



Report and Recommendation of the President to the Board of Directors

Project Number: 49419
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Proposed Multitranche Financing Facility Punjab National Bank India: Solar Rooftop Investment Program Guaranteed by India

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Asian Development Bank

CURRENCY EQUIVALENTS

(as of 29 February 2016)

Currency unit	–	Indian rupee (Re/Rs)
Re1.00	=	\$ 0.0145
\$1.00	=	Rs 68.75

ABBREVIATIONS

ADB	–	Asian Development Bank
CTF	–	clean technology fund
discom	–	(power) distribution company
EPC	–	engineering, procurement, and construction
GOI	–	Government of India
MFF	–	multitranche financing facility
MNRE	–	Ministry of New and Renewable Energy
OCR	–	ordinary capital resources
PNB	–	Punjab National Bank
PPA	–	power purchase agreement
SRIP	–	solar rooftop investment program
TA	–	technical assistance

WEIGHTS AND MEASURES

GW	–	gigawatt (1,000 megawatts)
kWh	–	kilowatt hour
MW	–	megawatt (1,000 kilowatts)
MWp	–	megawatt peak (1,000 kilowatt peak)

NOTES

- (i) 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 multitranche financing facility (MFF) to Punjab National Bank (PNB) for the Solar Rooftop Investment Program (SRIP) and (ii) a technical assistance grant for institutional capacity and market development.

2. The proposed investment program totaling \$500 million consists of financial intermediation loans to PNB. The Asian Development Bank (ADB) funds will provide general dollar funding support to PNB to facilitate its lending to eligible solar rooftop subprojects in India. The proposed SRIP will provide (i) a comprehensive institutional capacity and market development program and (ii) a designated solar rooftop financing facility to provide the debt financing to help the country meet its 40 gigawatts (GW) solar rooftop capacity target by 2022.

II. THE INVESTMENT PROGRAM

A. Rationale

3. **Background.** India's power system needs to expand rapidly over the next decade to fuel the country's economic growth. To maintain national energy security and expand the energy access to all people in India, the Government of India (GOI) relies much of its energy sources on coal.¹ To improve the country's environmental conditions and lessen the negative impact on climate change, GOI puts a high priority on renewable energy development. GOI first launched its solar development scheme through the Jawaharlal Nehru National Solar Mission in 2010 to add 20 GW of grid connected solar power by 2022. On 17 July 2015, the Union Cabinet approved a revised proposal to increase the original 20 GW solar power target to 100 GW, inclusive of 40 GW from the solar rooftop power by 2022.²

4. **Policy Framework and Roadmap.** To meet the new 40 GW solar rooftop capacity target, GOI needs to rapidly scale up the installation of solar rooftop systems in India. The proposed program is part of this commitment. In this context, GOI requested that the domestic banking sector provide designated solar rooftop financing facilities/programs to support this priority sector, including as a part of the banks' low cost housing loan program. In the same context, GOI also requested the financing support from ADB, KfW Development Bank, and World Bank, which focus more on commercial scale solar rooftop projects.³ The new 40 GW solar rooftop target by 2022 serves as the overarching MFF strategic framework, and the proposed ADB technical assistance (TA) and the SRIP financing structure contribute to the government roadmap to achieve such a target.

5. **Multitranche Financing Facility.** The MFF modality is well suited for the proposed SRIP as the solar rooftop market is still evolving and subprojects are typically developed in a phased manner based on the market, institutional, and subproject readiness. The existing sector strategy and associated road map prepared by GOI and the strategic importance of the sector for the development of the country justifies the use of MFF as the most feasible financing modality. The MFF

¹ India's energy mix is currently coal (44%), biomass (24%), oil (23%), natural gas (6%), other renewables (2%), and nuclear (1%). International Energy Agency. 2015. India Energy Outlook. Available: http://www.worldenergyoutlook.org/media/weowebiste/2015/IndiaEnergyOutlook_WEO2015.pdf

² Revision of cumulative targets under National Solar Mission from 20,000 MW by 2021-22 to 100,000 MW. 2015. Government of India. Available: <http://pib.nic.in/newsite/PrintRelease.aspx?relid=122566>.

³ The current request is \$500 million from ADB, \$500 million from World Bank (plus \$125 from Clean Technology Fund and \$23 million from Global Environment Facility), and €1 billion from KfW Development Bank.

modality provides PNB with the flexibility to disburse the ADB funds in line with the above readiness filters and based on achievement of phased benchmarks including finalization of risk-sharing arrangements, readiness of engineering and procurement contracts, and phased release of equity by subproject promoters. This provides the much-needed flexibility for PNB to properly and cost-effectively plan the disbursements of subprojects allocated for financing under the facility and minimize the associated ADB commitment charges.⁴

6. The Proposed Investment Program. The proposed \$500 million sovereign-guaranteed MFF is expected to have three tranches and an implementation period from 2016 – 2022 (see para. 15 for details).⁵ The SRIP intends to support primarily solar rooftop systems on commercial, industrial, and institutional (government and public sector) buildings by aggregating separate solar rooftop systems from multiple properties to achieve greater economies of scale. The ADB program may consider supporting smaller scale residential solar rooftop financing when such market matures. As requested by the Ministry of Finance, ADB will lend its funds directly to PNB, which will establish a designated solar rooftop unit – and possibly expanded over time to a division - and internal capacity to onlend the equivalent ADB dollar funds in local currency either through other financial intermediaries or directly to subborrowers, e.g., solar rooftop developers. PNB is one of the largest commercial banks in India with extensive branch network throughout the country which will be instrumental in supporting the roll-out of the program (see para. 12 for details). The SRIP's value addition is the provision of comprehensive institutional capacity and market development TA to catalyze a major solar rooftop sector binding constraint – lack of long-term bank debt financing in India.

7. Strategic context. The investment program with PNB is consistent with ADB's Energy Policy (2009) by (i) promoting energy efficiency and renewable energy, (ii) maximize access to energy for all, and (iii) promoting energy sector reform, capacity building, and governance.⁶ The investment program is also consistent with ADB's (i) Financial Sector Operational Plan where financial intermediation is recognized as an important instrument for on-lending including for infrastructure, and (ii) country partnership strategy (CPS) for India, 2013–2017,⁷ with respect to the energy sector road map to expand clean and renewable energy capacity and financial sector development to catalyze infrastructure investments, including through investment funds and credit lines. The SRIP also contributes to the ADB objective to double its annual climate financing from the current level of \$3 billion to \$6 billion by 2020. Finally, the SRIP supports India's Intended Nationally Determined Contribution, which includes the targets to lower the emissions intensity of gross domestic product by 33% to 35% by 2030 below 2005 levels, and to increase the share of non-fossil based power generation capacity to 40% of installed electric power capacity by 2030.

⁴ The benefits of an MFF modality are further demonstrated by ADB's successful implementation of a number of MFF financial intermediation loans, including to the India Infrastructure Finance Company: (i) ADB. 2013. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranches Financing Facility to India for Accelerating Infrastructure Investment Program*. Manila. (MFF 0077-IND for \$700 million approved on 27 September) and (ii) Indian Renewable Energy Development Agency (IRDA): ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranches Financing Facility to India for Clean Energy Finance Investment Program*. Manila. (MFF 0087-IND for \$500 million approved on 30 October)

⁵ This lending proposal was not included in ADB. 2014. *Country Operations Business Plan: India, 2015–2017*. Manila. The government requested ADB's financial assistance in a letter (fax) of 23 October 2015 as an addition to the country operations business plan. The South Asia Department confirmed that such financial assistance can be included in the 2016 resource envelope. A project preparatory technical assistance is not envisaged.

⁶ ADB. 2009. *Energy Policy*. Manila.

⁷ ADB. 2013. *Country Partnership Strategy: India, 2013–2017*. Manila.

8. **Demand Analysis.** India has an enormous solar energy potential. The estimated total solar energy capacity is about 750 GW.⁸ As of January 2016, the total installed grid-connected and off-grid/captive solar power capacities were only 5.5 GW, or about 0.7% of the total potential.⁹ The total solar rooftop potential in India is estimated to be 124 GW,¹⁰ while the present solar rooftop capacity in operations in India is estimated at about 221 megawatt (MW), or 0.2% of the total potential.¹¹ Under the 40 GW target, about 70% (28 GW) would be solar rooftop projects on large commercial, industrial, and institutional buildings and about 30% (12 GW) would be for residential properties. The total cost to develop 40 GW of solar rooftop capacity is estimated to be about \$60 billion.¹² A 2015 market survey conducted by the Energy and Resources Institute of 71 solar rooftop project developers in India indicated that the combined target for aggregated solar rooftop projects will be around 800 MW by 2017 and over 3 GW by 2020. This is indicative of the rapid market expansion supported by GOI and driven by the private sector. To ensure ADB's program viability, the initial demand for the ADB funds is driven by the following factors: (i) GOI's mandate to line ministries (e.g., ports and railways) and public institutions (e.g., schools and hospitals) to install solar rooftop systems on their properties and (ii) an initial pipeline of bankable subprojects provided by Ministry of New and Renewable Energy (MNRE), through its designated channel partners of private sector solar rooftop project developers, prior to tranche 1 effectiveness. A more detailed demand analysis is provided in the linked document 4: Sector Assessment (Summary): Rooftop Solar Energy (India).

9. **The Solar Rooftop Market in India.** The aggregated solar rooftop market in India is commercially viable and is developing rapidly. Grid parity is being achieved¹³ which means that solar rooftop power's levelized cost of electricity is becoming lower than that purchased from the power grid.¹⁴ The electricity tariff from solar rooftop system has been declining steadily to the current level of about Rs. 7 per kilowatt hour (kWh), versus the tariff from the local utilities at about Rs. 9-12 per kWh. This cost factor underpins the fundamental bankability of the commercial solar rooftop business models. In addition, 19 out of 29 states in India have issued solar policies. A net-metering policy that is critical to the sector development has been enacted in 24 out of 29 states. The renewable energy purchase obligations targets have been set by the Government of India.¹⁵ In June 2015, the Reserve Bank of India identified renewable energy as a priority lending sector to facilitate banking lending to the solar rooftop projects.¹⁶

10. **Aggregated Business Models.** There are two main types of business models emerging in the aggregated solar rooftop sector in India, namely the: (i) capex business model and (ii)

⁸ Ministry of New and Renewable Energy. 2014. *State wise Estimated Solar Power Potential in the Country*. Available: <http://mnre.gov.in/file-manager/UserFiles/Statewise-Solar-Potential-NISE.pdf> (as of November 2014).

⁹ Ministry of New and Renewable Energy. 2015. *Physical Progress (Achievements)*. <http://www.mnre.gov.in/mission-and-vision-2/achievements>.

¹⁰ The Energy and Resources Institute. 2014. *Reaching the Sun with Solar Rooftop*.

¹¹ Bridge to India. 2015. *India Solar Handbook*. Available: http://dev.bridgetoindia.com/wp-content/uploads/2015/06/BRIDGE-TO-INDIA_india-solar-handbook_2015_online-1.pdf. Other sources.

¹² Ministry of New and Renewable Energy. 2015. *MNRE and TERI discuss the road ahead for grid-connected solar rooftop power in India*. Available: <http://www.teriin.org/files/rooftop-solar-power-pr.pdf>.

¹³ This is correct in the case of solar rooftop installations on buildings owned by commercial and industrial entities which pay higher electricity tariffs than consumers in India.

¹⁴ The levelized cost of electricity compares different methods of electricity generation on a comparable basis. It is an economic assessment of the average total cost to build and operate a power-generating asset over its lifetime divided by the total energy output of the asset over that lifetime. The cost can also be regarded as the minimum cost at which electricity must be sold in order to break-even over the lifetime of the project.

¹⁵ MNRE. 2015. *Solar RPO and REC Framework*. <http://mnre.gov.in/file-manager/UserFiles/Solar%20RPO/solar-RPO-requirement-by-2022.pdf>

¹⁶ Reserve Bank of India. 2015. *Priority Sector Lending Targets and Classification*. Available: <https://rbidocs.rbi.org.in/rdocs/notification/PDFs/PSLGUID0A65BF4E0A884F60999E748C58EA7F88.PDF>

opex business model. Under the capex model, a property owner procures and owns the system while an engineering, procurement, and construction (EPC) contractor/developer constructs and commissions the system. This type of solar projects could be self-owned or third-party-owned, either grid-connected or off-grid. Under the opex model, the developer (e.g., a third party renewable energy service company) procures, owns and installs the solar rooftop system and usually enters into a long-term power purchase agreement (PPA) with the property owner to provide a lower tariff than would otherwise be purchased from utility companies/local power distribution companies (discoms). According to the financial analyses on a number of existing projects, both of these commercial solar rooftop business models are bankable, yielding an average financial rate of return between 12-16% when the PPA is at least 15 years. When accelerated depreciation is available to further incentivize the developers, the subproject equity return could be about 22%. The payback period is generally 7-8 years. A more detailed analysis is provided in the linked document 4: Sector Assessment (Summary): Rooftop Solar Energy (India).

11. **Short-Term Challenges.** However, few solar rooftop projects in India have benefited from commercial banks financing because of their general risk aversion when making large loan commitments to new sectors with limited track records. In addition, many discoms have poor financial health due to persistent low electricity tariff earnings. Currently, solar rooftop projects are often funded by expensive private equity, and the PPAs are not backed by the financial strength of the discoms but by the financial strength of private sector power off-takers such as major Indian conglomerates or corporations. Through the sequenced phasing of tranches with initial focus on getting the supporting infrastructure in place before actual on-lending materializes and the proposed comprehensive institutional capacity and market development program, ADB will contribute to the development of the enabling environment of the sector in order to generate a steady flow of pipeline subprojects that can then be financed by PNB. This institutional capacity and market development efforts will be closely coordinated and synergized with those of the GOI and the other development partners such as KfW and WB which are also involved in the sector.

12. **The Proposed Financial Intermediary.** PNB was established in 1895 and nationalized in 1969. As of 30 September 2015, GOI held a 62.1% stake in the bank. PNB is one of the “Big Four Banks” in India with total assets of INR6.3 trillion (\$95.6 billion) and about 5% of total market share. PNB has a total of 6,635 domestic branches and is able to originate solar rooftop subprojects throughout India. Moody’s gives PNB a “Baa3” rating with a positive outlook based on high standalone credit strength and a high level of systemic support. PNB has a strong energy sector team but would need to develop its specific solar rooftop credit risk assessment skills to facilitate subloan selection, credit review, approval, and pricing.¹⁷ Despite the deteriorating banking sector performance in India in recent months, it is expected that PNB would receive support due to its systemic importance.

B. Impact and Outcome

13. The impacts of the program are (i) promoting energy efficiency and renewable energy, (ii) maximize access to energy for all, and (iii) promoting energy sector reform, capacity building, and governance (Energy Policy, 2009). The outcome is increased lending to solar rooftop projects.

¹⁷ The United States Agency for International Development (USAID) has developed a solar rooftop-specific financial credit/risk model which could be used to assist lending institutions in India assess, appraise, and price their solar rooftop lending projects.

C. Outputs

14. The MFF outputs will be (i) improved solar rooftop market infrastructure and pipeline subproject development, (ii) improved PNB institutional capacity, and (iii) increased long-term funding to the solar rooftop sector. Under tranche 1, efforts will focus primarily on (i) and (ii) in order to develop the market and create a deal pipeline.

D. Investment and Financing Plans

15. To support the estimated \$60 billion GOI investment target to expand the solar rooftop capacity by 40 GW by 2022, the \$500 million ADB program will leverage about \$300 million subproject equity and about \$200 million debt financing. The total \$1 billion ADB program will contribute to about 1.7% of total estimated solar rooftop investment envelop of \$60 billion. The \$500 million ADB program will consist of \$325 million from ordinary capital resources (OCR) and \$175 million from clean technology fund (CTF), inclusive of \$5 million CTF grant. The MFF is expected to have 3 tranches: tranche 1 (\$100 million from 2016-2018 – to be funded entirely by the CTF loan); tranche 2 (\$150 million from 2018-2020 – to be funded by a mix of CTF and OCR); and tranche 3 (\$250 million from 2020-2022 – to be funded by OCR).

16. The availability of the ADB funds will be subject to the government's submission of related periodic financing requests, execution of the related loan and project agreements for each tranche, and fulfillment of terms and conditions and undertakings set forth in the framework financing agreement. The first tranche of the MFF will include \$5 million CTF grant for institutional capacity and market development. The \$170 million loan component will have a 40-year term, including a grace period of up to 10 years, an annual interest rate determined in accordance with CTF guidelines.¹⁸

Table 1: Financing Plan

Source	Amount (\$ million)	Share of Total (%)	Tranche 1 (\$ million)	Tranche 2 (\$ million)	Tranche 3 (\$ million)
Asian Development Bank ¹	325.0	32.5	0.0	75.0	250.0
Clean technology fund (loan)	170.0	17.0	95.0	75.0	0.0
Clean technology fund (grant)	5.0	0.5	5.0	0.0	0.0
Subborrowers' own fund ²	300.0	30.0	60.0	90.0	150.0
Unrestricted sources ³	200.0	20.0	40.0	60.0	100.0
Total	1,000.0	100.0	200.0	300.0	500.0

¹ Asian Development Bank funds are ordinary capital resources (loan funds).

² CTF grant \$5 million, please reflect MDB fee \$250,000 (5% of the grant amount)

³ The subborrowers' equity of 30% of the total subproject cost is indicative. The range of the equity share in a subproject structure is typically between 25% - 35%, depending upon the nature of the subproject.

⁴ Unrestricted sources can be from, e.g., participating financial institutions' own funds or government support.

Sources: Asian Development Bank.

E. Implementation Arrangements

17. PNB will be the executing/implementing agency of the ADB program. As requested by GOI, ADB will lend the funds directly to PNB. GOI will provide sovereign guarantees on the loan tranches under the MFF. ADB will manage the CTF TA grant implementation but with sufficient

¹⁸ The softer CTF loans have a maturity of 40 years with 10 years of grace period. Principal repayments from year 11-20 would be 2% and from year 20-40 at 4%. Multilateral development bank fee is 0.18% and service charge is 0.25%. The weighted average cost of funds is about 0.25%. For the CTF grant \$5 million, there is a multilateral development bank fee of 5% or \$250,000. The CTF implementation guideline is provided in Appendix XX.

counterpart commitment and support (e.g., from PNB, MNRE, and/or Solar Energy Corporation of India). The ADB loan funds will be provided to PNB on a reimbursement basis on the INR equivalent amounts upon subprojects financial closure.

18. Due to the minimal environment and social safeguard risks associated with solar rooftop projects, an environment and social safeguard management system may not be required. An environmental management plan is expected to be prepared for the proper disposal of the various components of solar rooftop systems at the end of subproject cycles. ADB's due diligence has determined that PNB's internal approval procedures are sufficient to minimize potential implementation risks. ADB intends to permit up to 20% of the total program cost for takeout finance (to buy out and consolidate existing solar rooftop portfolios from other financial institutions).

19. The implementation arrangements are summarized in Table 2 and described in detail in the project administration manual.¹⁹

Table 2: Implementation Arrangements

Aspects	Arrangements
Implementation period	December 2016–December 2022
Estimated completion date	31 December 2022
Management	
(i) Oversight body	Board of Directors, PNB Usha Ananthasubramanian (chair)
(ii) Executing agency	Punjab National Bank
(iii) Key implementing agencies	Punjab National Bank
(iv) Implementation unit	New Delhi, 10 staff
Procurement	In accordance with ADB's Procurement Guidelines (2013, as amended from time to time) as applicable to financial intermediation loans
Consulting services	In accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time) as applicable to financial intermediation loans
Retroactive financing	Permitted up to 20% of each tranche and total SRIP amount.
Disbursement	The loan proceeds will be disbursed in accordance with ADB's <i>Loan Disbursement Handbook</i> (2015, as amended from time to time) and detailed arrangements agreed upon between the government and ADB.

ADB = Asian Development Bank, PNB = Punjab National Bank, SRIP = Solar Rooftop Investment Program.
Source: Asian Development Bank

III. TECHNICAL ASSISTANCE

20. The TA will first help PNB develop sound solar rooftop capacity, including (i) a robust credit risk rating model and (ii) necessary project origination, screening, financial and technical reviews, approval, and monitoring capacity at its branch level.²⁰ The TA will assist in the solar rooftop market development by supporting: (i) GOI's mandate to (central and state level) government entities and public institutions to install solar rooftop systems on their buildings; (ii) a feasibility study to develop the concept of a project risk guarantee fund to increase the risk appetite of private sector developers to enter the solar rooftop sector; (iii) MNRE channel

¹⁹ Project Administration Manual (accessible from the list of linked documents in Appendix 2).

²⁰ Attached Technical Assistance (accessible from the list of linked documents in Appendix 2).

partners develop a viable long-term bankable subproject pipeline; (iv) discoms implement guidelines on net metering policy, gross metering, and feed-in-tariff; (v) discoms develop procedures, data requirements, application forms staffing responsibilities and service standards for responding to customer requests for grid connected rooftop systems; (vi) state nodal agencies in selected states, central electricity regulatory commission, and central electricity authority meet the renewable energy purchase obligations targets set by the Government of India;²¹ and (vii) the conduct of awareness campaigns among all stakeholders, in particular rooftop owners, on the available business models and their technical and commercial benefits.

IV. DUE DILIGENCE

21. [ADB's due diligence consisted of detailed financial, economic, technical, market, institutional, and related compliance reviews to ensure PNB's capacity to successfully implement the MFF. At the institutional level, ADB conducted financial risk management, credit, technical, procurement, environment and social safeguard, and climate risk assessments to ensure PNB's ability to comply with ADB's project implementation requirements. This included a review of PNB's processes and procedures. ADB has also conducted integrity due diligence, and rated PNB's capacity to be satisfactory. Safeguards due diligence included subproject site visits, and interactions with the project promoters, property owners, and the communities to understand the nature of environmental and social issues.]

22. PNB has a strong renewable energy team and extensive branch network that can be used to reach out to developers and rooftop owners to provide long-term funding of rooftop solar energy subprojects in India. The viability of the subproject pipeline, which should consist of mostly private sector commercial-scale solar rooftop projects, also benefits from government policy support.

23. The project's main beneficiaries are property owners through lowered power tariff payment and/or rental fees, private sector solar rooftop project developers through access to long-term and competitively priced funding and local utility companies such as power off-takers through additional electricity supply. The project is also expected to increase economic activity and employment, improve livelihoods and quality of life, improve environmental conditions, and strengthen India's public sector institutional capacity to institute international best practices.

A. Technical

24. [ADB assessed PNB's ability to appraise the technical viability of renewable energy subprojects and found its technical assessment process to be adequate. PNB's subproject appraisal process begins with a "know-your-customer" review, followed by more detailed appraisals to confirm the technical and associated financial viability. PNB includes an in-depth analysis of the proposed renewable energy technology and its risks and performance. PNB analyzes external technical risks and conducts a detailed assessment of subproject preparedness in terms of clearances and other statutory requirements. However, PNB does not have extensive experience and specific technical review capacity to appraise solar rooftop subprojects. PNB's solar rooftop technical and financial review capacity would therefore need to be strengthened through external capacity development.]

²¹ Please see MNRE explanations: <http://mnre.gov.in/information/solar-rpo/>

B. Economic and Financial

25. Because ADB's MFF will finance PNB's operations for eligible solar rooftop subprojects over time, the viability of PNB as a financial intermediary is the best available proxy for the economic and financial performance of the overall project. According to ADB guidelines,²² the most important criteria for determining the appropriateness of a financial intermediary's performance are capital adequacy, asset quality, management quality, earnings, liquidity, and sensitivity to market risk. [For PNB, the status of most of these indicators is satisfactory and improved during FY2001—FY2015.] ADB loans' dollar exchange rate risk could be mitigated through foreign currency and interest rate swap transactions, or avoided altogether through PNB's absorption of the dollar in its offshore operations. Economic and financial internal rates of return on sample eligible subprojects are provided in the economic and financial analysis. The case study provides a snapshot of the economic and financial performance of typical eligible subprojects. The incremental economic benefits are the additional power generation and the positive externalities from improved PNB operational efficiency and improvement of debt market condition. Renewable energy also generates positive but difficult to quantify environmental benefits such as reductions in greenhouse gas emissions and other pollutants typically associated with conventional power generation facilities.

C. Governance

26. **Financial management.** [PNB has the financial management capability to administer the MFF.] PNB's board of directors oversees all operations. PNB has adequate capacity for budgeting, accounting, finance, assets and liabilities management, internal controls, and reporting functions. There are well-defined operating procedures and guidelines and proper internal and external audit controls. PNB's accounting system is based on Indian Accounting Standard as adapted by the Institute of Chartered Accountants of India, and they have a capable management information system including financial accounts, loan management, payroll, and a reporting system compatible with the Credit Information Bureau (India). PNB is subject to the Reserve Bank of India prudential regulations for commercial banks in India, and is well within its capital adequacy requirements of 15%.²³ The overall financial management control risk is moderate.

27. **Procurement and disbursement.** All procurement to be financed under the MFF will be carried out in accordance with ADB's Procurement Guidelines. ADB will encourage PNB to require its subborrowers to adopt internationally competitive bidding procedures to the extent possible when the amount of the investment is unusually large and economy and efficiency can be gained through such procedures. For procurement of goods and services to be financed by subloans from the ADB loan, PNB will ensure that prices are reasonable and that relevant factors—e.g., time of delivery, efficiency, reliability, suitability for the subproject, and (for consulting services) quality and competence—are taken into account. ADB loan proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2012, as amended from time to time).

²² ADB. 2005. *Financial Management and Analysis of Projects*. Manila (Section 6.4. Assessing FI Performance). <http://www.adb.org/sites/default/files/pub/2005/financial-governance-management.pdf>

²³ Reserve Bank of India, Master Circulars RBI/2013-14/35, http://www.rbi.org.in/scripts/BS_ViewMasCirculardetails.aspx?id=8154#16.

28. **Anticorruption policy.** ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government and the PNB. The specific policy requirements and supplementary measures are described in the project administration manual.²⁴

D. Poverty and Social

29. The investment program supports renewable energy and more specifically solar energy development in India. The benefits of rooftop solar energy capacity additions include globalized benefits in the form of reduced greenhouse gas emissions, national benefits in terms of enhanced energy security and additional electricity supply contributing to inclusive and environmentally sustainable economic growth, and localized benefits of improvement of livelihoods and job creation at the subproject sites. The poverty reduction impact of renewable energy projects can be both direct and indirect. Directly, additional power generation supports economic activities and improves the livelihoods of individuals through the provision of lighting, heat, refrigeration, and other household amenities. The investment also creates employment and income, including economic benefits for other business sectors, service providers, and related industries. The strong institutional capacity development measures under ADB's MFF ensure the compliance of subprojects with the ADB and other requirements. Indirectly, rooftop solar energy projects minimize the negative environmental impacts and improve general public health conditions.

E. Safeguards

30. The safeguard categories for environment, involuntary resettlement, and indigenous peoples are all C. The solar rooftop systems are installed on top of the buildings and do not acquire land, therefore no impact on involuntary resettlement and indigenous people. Ground-mounted or any other types of solar energy systems that involve land acquisitions will not be included in the program. The nature of the solar rooftop systems is to improve the environmental conditions in India and mitigate the negative impact from global climate change. Solar rooftop projects do not require environmental clearance in India. Recycling of PV modules afterlife will help recover 90% of the module material. It is concluded that the environmental and social impacts associated with implementation of solar rooftop projects, either commercial-scale or residential-scale, is negligible or non-existent. Therefore, an environment and social safeguard management system is not prepared. However, under the ADB institutional development program to PNB, ADB will monitor the program implementation whether any unforeseen safeguard issue would arise and determine any remedial action accordingly.

F. Risks and Mitigating Measures

31. Key issue of the program design and processing is the underlying risk of ADB support to a key national development agenda when the market is not fully developed and demand for funds is uncertain. ADB will work closely with GOI and development partners to develop the aggregated solar rooftop markets in India and catalyze pilot project origination. The success of the ADB program design depends upon the government efforts and the appetite of the private sector to develop such a market. In line with this incipient nature of the new lending business line, the proposed MFF will help develop building blocks under the first tranche and associated TA, with important non-lending covenants to be followed by subsequent tranche(s) focusing on

²⁴ Project Administration Manual (accessible from the list of linked documents in Appendix 2).

onlending of funds. Major risks and mitigating measures are summarized in Table 3 and described in detail in the risk assessment and risk management plan.²⁵

Table 3: Summary of Risks and Mitigating Measures

Risks	Mitigating Measures
Limited initial solar rooftop subproject pipeline.	ADB and other development partners must (i) support GOI goal to develop the solar rooftop market infrastructure; and (ii) MNRE provides PNB with an initial list of bankable subprojects from its channel partners.
Slow solar rooftop sector development.	MNRE needs to aggressively lead the development of enabling environment of the solar rooftop market, which will be supported by ADB.
PNB has little incentives to develop a strong solar rooftop institutional capacity and unable to attract subproject borrowing.	Through the TA grant, ADB will enhance PNB's capacity to originate, review, price and close solar rooftop projects. A country-wide information campaign will increase awareness among all stakeholders for the benefits of the program.

ADB = Asian Development Bank, GOI = Government of India, MNRE = Ministry of New and Renewable Energy, PNB = Punjab National Bank

Source: Asian Development Bank

V. ASSURANCES AND CONDITIONS

32. The government and the PNB have assured ADB that implementation of the SRIP shall conform to all applicable ADB policies including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, and disbursement as described in detail in the project administration manual and loan documents.

33. The government and the PNB have given ADB certain undertakings for the MFF, which are set forth in the framework financing agreement. Specific covenants agreed by the government and the PNB with respect to individual tranches under the MFF are set forth in the loan agreement and project agreement for the respective tranches.

34. Prior to tranche 1 effectiveness, the following conditions will be met by the relevant stakeholders in order to enable initial disbursement to PNB: (i) PNB establishes a specific solar rooftop unit at its head office and some of its branches with appropriate staff capacity for project origination, screening, financial and technical reviews, approval, and monitoring and review, (ii) PNB establishes a robust credit risk rating model satisfactory to ADB, (iii) GOI provides mandates to certain government entities and public institutions to install solar rooftop systems on their buildings to ensure an initial pipeline of subprojects; and (iv) MNRE provides PNB with a list of bankable subprojects from its channel partners (primarily private sector solar rooftop developers).

VI. RECOMMENDATION

35. I am satisfied that the proposed multitranchise financing facility would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the multitranchise financing facility to Punjab National Bank, to be guaranteed by the

²⁵ Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

Government of India, for the Solar rooftop Investment Program in an aggregate principal amount not exceeding the equivalent of \$500,000,000, which comprises:

- (i) the provision of loans from ADB's ordinary capital resources, with interest and other terms to be determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility;
- (ii) the administration of cofinancing to be provided by clean technology fund;
- (iii) the administration by ADB of TA not exceeding the equivalent of \$5 million to the Government of India for institutional capacity and market development for rooftop solar energy to be provided by clean technology fund on a grant basis;
- (iv) and is subject to such other terms and conditions as are substantially in accordance with those set forth in the framework financing agreement presented to the Board.

Takehiko Nakao
President

30 June 2016

DESIGN AND MONITORING FRAMEWORK FOR THE INVESTMENT PROGRAM

Impact the Program is Aligned with			
Promoting energy efficiency and renewable energy (Energy Policy, 2009)			
Maximize access to energy for all (Energy Policy, 2009)			
Promoting energy sector reform, capacity building, and governance (Energy Policy, 2009)			
Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
Outcome Increased lending to solar rooftop projects.	By 2022 a. \$500 million is disbursed during the program implementation period (2016 baseline: 0). b. About \$300 million equity and about \$200 million additional debt were leveraged during the program implementation period (2016 baseline: 0). c. At least 400 MW of solar rooftop power generating capacity is funded by PNB (2016 baseline: 0) ¹ . d. Generation of approximately 441,700 additional tons of carbon dioxide equivalent avoided annually (2016 baseline: 0)	a-d. ADB program review missions and reports, and PNB's own ADB program review reports. c-d. MNRE reports.	Less than expected market demand for solar rooftop system and ADB funds. Slow renewable energy market development such as in the development of feed-in-tariff, renewable energy purchase obligation, and/or government incentives.
Outputs 1. Improved solar rooftop market infrastructure and pipeline subproject development.	1a. GOI mandates to increase solar rooftop installation on government and public institution buildings. 1b. GOI establishes a project risk guarantee facility. 1c. MNRE channel partners develop a substantial subproject pipelines seeking bank financing. 1d. Capacity development programs implemented at discoms, SNA, CERC, and CEA levels. 1e. Awareness campaigns are conducted.	1a-1c. Ministry of Power and MNRE annual reports and review reports. 1a-1c. ADB program review missions and reports.	Inadequate PNB ownership and staff capacity to operate the ADB program successfully. Slow momentum from the central government level to push state level reform agenda. Slow state level ownership and capacity to implement reform agenda.

¹ Assuming a Cost-to-MW ratio of US\$ 2.5 million per MW.

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
2. Improved PNB institutional capacity.	<p>2a. PNB establishes a designated solar rooftop unit at HQ and branch levels to originate, screen, review, approve and monitor subprojects.</p> <p>2b. PNB meets the ADB program disbursement targets (continuous).</p> <p>2c. PNB meets the ADB program compliance requirements (continuous).</p> <p>2d. USAID conducts training to the designated PNB staff for the establishment and operation of a designated solar rooftop project credit/risk rating system to facilitate subproject pricing and lending by December 2016.¹</p> <p>2e. PNB independently conducts solar rooftop subproject monitoring, review, and reporting at a pace satisfactory to the private sector developers by December 2019.</p>	2a-2e. PNB annual reports and ADB review reports.	
3. Increased long-term funding to the solar rooftop sector.	<p>3a. ADB disburses \$495 million in loans and \$5 million in grant during the program implementation period (2016 baseline: \$0).</p> <p>3b. PNB leverages the ADB program to catalyze private sector equity and debt financing (continuous).</p>	3a-3b. ADB program review missions and reports, and PNB's own program review reports.	

Key Program Actions

1. Improved solar rooftop market infrastructure and pipeline subproject development.
 - 1.1 GOI mandates (central and state level) government entities and public institutions to install solar rooftop systems on their buildings.
 - 1.2 GOI establishes a project risk guarantee fund to increase the risk appetite of private sector developers to enter the solar rooftop sector.
 - 1.3 MNRE channel partners, which are primarily private sector solar rooftop developers, develop a viable long-term bankable subproject pipeline.
 - 1.4 Discoms implement guidelines on net metering policy, gross metering, and feed-in-tariff.
 - 1.5 Discoms develop procedures, data requirements, application forms staffing responsibilities and service standards for responding to customer requests for grid connected rooftop systems.
 - 1.6 State nodal agencies in selected states, central electricity regulatory commission, and central electricity authority meet the renewable energy purchase obligations targets set by the Government of

India.

- 1.7 Awareness campaigns are conducted.
2. Improved PNB institutional capacity.
 - 2.1 PNB establishes a designated solar rooftop unit at HQ and branch levels to originate, screen, approve and monitor subprojects.
 - 2.2 PNB meets the ADB program disbursement targets (continuous).
 - 2.3 PNB meets the ADB program compliance requirements (continuous).
 - 2.4 USAID conducts training to the designated PNB staff for the establishment and operation of a designated solar rooftop project credit/risk rating system to facilitate subproject pricing and lending by December 2016.
 - 2.5 PNB independently conducts solar rooftop subproject monitoring, review, and reporting at a pace satisfactory to the private sector developers by December 2019.
3. Increased long-term funding to the solar rooftop sector.
(Tranche 1 by December 2016, tranche 2 by December 2018, and tranche 3 by December 2020)
 - 3.1 ADB disburses \$495 million in loans and \$5 million in grant during the program implementation period (2016 baseline: \$0).
 - 3.2 PNB leverages the ADB program to catalyze private sector equity and debt financing (continuous).

Inputs

ADB:	\$325 million loan
CTF:	\$170 million loan
CTF Grant:	\$5 million grant

Assumptions for Partner Financing

Outputs not administered by ADB that are necessary to reach the outcome include:

An estimated \$300 million, or 30% of subproject costs in equity (solar rooftop project developers' own funds)

An estimated \$200 million, or 20% of total subproject costs from other funding sources (PNB's own funds or from any other financial institutions/lenders)

ADB = Asian Development Bank, CEA = central electricity authority, CERC = central electricity regulatory commission, CTF = Clean Technology Fund, discoms = (power) distribution companies, FAM = Facility Administration Manual, GW = gigawatt, MNRE = Ministry of New and Renewable Energy, PNB = Punjab National Bank, SNA = state nodal agency, USAID = United States Agency for International Development.
Source: Asian Development Bank.

¹ The United States Agency for International Development (USAID) program has developed a solar rooftop -specific financial credit/risk model to assist lending institutions in India assess, appraise, and price the solar rooftop lending projects.

LIST OF LINKED DOCUMENTS

<http://www.adb.org/Documents/RRPs/?id=XXXXX-XX-3>

1. Loan Agreement
2. Framework Financing Agreement
3. Periodic Financing Request for Project 1
4. Sector Assessment (Summary): Rooftop Solar Energy (India)
5. Facility Administration Manual
6. Contribution to the ADB Results Framework
7. Development Coordination
8. Attached Technical Assistance
9. Financial and Economic Analysis
10. Country Economic Indicators
11. Summary Poverty Reduction and Social Strategy
12. Risk Assessment and Risk Management Plan

Supplementary Documents

13. Demand Analysis
14. Indicative Subprojects
15. Comparison of Financing Modalities
16. Financial Management Assessment
17. Project Climate Risk Assessment and Management Report
18. Clean Technology Fund Implementation Guideline