PROJECT INFORMATION DOCUMENT (PID)
CONCEPT STAGE

Report No.: PIDC13263

Project Name	Program For Large Scale Solar in India (P147820)
Region	SOUTH ASIA
Country	India
Sector(s)	Other Renewable Energy (80%), General energy sector (20%)
Theme(s)	Infrastructure services for private sector development (50%), Other Private Sector Development (25%), Other public sector governance (25%)
Lending Instrument	Investment Project Financing
Project ID	P147820
Borrower(s)	Department of Economic Affairs
Implementing Agency	Solar Energy Corporation of India
Environmental Category	B-Partial Assessment
Date PID Prepared/ Updated	03-Nov-2014
Date PID Approved/ Disclosed	04-Nov-2014
Estimated Date of Appraisal Completion	03-Aug-2015
Estimated Date of Board Approval	21-Sep-2015
Concept Review Decision	Track II - The review did authorize the preparation to continue

I. Introduction and Context

Country Context

India has more than 250 GW of installed power capacity (as of end July 2014) and the per-capita consumption of electricity in India is only about one-fourth of the world average. This underscores the need to grow the power system at a rapid pace for the next several decades. By 2035, India will need five times the installed capacity of 2005 to meet the ever-increasing demand driven by a growing manufacturing sector, and address the rising aspirations of its people, including the currently suppressed demand.

Currently, India relies largely on coal, both domestic and international, to the tune of 70% for its electricity requirements. India is currently the world's seventh largest emitter of global warming pollutants and fifth largest for emissions from fossil fuel combustion. Even though coal is expected to be the mainstay for the foreseeable future, it is critical that India supplements the non-renewable sources with cleaner and abundant renewable sources of energy and uses the available electricity

more efficiently. Currently, renewables (except large hydro) account for nearly 31,700 MW in the Indian power system.

Solar power, due to its abundant and sustained availability and falling costs, has emerged as a promising long-term option for meeting growing global energy demand while also addressing the adverse environmental impacts of conventional fuels. India is blessed with abundant solar insolation and energy generation potential, and harnessing the same can help address various challenges on national and international fronts.

First, on the national front, solar power can help address energy shortages in the country which currently stand in excess of 10 percent, leaving more than 300 million people without access to energy. Solar power can potentially address these challenges through both grid-connected and off-grid solutions. Second, solar power can foster energy security for India by reducing its dependence on imported fuel. Solar power can partially replace the imported coal and diesel needed to power the economy.

Cleaner energy production through solar power will also contribute to India's international commitment in Copenhagen in 2009 to reduce the emissions per unit of its GDP by 20-25 percent by 2020 over 2005 levels. India has already demonstrated swift price reduction and solar technology deployment. With land cost of solar-based electricity falling to the levels of that for imported coal, the stage is now set for a rapid scale-up and simultaneously meeting international emission reduction obligations.

Sectoral and Institutional Context

In June 2008, the National Action Plan for Climate Change (NAPCC) was launched. It outlines a national strategy on climate change to enhance India's ecological sustainability and encourage sustainable energy sources. Launched in 2010 as part of NAPCC, the Jawaharlal Nehru National Solar Mission (JNNSM), a Central government scheme, seeks to promote the development of solar power in India. JNNSM has a target of reaching 20 GW of grid-connected and 2 GW of off-grid solar power by year 2022. The development is staggered across three phases.

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JNNSM Phase-1, being implemented by Ministry of New and Renewable Energy (MNRE), was considered to be an international success and gave impetus to state-level solar schemes as well. The Central government took several proactive steps, including innovative institutional mechanisms for cost reduction, ensuring payment security, competitive selection, under JNNSM Phase I which combined to ensure the success of JNNSM Phase-I. The policy clarity from the JNNSM and state solar policies in India has laid the ground for rapid solar development in the country.

Collectively, Central and state-level solar schemes added more than 2,000 MW of solar capacity in the country, helping put India emerge as a formidable destination for solar developers worldwide. The current grid-connected solar capacity is 2,730 MW (as of August 2014; Bridge to India Research), which has grown from less than 2 MW in year 2009. Globally, India ranks eleventh in the world, in terms of installed solar capacity, when the leading countries are Germany, China and Italy. In terms of solar capacity addition, India ranks sixth globally with around 1.1 GW of solar addition in year 2013 (IEA). However, India is fast catching up, given the government push and favorable climatic conditions. The Ministry of New and Renewable Energy (MNRE) formed the Solar Energy Corporation of India (SECI), under the administrative control of MNRE, as a body to implement the solar plans of the GoI. Currently, the MNRE is implementing Phase-II of the

JNNSM.

Analytical work, undertaken by the World Bank, explored the performance of the JNNSM Phase-I across financing, regulatory and technology pillars. The study, Paving the Way for a Transformational Future: Lessons from JNNSM Phase-I, revealed that the lack of participation of commercial banks stood as a roadblock for GoI in achieving its targets under JNNSM. Going forward, adding 9,000 MW of grid-connected solar under JNNSM Phase-II would present a commercial debt market of around US$9 billion in three years. The analysis also shows that JNNSM Phase II development through Central and state-level solar schemes till year 2017 would require around 13 times the total debt available through Scheduled Commercial Banks (SCBs) from year 2010-13.

Currently, the GoI is deploying a host of incentives, such as Viability Gap Funding (VGF), bundling with coal power, and Feed-in-tariffs (FiTs), to the developers engaged in the solar sector. Paving the Way for a Transformational Future: Lessons from JNNSM Phase-I also probed the efficacy of these public interventions in terms of buying down tariffs vis-à-vis addressing structural impediments to solar financing. The findings from this study show relative benefits and impact of long-tenor financing. After trying out a variety of funding options, GoI is now planning to provide long-tenor financing for solar scale-up in India.

As part of the solar scale-up plan, GoI is proposing to set up four or five solar Ultra Mega Power Plants (solar UMPPs) totaling to around 16 GW capacity. These are based on the successful thermal UMPP program which assisted in the rapid addition of thermal capacity through private sector participation. There is a strong case for demonstration of these mega-scale grid-connected solar installations in terms of private sector participation, deployment of financing, and technical issues such as transmission and load distribution issues, etc. In addition, the GoI also has ambitious plans for installing decentralized applications, such as rooftop solar, through private sector mode. One of the modes being contemplated is through Renewable Energy Service Companies (RESCOs).

For the above strategy, the GoI is looking for implementation partners and financing mechanisms that can help it scale up its solar energy program. To achieve the same, India would need rapid scale-up of both decentralized and large sized solar capacities. As analyzed by the World Bank, the concessional finance is expected to crowd-in commercial lending on a long term. Thus, as a precursor, there is a strong case for a demonstration of this market scale-up through suggested innovative financing.

Safeguards: The environmental and social impacts of the project are mostly restricted to the project area and its immediate surroundings and are not likely to be significant. At the proposed site, almost 95 per cent of the land is government-owned with a few pockets of private land to be acquired in order to have a contiguous site for setting up Solar UMPP project.

For the decentralized solar component, the area for the rooftop and/or for the ground mounted solar installations is already available with the bulk consumers. Hence, land acquisition should not be a challenge. However, social screening will be carried out in the project sites to identify any potentially adverse social impact or the presence of any indigenous community.

A Resettlement Action Plan (RAP) and /or Indigenous Peoples Development Plan (IPDP) will be prepared as appropriate. The Project is in the process of preparing an Environmental and Social

Management Framework (ESMF) which will guide the mitigation and management of possible impacts.

Relationship to CAS

The proposed project is aligned with India's own vision for development outlined in the 12th Five-Year Plan (FY2013-17), which calls for a "faster, sustainable and more inclusive growth" and indicates that renewable energy has to play an expanding role in achieving energy security and access in the years ahead. Further, within the ambit of the ambitious plan of the new Government, the current project is a microcosm of overall strategy.

The project also aligns with the India Country Partnership Strategy (2013-17) along its two pillars – integration and transformation.

(i) Under Integration, the project aims large-scale greening of the energy mix and enhances investments in low-income states.

(ii) Under Transformation, demonstrate feasibility of implementation of mega-scale solar installations and their grid interaction, add clean power generation capacity, enhance SECI's institutional capacity to implement the envisioned solar scale-up, and foster innovative solar development.

II. Proposed Development Objective(s)

Proposed Development Objective(s) (From PCN)

The Project Development Objective is to support large-scale solar power generation in India.

Key Results (From PCN)

(i) Generation Capacity of Renewable Energy constructed under the project - Solar (MW)
(ii) Private capital mobilized (USD)
(iii) Annual million units (MU) of solar power generation injected into the grid

III. Preliminary Description

Concept Description

As GoI plans to rapidly scale-up solar installations in the country, the World Bank intends to partner with GoI and SECI across a long-term programmatic engagement, with the proposed project comprising the first phase of the engagement. This proposed project will consist of the following components:

(i) Component 1: Setting-up 700-800 MW Solar Ultra Mega Power Plant (Solar UMPP): US$400 million

As first phase of developing mega-sized solar installations, the World Bank will help develop the first solar UMPP in the Rewa District in the state of Madhya Pradesh. It is proposed that the World Bank will finance around 50% of the total project, and the remaining will be raised through the developer's own equity and commercial lending.

World Bank financing is proposed to flow to the private sector through SECI or a Joint Venture company formed between SECI and the Government of Madhya Pradesh following a transparent competitive bidding process. The project could be implemented through revenue-sharing or some other form of Public Private Partnership (PPP) models. The details of the structure would depend on

(i) legal and regulatory compliance to the law of the land; and (ii) ensuring adequate risk allocation between public and private sector.

(ii) Component 2: Setting-up 100 MW of decentralized solar installations for single large consumers: US$90 million

In the first phase of developing 1,000 MW of decentralized solar installations, the World Bank will also help set up 100 MW of rooftop solar installations for large consumers such as the Indian Railways and Airports Authority of India, through the Renewable Energy Service Companies (RESCOs) model. This component will also finance some decentralized ground-mounted solar PV systems within the premises of airports and railways on un-used lands. It is proposed that the World Bank finance around 50% of the total project and the remaining project funding be raised through GoI's subsidy support, the developers' own equity, and commercial lending.

World Bank financing is proposed to flow to the private sector through SECI following a transparent competitive bidding process. This component will be built by the competitively-selected private sector developer. The project could be implemented through revenue-sharing or some other form of Public Private Partnership (PPP) models. Within this component, SECI will have partnership arrangements (through formal agreements) with consumers, which would be government departments starting with Railways and Airports Authority. The declining cost of implementing rooftop solar projects and the increasing tariffs of grid power provide a strong case for the agencies' developing these unutilized rooftops to meet their captive energy consumption.

(iii) Component 3: Organizational Strengthening and Capacity Building for SECI: US$10 million

The World Bank's long partnership with National Thermal Power Corporation (NTPC) and POWERGRID has contributed to those organizations becoming financially strong and technically efficient entities for other utilities in the Indian power sector to emulate. They are recognized as flagship organizations (being listed on the Indian stock market and operating according to international best practices).

The corporate vision at SECI is to emerge a pioneer in the solar generation business like NTPC is in the thermal generation business. To achieve this objective, SECI is keen on using the association with the World Bank to improve its technical and organizational capacity. Under Phase-I of this component the aim is to assist SECI to conduct institutional assessments and prepare a strategic business plan. It will focus on the key business processes, human resources requirement, and financial requirements needed by SECI to achieve its vision. These capacity building activities will be undertaken under Phase-II of this component.

IV. Safeguard Policies that might apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
Environmental Assessment OP/BP 4.01	×		
Natural Habitats OP/BP 4.04			×
Forests OP/BP 4.36			×
Pest Management OP 4.09		×	
Physical Cultural Resources OP/BP 4.11			×

Indigenous Peoples OP/BP 4.10			×
Involuntary Resettlement OP/BP 4.12	×		
Safety of Dams OP/BP 4.37		×	
Projects on International Waterways OP/BP 7.50		×	
Projects in Disputed Areas OP/BP 7.60		×	

V. Financing (in USD Million)

Total Project Cost:	990.00	Total Bank Financing:	500.00
Financing Gap:	0.00		

Financing Source	Amount
Borrower	490.00
International Bank for Reconstruction and Development	500.00
Total	990.00

VI. Contact point

World Bank

Contact: Ashish Khanna
Title: Lead Energy Specialist
Tel: 5785+47755
Email: akhanna2@worldbank.org

Borrower/Client/Recipient

Name: Department of Economic Affairs
Contact: Mr. Tarun Bajaj
Title: Joint Secretary
Tel: 91-11-23092387
Email: jsmi-dea@nic.in

Implementing Agencies

Name: Solar Energy Corporation of India
Contact: Rajendra Nimje
Title: Managing Director
Tel: 011-71989200
Email: corporate@seci.gov.in

VII. For more information contact:

The InfoShop
The World Bank
1818 H Street, NW
Washington, D.C. 20433
Telephone: (202) 458-4500

Fax: (202) 522-1500
Web: http://www.worldbank.org/infoshop

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