Thailand Act, B.E. 2511 (1968). EGAT is the largest electricity generator in the country; the single wholesale purchaser of electricity; the system operator and dispatcher of the country's systemwide electricity generation; the owner and operator of Thailand's wholesale transmission network; and the sole supplier of electricity to Thailand's two electricity distribution authorities, Metropolitan Electricity Authority and PEA. EGAT is rated BBB+/negative¹⁹ for foreign currency obligations and BBB+/negative for local currency obligations by S&P. EGAT has never defaulted on any of its debt obligations and is considered one of the strongest off-takers in ADB's DMCs. EGAT receives sovereign support from the government and this support is expected to continue because of (i) the dominant and important service EGAT provides the electricity sector—and to a large extent the Thai economy as a whole, (ii) the legislative requirement that obligates the government to cover any deficiencies in its cash flows,²⁰ (iii) the current government guarantees for its debt obligations,²¹ and (iv) the government's financial interest in the wholly state-owned utility. For these reasons, EGAT's credit ratings are likely to remain linked to the sovereign ratings of the government.

45. For the year ended 31 December 2009, EGAT had total revenues of B373 billion, net income of B34 billion, and total assets of B474 billion. Electricity revenues have grown steadily from B259 billion in 2004 to B373 billion in 2009 at a compound annual growth rate of 7.5%.

¹⁹ S&P's outlook revision to negative occurred on 2 December 2008 following similar action taken on the sovereign credit ratings on Thailand, which is rated BBB+/negative.

²⁰ If EGAT cannot obtain funds from other sources.

²¹ Guarantee covers all of EGAT's foreign debt and approximately half of its domestic debt.

EGAT's net income increased to B34 billion in 2008 from B32 billion in 2007. EGAT's debt-to-equity ratio has decreased in the past 3 years from 0.87 in 2006, to 0.82 in 2007 and 0.72 in 2009.

46. PEA is a state enterprise established by the Provincial Electricity Authority Act B.E. 2503, and has exclusive rights to distribute power to end users in all areas except Bangkok, Nonthaburi and Samut Prakran provinces. The PEA Act requires the government to allocate additional funds to the PEA in the event the PEA has insufficient funds in its budget to meet its operational and capital expenses or debts.²² These provisions indicate that the government will, to some extent, stand behind the PEA and support it (this is the same as the implied government support for EGAT).

47. PEA's operating revenues increased from B265.2 billion (\$7.8 billion) in 2008 to B289.0 billion (\$8.5 billion) in 2009, and net income increased from B10.2 billion (\$300 million) in 2008 to B14.0 billion (\$412 million) in 2009. The net income increase is partly attributed to the foreign exchange gain of B442 million (\$13 million) in 2009 compared to a foreign exchange loss of B1.5 billion (\$44 million) in 2008, which is recognized as net income in the current year under Thai Generally Accepted Accounting Principles. Financial leverage (total debt-to-assets ratio) remained stable at 62.1% in 2008 and 61.4% in 2009. Overall, PEA's credit profile is satisfactory due to adequate profitability, relatively stable cash flows and expected government support.

2. Engineering, Procurement, and Construction

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48. PB Power, acting as the owner's engineer, has assisted BCP with the organization of the bidding process, technical evaluation, assessment of energy yield, grid connection, and economic viability of the 34.5 MW SPP solar plant. Multicrystalline photovoltaic technology is considered a proven and reliable technology with an operational track record that extends for several decades. It has been utilized in hundreds of large and small installations, and there is substantial empirical evidence about its performance and life expectancy. The 9.43 MW plant will also use similar technology and design and the modules will be installed alongside the 34.5 MW solar farm. PB Power has been appointed as the project management consultant overseeing the development and construction of both the 34.5 MW and the 9.43 MW project.

49. In general, the construction of solar photovoltaic projects is significantly less complex than conventional power plants. There are no moving parts, no fuel processing requirements, and no need to handle high temperatures and pressures. Scaling up a project's capacity consists of installing additional modules, and installation can be completed in phases, allowing each phase to start producing electricity once it is connected to the grid. Each of these aspects reduces the risk of cost overrun and time delay. The project will include a storm water and drainage system.

50. Suntech Power, a New York Stock Exchange-listed company, is one of the largest photovoltaic solar panel manufacturers in the world. In 2009, Suntech Power reached a solar cell and module capacity of 1.1 GW and is currently increasing its capacity to 2.0 GW by 2010 to become the world's largest manufacturer. With offices in every major solar market, Suntech

²² Section 23 of the PEA Act.

Power has delivered over 2.2 GW of solar products to more than 1,400 customers in more than eighty countries. Suntech's modules are tested and certified by international certification bodies Technischer Überwachungs-Verein, IEC, and ISO and are backed by an industry leading, 25-year power output warranty. Suntech Power is able to achieve higher manufacturing efficiencies through economies of scale and lower costs while providing competitive warranties.

3. Operation and Maintenance

51. Solar farms require minimal maintenance and operation is not expected to present major technical challenges. With no moving parts and a modular structure, the risk of major outages is limited, as the failure of one module does not affect the output of the others. The project's electrical inverters (which convert direct current into alternating current) will be continually maintained to avoid the need for periodic replacement, and the photovoltaic solar panels will require daily monitoring and minimal maintenance (e.g., cleaning).

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4. Power Evacuation

52. The 34.5 MW and 9.43 MW solar projects will both connect to PEA's transmission system located 200 meters across the road from the site. More specifically, the 34.5 MW project will connect to PEA's existing 115-kilovolt line, and the 9.43 MW project to the 22-kilovolt line, both of which have sufficient capacity for the proposed interconnects. The interconnection costs are estimated at B1 million and will be borne by the project, with the construction work and right of way the responsibility of PEA.

5. Anticorruption Policy and Policy Combating Money Laundering and the Financing of Terrorism

53. BCP was advised of ADB's Anticorruption Policy (1998, as amended to date) and policy relating to the Combating of Money Laundering and the Financing of Terrorism (2003). Consistent with its commitment to good governance, accountability, and transparency, ADB will require BCP to institute, maintain, and comply with internal procedures and controls following international best practice standards for the purpose of preventing corruption or money laundering activities or the financing of terrorism and covenant with ADB to refrain from engaging in such activities. The loan documentation between ADB and BCP will further allow ADB to investigate any violation or potential violation of these undertakings.

6. Project Performance Monitoring, Reporting, and Evaluation

54. BCP will submit quarterly unaudited financial statements, annual audited financial statements, and annual environmental and social monitoring reports to ADB. BCP has agreed to hire an internationally reputable accounting firm to audit its annual accounts according to international financial reporting standards. ADB will monitor the project using information from its own sources and from the public domain. The project will be evaluated on three levels: (i) the success of the project, (ii) the increase in Thailand's solar power generating capacity, and (iii) the reduction in carbon emissions. The performance indicators are included in the design and monitoring framework (Appendix 1).

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IV. THE PROPOSED ADB ASSISTANCE

A. The Assistance

1. Loan, Risk Participation, and Added Value

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55. The loans will each be structured as unsecured corporate loans to BCP and have conditions precedent, events of default, covenants and representations and warranties that are customary for a corporate facility of this nature, and in line with provisions in other facilities provided by commercial lenders to BCP. The proceeds of the loans will be used by BCP solely to finance the project.

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56. The tenor is longer than tenors for corporate loans that are currently provided by Thai commercial banks or the bond market.²³ BCP's solar project requires the long tenor because of the nature of the project (long asset life, very high upfront capital expenditure and no ongoing fuel costs). Therefore, the long tenor from ADB's loan plays a crucial role in ensuring the economic and financial viability of the project to BCP. Moreover, by taking the back-end risk of the commercial bank facility through an innovative risk participation structure, ADB is able to mobilize significant financing from a private sector bank. In addition, BCP has chosen ADB as a strategic partner to expand into solar power because of ADB's proven experience in financing renewable energy combined with its strong mandate, reputation, and commitment to facilitating the transition of DMCs to low-carbon economies. ADB strongly supports companies that have sound corporate governance structures and sustainable development policies, an area in which BCP has become a prominent leader within Thailand. The alignment in values between ADB and BCP supports the formation of a long-term partnership that would include future clean energy projects.

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2. Compliance with Investment Limits

57. The proposed transaction, once approved and signed, will increase ADB's projected nonsovereign exposure by end of June 2011 to \$5.9 billion. Additionally, the proposed transaction will increase nonsovereign exposure to Thailand to \$354.8 million or 6.0% of the total nonsovereign exposure and will increase nonsovereign exposure in the renewable energy generation subsector to \$612.8 million or 10.4% of total nonsovereign exposure. The proposed financing is within ADB's approved medium-term, country, industry, single obligor and group exposure limits for nonsovereign transactions. ADB will ensure that the proposed ADB financing up to a maximum of \$145 million will not exceed 25% of the total assets of the borrower.

B. Justification for ADB Assistance

58. ADB's support for the project is justified based on the following:

²³ Companies with a BBB+ local credit rating can only raise funds in the Thai bond market with tenors of up to 5–7 years. From commercial banks, BCP is able to mobilize loans with a tenor of up to 10 years.

- (i) ADB assistance will play a crucial role in helping the project secure appropriate long-term financing, which is a necessary condition for the viability of a solar project. Due to the current market conditions, local banks can rarely provide loans for more than 5–10 years on a corporate basis. However, tenors required to ensure the economic viability of solar power generation projects are significantly longer. ADB's long-term local currency loan and pre-financed CERs from ADB's Future Carbon Fund help to achieve economic and financial viability of a power generation plant that has high upfront investment costs, but no ongoing fuel cost.
- (ii) ADB's innovative risk participation structure has a catalytic effect as it enables an international commercial bank to participate in long-term financing for solar projects in Thailand.
- (iii) The project will be pioneering role in demonstrating the commercial viability of large-scale private sector solar farms, a model that can then be replicated by other private sector investors in the region. The proposed project will be one of the first large-scale power generation plants tapping into Thailand's abundant solar resource, which reflects over 50,000 MW of potential power generation capacity.
- (iv) ADB assistance for the project is consistent with ADBs country partnership strategy for Thailand 2007–2011 (footnote 12) and country operations business plan,²⁴ in which the three core strategic areas of partnership are infrastructure development, environmentally sustainable development and capital markets development.
- (v) ADB's TA will develop and support the identification of policy instruments that provide incentives for corporations in DMCs to develop and implement carbon-neutral strategies; implementation of corporate strategies to determine and track their carbon footprint; align corporate, strategic, and environmental objectives; and monitor and comply with carbon reduction targets. By training industry participants and disseminating knowledge on zero-carbon strategies, ADB will help to reduce the energy companies' environmental impact and enhance their long-term sustainability in the context of evolving global efforts and regulatory frameworks to reduce carbon emissions.

C. Risks and Mitigation Measures

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59. The main risks of the project and their mitigation measures are as follows:

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- (i) **Market and operational risk management.** BCP has embraced enterprise risk management as a tool to mitigate risks associated with commodity, foreign exchange, and interest rate fluctuations, as well as operational risks. Enterprise risk management enhances the ability of BCP to achieve its business and operating goals.
- (ii) **Tenor of the offtake contract.** The offtake agreement's tenor of 5 years is substantially shorter than the proposed loan tenor of 15 years. This risk is

²⁴ ADB. 2009. *Country Operations Business Plan: Thailand, 2009–2011*. Manila.

mitigated by the automatic renewal feature of the offtake contract without amendment and at the option of the project (unless there is a breach that remains uncured). Indications from historical experience and current government policy on renewable energy point to minimal risk of the offtake contract not being renewed.

- (iii) **Offtaker counterparty risk.** 30 MW of electricity generated from the project will be purchased by EGAT under the SPP program and 8 MW will be purchased by PEA under the VSPP program. As one of the most profitable state-owned companies in Thailand, EGAT has a record of honoring all of its payment obligations under various PPAs even during the Asian financial crisis. EGAT's financial position is strong and the government has supported EGAT in the past with guarantees on foreign and local debt. Furthermore, the EGAT Act contemplates that there would be financial support from the government for EGAT (as a state-owned enterprise) in appropriate circumstances. This is reflected in EGAT's S&P ratings of BBB+/negative for long-term local and foreign currency obligations, which closely track Thailand's sovereign ratings. PEA has a satisfactory credit profile and the PEA Act requires the government to allocate additional funds to PEA in the event PEA has insufficient funds in its budget to meet its operational and capital expenses or debts.
- (iv) **Adder availability risk.** The "adder" or feed-in tariff of THB8/kWh is only available for the first 10 years post-completion and will fall away with 4 years remaining on ADB's loan. Once the adder expires, the project will be exposed to market risk with respect to the wholesale electricity tariff. This risk is mitigated by the full-recourse nature of ADB's loan and the fact that a significant level of debt amortization will have occurred by the time the adder falls away.

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- (v) **Technology risk.** Multicrystalline photovoltaic technology was selected because it could provide higher capacity given limited land availability relative to thin-film PV panels. This technology has been proven internationally at utility scale to be a reliable and mature technology.
- (vi) **Solar irradiation and site selection risk.** Solar panels should be installed in a location with satisfactory and consistent sunlight. Independent solar resource studies performed by the National Aeronautics and Space Administration show an average direct solar radiation level close to the project site of 5.18 kWh per square meter per day over the period 1987–2009. PB Power has also been engaged to analyze the results of the various studies. In addition, onsite solar measurements will be taken during construction.

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- (vii) **Regulatory risk.** Sudden changes or reversals in government policy toward the energy sector may negatively affect cash flow from BCP's operations. Regulatory risk is, however, expected to be minimal in the Thailand electricity sector given the priority and public commitment given by the government to the support of renewable energy resources. Moreover, changing a publicly announced policy would set an unpopular precedent and undermine investor confidence in the sector. Changes to regulatory standards in the BCP's refining operations are

expected but these changes are generally phased in over time; in the past the government has provided subsidies to ease the transition.

- (viii) **Country risk.** Thailand's country risk is low considering its well developed trade and manufacturing sectors. The government has high fiscal discipline and is known for promoting a favorable business environment that values contract enforcement and investor protections. However, political instability could affect the country's reputation as an investment destination.
- (ix) **Counterparty risk on risk participant(s).** The selected risk participant meets the criteria of eligible counterparty under existing board policy. Mizuho has solid investment grade ratings (S&P: A+/Stable; Moody's: Aa3/Stable; Fitch: A/Stable), operates a strong wholesale banking franchise and is considered a systemically important bank in Japan. Further, under the risk participation agreement, ADB is expected to have the right to substitute any risk participant whose credit rating falls below a specified minimum threshold.

D. Assurances

60. Consistent with the Agreement Establishing the Asian Development Bank (the Charter),²⁵ the government has been requested to confirm that it has no objection to the proposed assistance to BCP. No funding will be disbursed until ADB receives such confirmation. ADB will enter into finance documents acceptable to ADB following the approval of the proposed financing by the ADB Board of Directors.

E. Technical Assistance

61. Many energy companies acknowledge the unsustainable nature of large carbon emissions in the long run and are therefore beginning a transition towards a lower carbon footprint by investing in energy efficiency, assessing the carbon life cycle of their products, and rebalancing their portfolios towards lower-emission alternatives. This represents an enormous undertaking and challenge for the industry, one that is particularly difficult in DMCs that lack the required legislative incentives. Without strong legislative frameworks and incentives such as carbon taxes or "cap and trade" emissions trading schemes, DMCs must rely on progressive industry leaders within the private sector to initiate environmentally sustainable strategies that take into account their overall carbon footprint and aim to reduce emissions on a company-wide basis.

62. BCP is emerging as a leader in sustainability within the energy industry in ADB's DMCs as it commits to neutralizing its carbon footprint by developing utility-scale solar power and reducing carbon emissions across its operations. BCP has initiated a proactive, zero-carbon strategy that will reduce its environmental impact and enhance the long-term sustainability of the company. The strategy, which also includes capital investment in biofuels and a larger selection of environmentally friendly product offerings, will lead to a stronger and more resilient Thai economy, and advance global efforts to reduce carbon emissions.

63. The proposed TA amounting to \$400,000 aims to support the implementation of carbon neutral strategies within private sector energy companies in DMCs. The TA will include (i) the development and implementation of a system to determine, track, and monitor BCP's carbon footprint on a company-wide basis and implement strategies to offset carbon emissions with an

²⁵ ADB. 1966. *Agreement Establishing the Asian Development Bank*. Manila.

objective of reaching zero emissions within a set time frame; (ii) training of staff on implementation of the zero-carbon-footprint strategy; (iii) establishment of carbon life cycle assessment of BCP products (i.e., gasoline, ethanol, fuel oil, etc.) in accordance with generally accepted standards; (iv) creation of a simulation model to assess new products and investments with regard to emissions and potential for offsetting of emissions; (v) establishment of a business-as-usual GHG emissions baseline as a reference case; and (vi) dissemination of knowledge in carbon tracking and reduction strategies through seminars and training for other energy companies in the region.

64. The TA will strengthen the managerial and governance capability of BCP (and eventually other energy companies in DMCs) as they make the transition from fossil-based to carbon-neutral business models. The TA will also organize seminars to build the capacity of energy companies that wish to be leaders in sustainability, raise the awareness of stakeholders in the energy sector on the long-term benefits of a low-carbon-footprint strategy, and disseminate best practice guidelines. The beneficiary of the TA will be BCP to the extent that the TA will help it to better plan GHG reductions across its operations. Other energy companies are also beneficiaries as they will benefit from training and the dissemination of knowledge through the seminars.

V. RECOMMENDATION

65. I am satisfied that the proposed loans would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the Bangchak Solar Power Project.

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66. If the Board approves the proposed loans I, under the authority delegated to me by the Board, will approve a proposed capacity development technical Assistance (TA) of up to \$400,000 to Bangchak Petroleum Public Company Limited to support the implementation of carbon neutral strategies of BCP and other private sector energy companies in developing member countries.

Haruhiko Kuroda
President

10 September 2010

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and Indicators	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact Diversified energy mix through the addition of renewable energy capacity Solar power generation replicated	20.4% of primary commercial energy to come from alternative energy by 2022 (increase from 3% in 2005) At least one other utility-scale solar power generating facility installed by 2014	Statistics and information disclosed by the Ministry of Energy, Energy Policy and Planning Office, Departmental Operation Centre	Assumption Stable and consistent regulatory policies for the renewable energy sector Risk Demand for renewable power from EGAT or PEA is lower than expected
Outcome Demonstrated profitability and sustainability of a utility-scale private sector solar power facility	Average of 58,000 MWh of solar power delivered to offtakers per annum Average annual reduction in CO ₂ emissions of 30,000 tons	Project reports on operations Statistics and information disclosure by EGAT and PEA Clean Development Mechanism executive board reports	Assumptions Plant achieves forecasted production Offtakers comply with their purchase and payment commitments
Outputs 1. One of Thailand's first utility-scale solar power-generating facilities installed and operated. 2. Enhanced management and decision making capacity for developing carbon neutral strategies	44.5 MW solar power capacity commissioned by 2011 People employed temporarily 2010-12 and permanently by 2012: 50 and 8 Carbon monitoring and tracking system in place by 2Q 2011 Training Program and Seminar for 50 industry people by 2Q 2011	BCP annual reports Offtaker (EGAT) disclosure Project reports on operations. Reports will include compliance with core labor standards.	Assumption Project agreements are adhered to as agreed by third parties.
Activities with Milestones 1.1. Construction work in progress, as scheduled 1.2. Commissioning of solar projects—October 2011 2.1 Technical assistance complete by 2Q 2011 2.2 TA training program and seminar complete by 2Q 2011			Inputs ADB: B4,200 million CONFIDENTIAL INFORMATION DELETED ADB-TA: \$400,000

ADB = Asian Development Bank, BCP = Bangchak Petroleum Public Company, CO₂ = carbon dioxide, EGAT = Electricity Generating Authority of Thailand, MWh = megawatt hour, PEA = Provincial Electricity Authority, Q = quarter, TA = technical assistance
Source: Asian Development Bank.