



Report and Recommendation of the President to the Board of Directors

Project Number: 49366-001
July 2016

Proposed Loan Stumpf Energy Solutions (Thailand) and Stumpf Energy Tranche B Distributed Commercial Solar 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 in accordance with paragraph 97 (v) and (viii) of ADB's Public Communications Policy 2011.

CURRENCY EQUIVALENTS

(as of 1 June 2016)

Currency unit	–	baht (B)
B1.00	=	\$0.028
\$1.00	=	B35.65

ABBREVIATIONS

ADB	–	Asian Development Bank
EPC	–	engineering-procurement-construction
FIT	–	feed-in tariff
kWp	–	kilowatt-peak
LLA	–	lender's legal advisor
LTA	–	lender's technical advisor
MW	–	megawatt
MWp	–	megawatt-peak
UAE	–	United Arab Emirates

NOTE

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

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PROJECT AT A GLANCE

1. Basic Data		Project Number: 49366-001	
Project Name	THA: Distributed Commercial Solar Power Project	Department /Division	PSOD/PSIF2
Country	Thailand		
2. Sector		Subsector(s)	
✓ Energy	Renewable energy generation - solar		ADB Financing (\$ million)
			47.00
		Total	47.00
3. Strategic Agenda		Subcomponents	
Inclusive economic growth (IEG)	Pillar 1: Economic opportunities, including jobs, created and expanded		Climate Change Information
Environmentally sustainable growth (ESG)	Global and regional transboundary environmental concerns		Mitigation (\$ million) 47.00
			CO ₂ reduction (tons per annum) 73,200
			Climate Change impact on the Project High
4. Drivers of Change		Components	
Partnerships (PAR)	Commercial cofinancing		Gender Equity and Mainstreaming
	Private Sector		No gender elements (NGE) ✓
Private sector development (PSD)	Promotion of private sector investment		
5. Poverty Targeting		Location Impact	
Project directly targets poverty	No	Nation-wide	High
6. Nonsovereign Operation Risk Rating			
Obligor Name		Implied Project Rating	Final Project Rating
Stumpf Energy Solutions (Thailand), Co. Ltd.		NSO7	NSO7
7. Safeguard Categorization		Environment: C	Involuntary Resettlement: C
		Indigenous Peoples: C	
8. Financing			
Modality and Sources		Amount (\$ million)	
ADB		47.00	
Nonsovereign Fixed Interest Rate Loan: Ordinary capital resources		47.00	
B-Loans		0.00	
None		0.00	
Official Cofinancing^a		0.00	
None		0.00	
Others^b		78.40	
Total		125.40	

^a Concessional financing from external sources.

^b Derived by deducting ADB financing, B Loans and Official Cofinancing from Project Total Cost.

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan of up to B1,676 million (or its equivalent in US dollars) to Stumpf Energy Solutions (Thailand) and Stumpf Energy Tranche B¹ for the Distributed Commercial Solar Power Project in Thailand.²

II. THE PROJECT

A. Project Identification and Description

1. Project Identification

2. As of February 2016, Thailand's installed power generation capacity was 39,756 megawatts (MW). Generation depends heavily on conventional fuels, with 65% produced by natural gas and 20% produced by coal and lignite, with only 6% produced by renewable energy sources (excluding large hydroelectric power plants). Natural gas has traditionally been Thailand's reliable and low-cost source of energy, but growing demand and dwindling reserves in the Gulf of Thailand mean the country must begin the transition towards securing alternative sources. As part of its strategy to diversify the energy mix and promote renewable energy, the Government of Thailand prepared the Alternative Energy Development Plan, 2015–2036,³ which (i) notes the significant potential of solar power in Thailand, and (ii) indicates that energy imports can be avoided through developing domestic solar projects with private investment. The plan aims to increase the share of renewable energy used for power generation to 30%, including the installation of 19,634 MW of renewable energy capacity by 2036, with 6,000 MW coming from solar power.

3. To implement Strategy 2020 and the country partnership strategy, 2013–2016 for Thailand of the Asian Development Bank (ADB), which emphasize support for clean energy, ADB identified the opportunity to provide financial assistance to the project through close cooperation and strong relationships with various sponsors and financial institutions in Thailand built over the last 5 years. Since its early engagement in the project, ADB has played a key role in devising an innovative financing structure of 'single loan, multiple projects', which significantly reduces transaction costs, improves project viability and enhances scalability of the business model, and played catalytic role of mobilizing investment from local commercial banks.

2. Project Design

4. The project involves the rollout and operation of multiple solar photovoltaic installations, each with a capacity ranging from 400 kilowatts-peak (kWp) to 5 megawatts-peak (MWp), on rooftops or elsewhere on the premises of commercial and/or industrial buildings owned or leased by host companies in Thailand up to an aggregate capacity of 100 MW and will be installed at no up-front cost to the host companies.

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¹ Stumpf Energy Solutions II (Thailand) is the proposed name of a special purpose vehicle that the sponsor, Stumpf Energy, is in the process of incorporating. Incorporation of the special purpose vehicle will be completed prior to execution of the finance documents, and its shareholders will be the same as that of Stumpf Energy Solutions (Thailand). In this report, the name "Stumpf Energy Tranche B" is used to refer to the name of the second borrower.

² The design and monitoring framework is in Appendix 1.

³ Government of Thailand, Ministry of Energy, 2015, *Alternative Energy Development Plan 2015-2036*. Bangkok.

5. The project, which does not rely on Thai FIT regime, has strong potential to be scaled up, particularly in Thailand's growing manufacturing sector. Host companies will maintain connections to the national grid to augment their power supply, and they will benefit from the project in the following ways: (i) discounted electricity prices, (ii) more reliable electricity supply, (iii) avoidance of having to pay the up-front costs associated with developing their own solar power facilities, (iv) reduced emissions, and (v) an improved corporate image. The project offers attractive benefits for Thailand, including (i) helping it reach its renewable energy target by scaling up grid-parity solar power; and (ii) increasing its use of distributed generation (i.e., power that is generated where it is consumed), thereby reducing the need to upgrade and maintain grid infrastructure.

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7. Since its early engagement in the project, ADB has played a key role in devising an innovative financing structure of 'single loan, multiple projects', where the financing contemplated will be used to support multiple solar projects on rooftops or elsewhere on the premises of commercial and/or industrial buildings that have been traditionally difficult to finance individually due to their smaller size. This structure significantly reduces transaction costs borne by each subproject, thereby increasing their standalone viability and enhancing the scalability of the business model of grid-parity solar projects that do not require FIT subsidies in Thailand.

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3. The Borrowers and Sponsor

8. The borrowers will be special purpose vehicles incorporated in Thailand. Stumpf Energy Solutions (Thailand) has already been incorporated and Stumpf Energy Tranche B is in the process of being incorporated.

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The borrowers are (or will, following incorporation, be) wholly owned subsidiaries of the sponsor, Stumpf Energy, a newly set up entity which is wholly and indirectly owned by Millennium Privatstiftung in Austria and Georg Stumpf, the ultimate beneficiary of Millennium Privatstiftung.

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One of its wholly owned subsidiaries, M+W Group, is a global engineering, construction, and project management company that specializes in the fields of advanced technology facilities, life science and chemicals, energy, and environmental technologies.

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B. Development Impacts, Outcome, and Output

14. **Impacts.** The project will demonstrate the viability of the business model of solar projects on rooftops or elsewhere on the premises of commercial and/or industrial buildings that do not require FIT subsidies in Thailand. This will lead to unlocking of vast potential to scale up solar photovoltaic installations on rooftops or elsewhere on the premises of commercial and/or industrial buildings, particularly in Thailand's growing manufacturing sector. The project will also contribute to the diversification of Thailand's energy mix by adding renewable energy capacity, thus helping the country progress toward its renewable energy target. Solar energy is a clean and sustainable source of electricity that diversifies the country's energy mix, strengthens energy security, and reduces reliance on fossil fuel. The project is also aligned with one of the sustainable development goals of the United Nations' 2030 Agenda for Sustainable Development: "Ensure access to affordable, reliable, sustainable and modern energy for all."⁴

15. **Outcome.** The outcome will be the demonstration of the sustainability of operations of the private sector grid-parity rooftop solar business model in Thailand.

16. **Output.** The output will be the rollout and operation of multiple solar photovoltaic installations on rooftops or elsewhere on the premises of commercial and/or industrial buildings, with a total capacity of up to 100 MW.

C. Alignment with ADB Strategy and Operations

17. **Consistency with ADB Strategy.** The project is consistent with ADB's Midterm Review of Strategy 2020.⁵ The review reaffirmed ADB's support under Strategy 2020 for (i) environmentally sustainable development; (ii) the role of the private sector in meeting growing energy demand in the region; and (iii) capitalizing on ADB's operating strengths in infrastructure development, finance, and other areas.⁶ The midterm review also supported the expansion of environmentally friendly technologies for clean and efficient energy generation and use, as well as a larger role for private sector financing of infrastructure.

18. **Consistency with country strategy.** The project is consistent with ADB's country partnership strategy, 2013–2016 for Thailand, which supports three core strategic pillars: (i) knowledge and innovation, (ii) private sector development, and (iii) regional cooperation and integration. These strategic pillars are operationalized in four program areas: (i) infrastructure; (ii) finance sector development; (iii) environment, including climate change; and (iv) regional cooperation and integration.⁷ The government's Alternative Energy Development Plan, 2015–2036 sets a target of increasing the share of renewable energy and alternative energy used for power generation to 30% by 2036, including the installation of 19,634 MW of renewable energy capacity by 2036, with 6,000 MW coming from solar power.

19. The project is consistent with ADB's Energy Policy, which emphasizes investments in energy efficiency, renewable energy, and wider access to energy.⁸ The project will contribute to ADB's target of doubling annual climate financing to \$6 billion by 2020 (up from the current \$3 billion), and to the Private Sector Operations Department's target of one in four of its projects approved each year being a clean energy project.

⁴ United Nations. 2015. *Transforming our World: The 2030 Agenda for Sustainable Development*. New York.

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

⁶ ADB. 2008. *Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank, 2008–2020*. Manila.

⁷ ADB. 2013. *Country Partnership Strategy: Thailand, 2013–2016*. Manila.

⁸ ADB. 2009. *Energy Policy*. Manila.

D. Project Cost and Financing Plan

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E. Implementation Arrangements23. Table 6 summarizes the implementation arrangements.⁹**Table 6: Summary of Implementation Arrangements**

Aspects	Arrangements
Project framework	The project involves development of multiple solar photovoltaic installations on rooftops or elsewhere on the premises of commercial and/or industrial buildings owned or leased by host companies up to an aggregate capacity of 100 MW. The project will enter into long-term power purchase agreements directly with the host companies, which will each be required to meet stringent eligibility credit criteria for creditworthiness developed by the ADB and Siam Commercial Bank.
Financing arrangements	The project involves the development of multiple solar subprojects using a 'single loan, multiple project' financing structure. CONFIDENTIAL INFORMATION DELETED
Management	The project will be developed and managed by the borrowers, Stumpf Energy Solutions (Thailand) and Stumpf Energy Tranche B. CONFIDENTIAL INFORMATION DELETED
Implementation period	CONFIDENTIAL INFORMATION DELETED
Construction arrangements	The project will be constructed under a fixed-price, date-certain, turnkey EPC contract covering all design, engineering, supply, construction, testing, and commissioning.
Supplier and/or contractor	CONFIDENTIAL INFORMATION DELETED
Operations arrangements	
Revenue structure	CONFIDENTIAL INFORMATION DELETED
Major cost structure	Solar 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 solar power projects.
Operation and maintenance	O&M requirements for solar power projects are relatively low and usually comprise electrical works, panel cleaning, regular inspections, minor repairs, measurements, data verification, reporting, and site security. CONFIDENTIAL INFORMATION DELETED
Performance monitoring	The borrowers will submit quarterly unaudited financial statements and annual audited financial statements on a consolidated basis.

EPC = engineering–procurement–construction, O&M = operation and maintenance, Q = quarter.

Source: Stumpf Energy.

F. Projected Financial and Economic Performance

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⁹ Details of Implementation Arrangements (accessible from the list of linked documents in Appendix 2).

III. THE PROPOSED ADB ASSISTANCE

A. The Assistance

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B. Value Added by ADB Assistance

26. As ADB's first grid-parity solar project in Thailand, the project has inherent risks that are absent in utility-scale solar projects with FIT subsidies. ADB's active participation enhances local commercial banks' confidence to co-invest because ADB is seen as playing an important role in the early stage of development of the grid-parity rooftop solar business model by catalyzing investment and setting high standards for subsequent scale-up in Thailand. ADB's innovative financing structure of 'single loan, multiple projects' will significantly reduce transaction costs, increase project viability, and enhance scalability of the business model.

27. Although Thailand has a relatively strong banking sector, local commercial banks are unable to provide long tenors that are necessary for the innovative grid-parity solar business model. Shorter tenors reduce the feasibility and increase the operational leverage of projects, which may lead to undue financial distress. With high up-front capital costs and long-term revenue streams, renewable energy projects require lower amortization profiles to enhance their financial viability. ADB's financial assistance fills a funding gap in long-term finance that will ensure that commercial rooftop solar projects are financed in a sound and sustainable manner.

C. Risks

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IV. POLICY COMPLIANCE

A. Safeguards and Social Dimensions

35. In compliance with ADB's Safeguard Policy Statement (2009), the project is classified as category C for environment, involuntary resettlement, and indigenous peoples.

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36. The borrowers will comply with national labor laws and, pursuant to ADB's Social Protection Strategy, will take measures to comply with the internationally recognized core labor standards.¹⁰ The borrowers will report regularly to ADB on (i) its and its contractors' compliance with such laws, and (ii) the measures taken to achieve compliance. Information disclosure and consultation with affected people will be conducted in accordance with ADB requirements.

B. Anticorruption Policy

37. The sponsor and Stumpf Energy Solutions (Thailand) were 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.

¹⁰ ADB. 2003. *Social Protection*. Manila (adopted 2001).

C. Investment Limitations

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D. Assurances

39. Consistent with the Agreement Establishing the Asian Development Bank (the Charter),¹¹ ADB will proceed with the proposed assistance upon establishing that the Government of Thailand has no objection to the proposed assistance to the borrowers. 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

40. 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 the loan of up to B1,676,000,000 (or its equivalent in US dollars) from ADB's ordinary capital resources to Stumpf Energy Solutions (Thailand) and Stumpf Energy Tranche B for the Distributed Commercial Solar Power Project in Thailand, with such terms and conditions as are substantially in accordance with those set forth in this report, and as may be reported to the Board.

Takehiko Nakao
President

14 July 2016

¹¹ ADB. 1966. *Agreement Establishing the Asian Development Bank*. Manila.

DESIGN AND MONITORING FRAMEWORK

Impacts the Project is Aligned with			
Energy mix diversified through the addition of alternative energy capacity and more electricity consumption from renewable sources (Alternative Energy Development Plan, 2015–2036) ^a			
Viability of the business model of grid-parity rooftop solar projects demonstrated (Alternative Energy Development Plan, 2015–2036) ^a			
Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
Outcome Private sector rooftop solar operation sustained	CONFIDENTIAL INFORMATION DELETED	a.–d. ADB's annual development effectiveness monitoring reports	Weak power demand due to adverse macroeconomic shock
Output Solar panels installed on rooftops or elsewhere on the premises of commercial and/or industrial buildings	CONFIDENTIAL INFORMATION DELETED	1a.–c. Company annual technical report	Delayed commissioning due to force majeure events Increase in cost of raw material exceeds budgeted cost
Key Activities with Milestones			
1. Solar panels installed on rooftops or elsewhere on the premises of commercial and/or industrial buildings CONFIDENTIAL INFORMATION DELETED			
Inputs			
CONFIDENTIAL INFORMATION DELETED			
Assumptions for Partner Financing			
NA			

ADB = Asian Development Bank, MW = megawatt, NA = not applicable, Q = quarter.

^a Government of Thailand, Ministry of Energy. 2015. *Alternative Energy Development Plan, 2015–2036*. Bangkok.

^b Emission factor of 0.61.

Source: ADB.

LIST OF LINKED DOCUMENTS

<http://adb.org/Documents/RRPs/?id=49366-001-3>

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