Report and Recommendation of the President to the Board of Directors

Project Number: 48233
November 2014

Proposed Loan and Administration of Loan
Chaiyaphum Wind Farm Company Limited
Subyai Wind Power Project
(Thailand)

This is an abbreviated version of the document approved by ADB's Board of Directors that excludes information that is subject to exceptions to disclosure set forth in ADB's Public Communications Policy 2011.

CURRENCY EQUIVALENTS
(as of 1 October 2014)

Currency unit	–	baht (B)
B1.00	=	$0.03
$1.00	=	B34.00

ABBREVIATIONS

ADB	–	Asian Development Bank
CTF	–	Clean Technology Fund
EGAT	–	Electricity Generating Authority of Thailand
EGCO	–	Electricity Generating Public Company
EPC	–	engineering, procurement, and construction
GHG	–	greenhouse gas
MW	–	megawatt
O&M	–	operation and maintenance
PPA	–	power purchase agreement
SPP	–	small power producer

NOTE

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

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I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on (i) a proposed local currency loan not exceeding B1,807 million (or its equivalent in US dollars); and (ii) proposed administration of a loan not exceeding $30,000,000 or the equivalent of 15% of project costs, whichever is less, to be provided by the Asian Development Bank (ADB) Clean Technology Fund (ADB CTF),[1] both to Chaiyaphum Wind Farm Company Limited for the Subyai Wind Power Project in Thailand.[2]

II. THE PROJECT

A. Project Identification and Description

1. Project Identification

2. The 81-megawatt (MW) Subyai Wind Power Project is part of the long-term growth strategy of the Electricity Generating Public Company (EGCO), which emphasizes expanding investments into renewable energy to strengthen its business in independent power generation in Thailand. With its recent acquisitions and projects currently under development, EGCO plans to increase its installed renewable energy capacity to over 300 MW by 2015.[3] EGCO's strategy aligns with the revised Renewable and Alternative Energy Development Plan, 2012–2021, which sets a target of generating 25% of primary energy from renewable sources by 2021, thereby avoiding 76 million tons of carbon emissions annually. Despite Thailand's strong mandate and incentives for renewable energy, only 223 MW of wind power capacity have been installed. Significant investment from the private sector is needed to reach the government's target for wind power capacity of 1,800 MW by 2021.

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3. The project is eligible for cofinancing from the ADB CTF.[4] The Clean Technology Fund (CTF) provides concessional financing to support the rapid deployment of low-carbon technologies with significant potential to reduce and avoid greenhouse gas (GHG) emissions over the long term. It is administered through multilateral development banks, including ADB, and is one of the largest funds helping developing countries fill gaps in financing projects to mitigate climate change. On 24 May 2012, the CTF Trust Fund Committee approved the allocation of $99.5 million for the ADB Thailand Private Sector Renewable Energy Program, to be utilized and administered by ADB.[5] The project is the fourth private sector project and the second wind power project in Thailand under the ADB CTF, and would bring the total approved amount to $81.2 million of the total $99.5 allocation.[6] The AD

[1] Financed by the Clean Technology Fund.
[2] The design and monitoring framework is in Appendix 1.
[3] EGCO's current installed capacity (on an equity basis) for renewable energy includes 24.96 MW generated from biomass and waste, 123.6 MW from solar, and 6.75 MW from wind.
[4] Climate Investment Funds. http://www.climateinvestmentfunds.org.
[5] ADB Thailand Private Sector Renewable Energy Program approved by the CTF Trust Fund Committee on 24 May 2012 pursuant to the Financial Procedures Agreement entered into between ADB and the International Bank for Reconstruction and Development as trustee of the Trust Fund for the Clean Technology Fund dated 18 March 2010.
[6] ADB. 2009. *Establishment of the ADB Clean Technology Fund and the ADB Strategic Climate Fund*. Manila.

4. B CTF program is playing a pivotal role in building a critical mass of first generation renewable energy projects in Thailand that will help catalyze long-term private sector investment in the sector on a self-sustaining basis.

5. Thailand's electricity production depends heavily on conventional fuels, with 65% produced using natural gas and 21% coal and lignite. Natural gas has traditionally provided Thailand with a reliable and low-cost source of energy, but growing demand and dwindling natural gas reserves from the Gulf of Thailand mean the country must diversify and secure alternative fuel sources for power generation. 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.

6. To complement its renewable energy strategy, the Ministry of Energy advocates decentralized power generation through the country's small power producer (SPP) program. The program allows private developers to build, own, and operate 10–90 MW power projects and enter into a power purchase agreement (PPA) with the Electricity Generating Authority of Thailand (EGAT). Renewable energy SPPs are also eligible for an "adder" incentive in addition to the wholesale electricity price. Government support through the SPP program and the adder incentive is essential for the viability and sustainability of the proposed project.

2. Project Design

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3. The Borrower and Sponsors

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7. EGCO is Thailand's first independent power producer and currently the second largest private power producer in the country. It was privatized by EGAT in 1992 and listed on the Stock Exchange of Thailand in 1995. EGCO is owned by EGAT (25.4%),[1] TEPDIA Generating (23.9%), and the public (50.7%).[2]

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B. Development Impact, Outcome, and Outputs

1. Impact

8. The impact of the project will be the diversification of Thailand's energy mix by adding renewable energy capacity, thus helping the country progress toward its clean energy targets.[3] To achieve sustainable long-term economic growth, Thailand is promoting alternative sources of energy such as wind for power generation and is beginning its transition to a low-carbon economy. Wind energy is a clean and sustainable source of electricity that diversifies the country's energy mix, strengthening energy security and reducing reliance on fossil fuel.

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[2] TEPDIA Generating is jointly owned 50% by Mitsubishi and Tokyo Electric Power Company.

[3] The government has established clean energy targets of 1,800 MW of wind power by 2021 and 25% of primary commercial energy from renewable sources by 2021.

9. The project will also contribute to accelerating and expanding private investment in clean energy infrastructure. Successful project implementation and viable returns are expected to catalyze other private investments in wind energy projects.

2. Outcome

10. The outcome will be the demonstrated viability and sustainability of a relatively large utility-scale wind project in the private sector.[4]

3. Outputs

11. The outputs will be the installation and operation of the 81 MW wind power plant.

C. Alignment with ADB Strategy and Operations

1. Consistency with Strategy 2020 and Country Strategy

12. The project is consistent with ADB's midterm review of Strategy 2020, which supports development that is environmentally sustainable and recognizes the role of the private sector in meeting growing energy demand in the region, and capitalizing on ADB's operating strengths in infrastructure development, finance, and other areas.[5] The strategy also supports expanding environment-friendly technologies for clean and efficient energy generation and use, as well as a larger role for private sector financing of infrastructure through public–private partnerships.

2. Consistency with the Country Strategy

13. The project is consistent with ADB's country partnership strategy, 2013-2016 for Thailand, which supports three strategic areas: infrastructure development, environmental sustainability, and support for the private sector.[6] The government's Alternative Energy Development Plan, 2012–2021 notes the immense potential of wind power in Thailand and that energy imports can be avoided through its use with private investment. The project supports the government's long-term objective for the Thailand Clean Technology Fund Investment Plan to use CTF resources to support renewable energy projects in the private sector.[7]

3. Consistency with the Energy Policy

14. The project is consistent with ADB's Energy Policy, which emphasizes investments in energy efficiency, renewable energy projects, and wider access to energy.[8] It advances ADB's target of investing $2 billion per year in clean energy to accelerate low-carbon growth and reduce regional GHG emissions, as well as the target of ADB's Private Sector Operations Department to receive 25% of its annual approvals, by number, for clean energy projects.

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[4] A 90 MW contract capacity wind farm under the SPP program is relatively large compared with projects developed under the very small power producer program, which have contract capacity under 10 MW.

[5] ADB. 2014. *Midterm Review of Strategy 2020: Meeting the Challenges of a Transforming Asia and Pacific*. Manila.

[6] ADB. 2007. *Country Partnership Strategy: Thailand, 2007–2011.* Manila. ADB is working with the Government of Thailand to prepare a new country partnership strategy, 2012–2016, which will align with the Eleventh National Economic and Social Development Plan, 2012–2016.

[7] The CTF provides scaled-up financing to demonstrate, deploy, and transfer low-carbon technologies with significant potential to avoid GHG 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.

[8] ADB. 2009. *Energy Policy.* Manila.

Further, it will support ADB's target of installing 1 gigawatt of wind power by 2015 under its Quantum Leap in Wind Initiative.

4. Lessons

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D. Project Cost and Financing Plan

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E. Implementation Arrangements

15. Table 3 summarizes the implementation arrangements (footnote 11).

Table 3: Summary of Implementation Arrangements

Aspects	Arrangements
Regulatory framework	The project is developed as a public–private partnership under Thailand's small power producer program, which uses renewable energy from private sector power plants with 10–90 MW capacity to provide clean electricity to the grid.
Management	CONFIDENTIAL INFORMATION DELETED
Implementation period	CONFIDENTIAL INFORMATION DELETED
Construction arrangements	CONFIDENTIAL INFORMATION DELETED
Supplier and contractor	CONFIDENTIAL INFORMATION DELETED
Operations arrangements	
Revenue structure	EGAT has committed to buying all electricity generated by the project under its standard renewable energy PPA up to a maximum of 90 MW. The PPA has a 5-year term with continually automatic extensions. The project will receive monthly revenue by selling electricity on a single-tariff formula comprising the countrywide average wholesale rate and the adder incentive of B3.5 per kilowatt-hour, as specified in the PPA. The adder is applicable for 10 years from the start of commercial operation, at which time the project will be competitively priced, as it will receive only the market wholesale rate. The automatic extension of the contract term of each PPA will mean that, at a minimum, the PPA term matches the economic life of the project and exceeds the full term of the debt.
Major cost structure	Wind power has relatively high up-front capital costs and minimal operating costs. The long-term average cost structure is highly predictable, with limited expenditure on maintenance and parts replacement and no ongoing fuel expense. As debt financing is the only material expense, it drives the economics and viability of wind power projects.
Operation and maintenance	CONFIDENTIAL INFORMATION DELETED
Relevant parties	Revenue offtake is supported by EGAT, Thailand's state-owned utility.
Performance monitoring	The borrower will submit quarterly unaudited financial statements, annual audited financial statements, and semiannual environmental and social monitoring reports to ADB during construction, and annually thereafter. The performance indicators are included in the design and monitoring framework

Aspects	Arrangements
	(Appendix 1).

ADB = Asian Development Bank; EGAT = Electricity Generating Authority of Thailand; EGCO = Electricity Generating Public Company; EPC = engineering, procurement, and construction; MW = megawatt; O&M = operation and maintenance; PPA = power purchase agreement; Q = quarter.
Source: Asian Development Bank.

F. Projected Financial and Economic Performance

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III. THE PROPOSED ADB ASSISTANCE

A. The Assistance

16. The proposed assistance includes (i) a local currency loan not exceeding B1,807 million (or its equivalent in dollars); and (ii) a proposed concessional loan from the ADB Clean Technology Fund not exceeding $30,000,000 or 15% of project costs, whichever is less, to be administered by ADB.[9] Both loans will have a tenor of up to 18.1 years. The longer repayment profile of the ADB loan and expected ADB Clean Technology Fund loan and the concessional nature of the ADB Clean Technology Fund loan are necessary for the project to reach financial close, achieve sound debt service levels over the life of the project, and reduce asset-liability mismatches by amortizing the high up-front costs of wind power over the long term. With no ongoing fuel costs, debt financing drives the cost structure and economic viability of wind power, and therefore its sustainability and competitiveness depends on its ability to amortize its high up-front capital costs over a longer period.

B. Value Added by ADB Assistance

17. ADB support for the project is justified by the following:

(i) ADB assistance will play a crucial role in helping the project secure appropriate long-term financing necessary for wind power projects to reach financial close, achieve sound debt service, and reduce the inherent risks associated with wind power projects arising from their high up-front capital costs and intermittent revenue generation.

(ii) ADB assistance will help secure the necessary financing for this project by replicating the financing structure established by the 7.5 MW Theppana Wind Power Project. Theppana served as a pilot project for EGCO's entry into wind power generation and was intentionally structured on a limited recourse basis to provide a sound financing structure that can be easily replicated by the anticipated, and much larger, 81 MW Subyai Wind Power Project.

(iii) ADB assistance supports the ADB CTF program, which is playing a pivotal role in building a critical mass of first-generation renewable energy projects in Thailand. Despite Thailand's untapped wind resources, the government's target commitments, and the availability of renewable energy incentives, very few wind

[9] ADB will provide the ADB CTF loan as the implementing entity for the CTF. ADB will hold CTF funding for the CTF tranche in trust prior to disbursing the loan. The CTF will assume all credit risks on principal and interest repayments related to its loan, and the borrower will have no recourse to ADB for the CTF tranche. Therefore, the tranche will not count as ADB exposure to the project (ADB. 2010. Exposure and Investment Limitations on Nonsovereign Operations. *Operations Manual.* OM D13/BP. Manila.). Further, as with B loans, the CTF portion will not consume ordinary capital resources. The drawdown for the CTF is conditional on the availability of the ADB direct loan for drawdown.

power projects have achieved commercial operations due to the lack of long-term financing. By establishing a critical mass of wind power projects, the ADB CTF program aims to catalyze long-term private sector investment on a self-sustaining basis, and generate the momentum needed to reach the government's ambitious targets for GHG avoidance by 2021.

C. Risks

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IV. POLICY COMPLIANCE

A. Safeguards and Social Dimensions

18. The project is category B for environment. In compliance with the environmental assessment requirements of ADB's Safeguard Policy Statement (2009), the borrower completed an initial environmental examination for the project. The project site and its immediate vicinity do not support natural vegetation of ecological significance. The site does not provide an important habitat for any terrestrial birds, and is not located along migratory bird routes. The potential environmental and social impacts of the project have been identified, and effective measures to avoid, minimize, and mitigate them are outlined in the environmental management plan. Impacts during construction are short term and will be readily mitigated. During operation, predicted noise and shadow flicker effects will be studied, confirmed, and monitored.

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The cost of mitigation measures is included in project design and overall project cost. The monitoring program will record noise, shadow flicker frequency, bird and bat injury or mortality, complaints received, and incidents and accidents. The borrower will submit an annual monitoring report to ADB.

19. The project is category C for involuntary resettlement and indigenous peoples.

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20. During construction, 250 workers will be engaged, mainly as skilled and unskilled laborers. The borrower and its contractors will comply with ADB's Social Protection Strategy and report annually to ADB on their compliance with national labor laws and internationally recognized core labor standards.[10] Stakeholders, including communities in the vicinity of the project, were informed and consulted about the project. The project is categorized as having no gender element, given its limited potential for gender-inclusive design.[11] Sex-disaggregated employment data will be collected from the borrower. The initial environmental examination includes a grievance redress mechanism to receive complaints and facilitate their resolution.

[10] ADB. 2003. *Social Protection Strategy.* Manila (adopted in 2001).
[11] CONFIDENTIAL INFORMATION DELETED

B. Anticorruption Policy

21. The Chaiyaphum Wind Farm Company 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

22. The proposed ADB loan is within the medium-term country, industry, group, and single-project exposure limits for nonsovereign investments.

D. Assurances

23. Consistent with the Agreement Establishing the Asian Development Bank, the Government of Thailand will be requested to confirm that it has no objection to the proposed assistance to the Chaiyaphum Wind Farm Company Limited.[12] ADB will enter into suitable finance documentation, in form and substance satisfactory to ADB, following approval of the proposed assistance by the ADB Board of Directors.

V. RECOMMENDATION

24. 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) the loan not exceeding B1,807,000,000 (or its equivalent in US dollars) from ADB's ordinary capital resources; and

(ii) the administration by ADB of the loan not exceeding $30,000,000 or the equivalent of 15% of project costs, whichever is less, to be provided by the ADB Clean Technology Fund;

both to Chaiyaphum Wind Farm Company Limited for the Subyai Wind 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.

Takehiko Nakao
President

11 November 2014

[12] ADB. 1966. *Agreement Establishing the Asian Development Bank*. Manila.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and/or Indicators with Baselines	Data Sources and/or Reporting Mechanisms	Assumptions and Risks
Impact Diversified energy mix through the addition of renewable energy capacity Increased private sector participation in wind power production	Wind power capacity increased from 223 MW in 2014 to 1,800 MW of new wind power capacity by 2021 to help meet Thailand's target of 25% of primary commercial energy from renewable energy[a] At least 10 other private sector-owned utility-scale wind power generators installed by 2025	Statistics and information disclosed by the Ministry of Energy	**Assumptions** Regulatory policies for renewable energy are stable and consistent. Tariffs for wind power are viable. **Risk** Demand from the Electricity Generating Authority of Thailand is lower than expected.
Outcome Demonstrated viability and sustainability of utility-scale private sector wind farm	CONFIDENTIAL INFORMATION DELETED	Subyai annual technical reports Development effectiveness monitoring reports Subyai audited financial statements Subyai audited financial statements	**Assumptions** The plant achieves the forecasted availability. The offtaker complies with its purchase and payment commitments. Tariff rates for wind power over the operating life of the project are viable. **Risks** Operation and maintenance is deficient. Wind resources over the operating life of the project are lower than estimated.
Outputs Installation and operation of 81 MW utility-scale wind power plant	CONFIDENTIAL INFORMATION DELETED	Subyai annual technical reports Sex-disaggregated employment data collected from Subyai Audited financial statements and reports on operations	**Assumption** Third parties adhere to project agreements. **Risk** Commissioning of the wind power plant is delayed.
Activities with Milestones CONFIDENTIAL INFORMATION DELETED			**Inputs** ADB: B1,807 million ($53 million) ADB Clean Technology Fund: B1,016 million ($30 million) CONFIDENTIAL

Design Summary	Performance Targets and/or Indicators with Baselines	Data Sources and/or Reporting Mechanisms	Assumptions and Risks
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ADB = Asian Development Bank, MW = megawatt.
[a] The government has established a revised clean energy target of 1,800 MW of wind power by 2021 and 25% of primary commercial energy from renewable sources by 2021.
[b] Annual production (megawatt-hours) X emission factor (0.5473 tons of carbon dioxide equivalent per megawatt-hour).
Source: Asian Development Bank.

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