Partnership to Advance Clean Energy - Deployment (PACE-D)
Technical Assistance Program

Institutional Strengthening in Focal States

USAID
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Ministry of POWER
GOVERNMENT OF INDIA

Government of India
Ministry of New and Renewable Energy
Renewable Energy is Green, Clean & Sustainable

December 2015

This brochure is made possible by the support of the American People through the United States Agency for International Development (USAID). The contents of this brochure are the sole responsibility of Nexant, Inc. and do not necessarily reflect the views of USAID or the United States Government. This brochure was prepared under Contract Number AID-386-C-12-00001.

About Us

The Partnership to Advance Clean Energy - Deployment Technical Assistance (PACE-D TA) Program is a five-year bilateral initiative led by the U.S. Agency for International Development (USAID) and the U.S. Department of State, and implemented in partnership with the Ministry of Power (MOP) and the Ministry of New and Renewable Energy (MNRE). The Program has three key components: energy efficiency (EE), renewable energy (RE) and cleaner fossil technologies. Within each of these components, the Program's focus is on institutional strengthening, capacity building, technology pilot projects, innovative financing mechanisms and increasing the awareness of clean energy technologies.

Overview

The PACE-D TA Program is engaged in providing technical assistance and building the institutional capacity of state organizations in four focal states (Haryana, Karnataka, Madhya Pradesh and Rajasthan) to promote clean energy technology deployment. The technical support and increased institutional capacity will enable these states to propose, adopt, and implement effective policies, regulations and programs to support wide-scale deployment of clean energy technologies. The broader objective of the technical assistance is that these states lead the way, and other states replicate and expand on these clean energy interventions.

Karnataka

Karnataka is estimated to have nearly 20 GW of solar power potential. The state has set an aggressive capacity addition target of 5,400 MW under the RE Policy and Solar Energy Policy for the period 2014-2021. The Program provided technical assistance to Karnataka Renewable Energy Development Ltd. (KREDL) to develop the RE and Solar Energy Policy. Electricity supply companies including Bangalore Electricity Supply Company (BESCOM) are taking the lead by rolling out new initiatives for the deployment of solar rooftop projects. The PACE-D TA Program is working with BESCOM to design, develop, and implement two solar initiatives under the Solar Energy Policy framework. These initiatives will result in the installation of a significant decentralized solar energy capacity and greenhouse gas emission reductions. The Program also provided necessary support to KREDL to develop a separate "Karnataka Energy Efficiency and Conservation Policy 2014-19".

Photo: KREDL

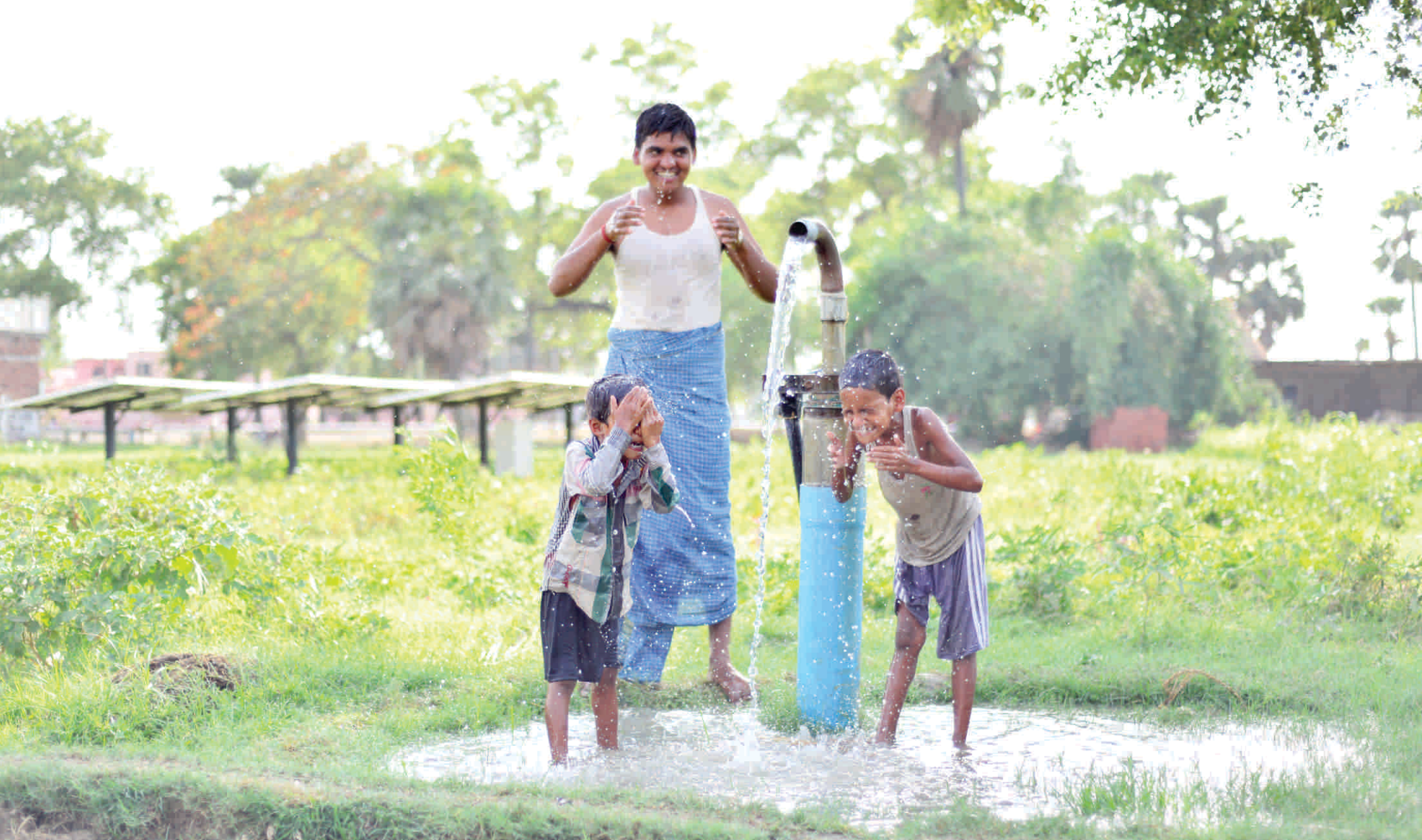
Solar Rooftop Scheme

BESCOM's rooftop photovoltaic (PV) scheme, launched in November 2014, is the first of its kind in the country. BESCOM has developed a customer-friendly framework of detailed processes, template forms and systems to enable stakeholders to design, develop and install their own solar rooftop systems. This scheme is being disseminated as a shared, open-source online framework, with information made available to all stakeholders. The PACE-D TA Program assisted BESCOM in developing the required processes, forms, formats and guidelines for interconnection. It also designed a standardized training format for solar rooftop deployment for BESCOM and assisted in training its officials. Since the launch of its solar rooftop scheme, BESCOM has received 751 applications to install a total of 75 MW of solar power. As of November 2015, 2.5 MW has already been installed, including 400 kWp at the Chinnaswamy Cricket Stadium in Bangalore. The Program is currently providing guidance to BESCOM on the interconnection of systems, and training and capacity building of utility personnel. It is also developing a training module and a handbook guide to encourage other utilities such as BESCOM to roll-out similar solar rooftop schemes across India. The Program's technical assistance to BESCOM on solar rooftop will help the Government of Karnataka achieve its state target of 2.3 GW of solar rooftop by 2022.

RE and EE Policy

The Program provided support to KREDL to develop a comprehensive "Karnataka Energy Efficiency and Conservation Policy 2014-19" with the objective of promotion and large-scale deployment of EE measures in the state. The comprehensive EE policy of Karnataka, the first of its kind in India, has set a target of saving nearly 300 MkWh and avoiding fossil fuel-based generation capacity addition of around 63 MW during the policy period. The proposed policy provides sector wise energy savings approach and target for different consumer categories including municipal, domestic, agriculture, commercial and industries. The policy will provide a long-term vision for driving energy efficiency and energy conservation across different consumer categories in the state, and also help to establish it as a leading state for the deployment of large-scale EE programs.

Similarly, the Program supported KREDL in the development of a comprehensive RE Policy for 2014-2021. The exercise was undertaken with the objective of addressing the barriers encountered during the earlier RE policy regime and further accelerating RE deployment in the state. The Program undertook a comparative analysis of RE policies of various states and presented key learnings in terms of innovative programs/schemes, incentive frameworks, and institutional frameworks relevant for wind, small hydro, biomass, cogeneration and solar power development. On implementation, the RE and Solar Energy policies will lead to capacity addition of 3,600 MW of renewable energy and 1,800 MW of solar energy respectively during their control period.



Solar Irrigation Pumping Scheme

The *Surya Raitha* scheme, launched by the Government of Karnataka in September 2014, is designed to replace conventional electrical irrigation pump-sets with energy-efficient, net-metered solar-powered pump sets. The PACE-D TA Program is providing technical assistance to BESCOM in the design and development of the pilot project being established under this scheme including multiple business models that can be implemented on the ground. The Program also supported the Government of Karnataka in the process of managing the bids, including advising on the terms of reference and evaluation criteria for the pilot project. The pilot project will help a) evaluate business models, b) identify and address technical challenges, and c) evaluate best practices in institutional design on the ground, so that these can be replicated throughout the state. The Program aims to facilitate the deployment of 27 MW under this scheme by 2017, of which nearly 2 MW is currently under implementation as a part of the pilot project. The scheme will improve livelihoods, conserve electricity, and enhance the quality of irrigation by providing farmers with reliable and uninterrupted daytime power supply.

Upon successful implementation, this pilot can be scaled up and replicated in other states, ensuring greater reliability in agricultural energy supply. India, currently facing issues due to erratic power supply to agriculture and high dependence on back up diesel power from nearly 19 million electric pumps, has a vast potential to leverage solar-based irrigation systems to reduce its peak load and power consumption. The PACE-D TA Program's pilots can help test the business models and build the capacity of stakeholders to take forward such initiatives on a large-scale.

Rajasthan

The desert state of Rajasthan has almost 300 days of sunlight, making it a prime candidate for large-scale solar deployment. While the potential for large capacity, grid-connected solar projects has begun to be realized, the market opportunity for decentralized and small rooftop systems remains untapped. The PACE-D TA Program is working on several initiatives in Rajasthan: enabling framework (regulations and implementation) for solar rooftop, renewable purchase obligation (RPO) compliance, infrastructure business models for solar parks implementation, energy efficiency policy, Energy Conservation Building Code (ECBC) implementation and a Smart Grid pilot project.

Photo: TERI

Infrastructure Business Models for Solar Park

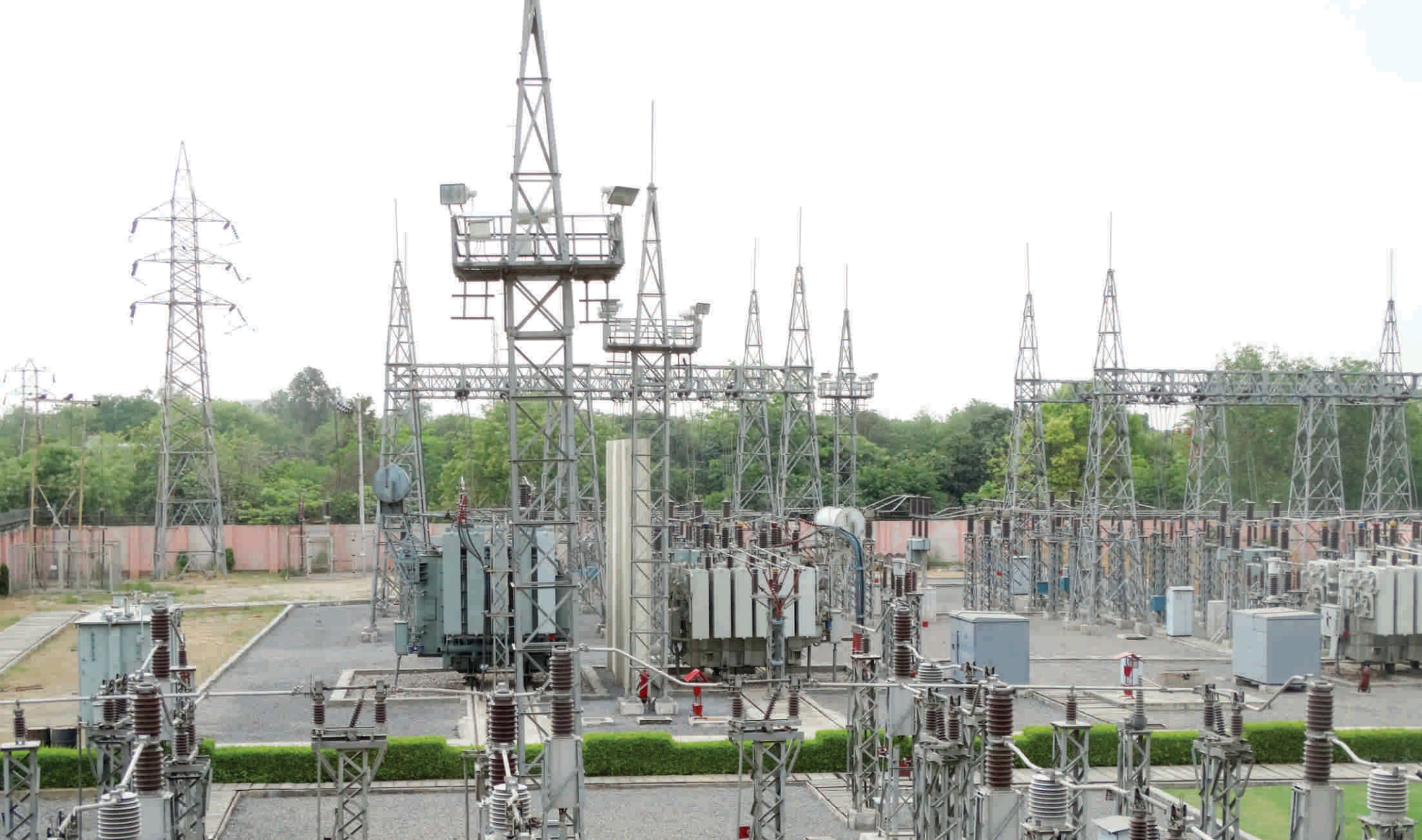
The Government of India has launched a scheme for the development of solar parks and ultra-mega solar power projects commencing 2014-15 (till 2018-19), through which at least 25 such parks, each with a capacity of 500 MW and above (and a cumulative target of over 20,000 MW), will be set up. The PACE-D TA Program is currently working on analyzing different public-private partnership models to encourage private sector participation in solar park development in Rajasthan. The objective of the engagement is to develop guidelines for the Government of Rajasthan and the Rajasthan Renewable Energy Corporation Limited (RRECL) for determining the respective stakeholder's role and level of engagement in public-private partnership models which can assist in a) facilitating accelerated development, b) channeling public and private finance, and c) addressing different objectives/concerns regarding solar park development. These objectives could include off-take risk mitigation, inclusion of community, ensuring supply of land or facilitate project development for the developers in the park. The guidelines are expected to promote sustained investment in solar parks in Rajasthan. The Program's support to RRECL will also help lay a strong foundation for solar parks in the country.

Enabling Framework for Solar Rooftop

One of the main barriers to solar rooftop deployment is lack of clarity around the governing regulatory conditions, such as the legal standing of third-party-based rooftop installations. The Program, in collaboration with the state's energy department and nodal agency, prepared a white paper and provided policy and regulatory advisory support for the development of the Net Metering framework for the state. The Program also provided inputs on the regulations to reflect current and future market needs. The Program is currently developing a detailed framework for the interconnection of solar rooftop systems on behalf of the state's largest distribution utility, Jaipur Vidyut Vitran Nigam Ltd. (JVVNL). The framework includes detailed processes, forms, formats and systems to encourage and support customers to design, develop, and install solar rooftop systems. The Program's initiatives to build the capacity of utilities such as JVVNL will facilitate the Government of Rajasthan to meet its solar rooftop target of 2.3 GW by 2022.

RPO Compliance Mechanism

While many Indian states, including Rajasthan, have specified solar and non-solar RPOs, very few states have initiated the process of a streamlined RPO compliance monitoring and reporting. The PACE-D TA Program is assisting the state of Rajasthan in developing a compliance mechanism for open access/captive consumers under the RPO framework. This includes design of the overall framework, outline of the institutional structure, and preparation of an RPO information manual for obligated entities (OEs). The proposed framework for RPO enforcement by the state will push the OEs to purchase electricity from RE sources and hence create a demand for new RE deployment. It will also remove the regulatory ambiguity surrounding RPO compliance by various OEs. Similar frameworks could be replicated in other Indian states for effective RPO compliance management.



EE Policy

Rajasthan faces a significant demand supply gap in terms of both energy generation and installed capacity. While there is a tremendous potential to reap the benefits of implementing energy-efficiency measures such as demand-side management (DSM) and ECBC, the existing policy framework does not provide specific EE targets or an institutional mechanism to achieve the same. The PACE-D TA Program recommended the development of a state specific energy efficiency and conservation policy to the Government of Rajasthan to provide a long-term strategy for EE in the state, identify frameworks to leverage funds for EE activities and develop an inter-institutional mechanism to implement the identified activities. The Program provided technical support to the state to develop a draft EE policy covering the period 2015-2019. The EE policy aims to save around 100 MW and 440 MkWh of electricity consumption by 2019.

Smart Grid Pilot Project

The Government of India is supporting Smart Grid pilot implementation in 14 state-owned utilities. The PACE-D TA Program is working closely with the India Smart Grid Task Force to build the capacity of these 14 utilities via training and technical papers. In addition, the Program is providing technical assistance to two utilities—Ajmer Vidyut Vitran Nigam Ltd. (AVVNL) and Tripura State Electricity Corporation Limited—on specific Smart Grid interventions. In Ajmer, the Program will support AVVNL to demonstrate the benefits of select functionalities such as advanced metering infrastructure for automatic energy audit and loss reduction analytics including energy theft monitoring and tamper alerts. The project will be implemented via an innovative Pay for Service (or rental) model.

ECBC Implementation

The PACE-D TA Program is supporting the Department of Urban Development and Housing (UDH), Government of Rajasthan, RRECL, and Jaipur Development Authority (JDA) to develop and implement a strategic road map for rollout of mandatory ECBC implementation in the state. An ECBC Implementation Task Force has been established to facilitate the adoption of compliance and enforcement mechanism in Rajasthan. The Task Force comprises members from the UDH, RRECL, JVVNL, Rajasthan State Road Development and Construction Corporation Ltd., Jodhpur Vidyut Vitran Nigam Ltd., AVVNL, and Rajasthan State Real Estate Development Council. The PACE-D TA Program has developed a draft document on the process for mandatory ECBC compliance procedures for Jaipur. The ECBC implementation framework adopted by Jaipur could be further replicated by other cities in the state and, with appropriate modifications, other cities in India.

Nearly two-thirds (66 percent) of the building stock that will exist by 2030 is yet to be constructed in India. The Program's capacity building interventions on ECBC implementation will help states to develop an effective ECBC implementation, enforcement, and compliance framework, and scale up India's vibrant Indian green building sector.

Haryana

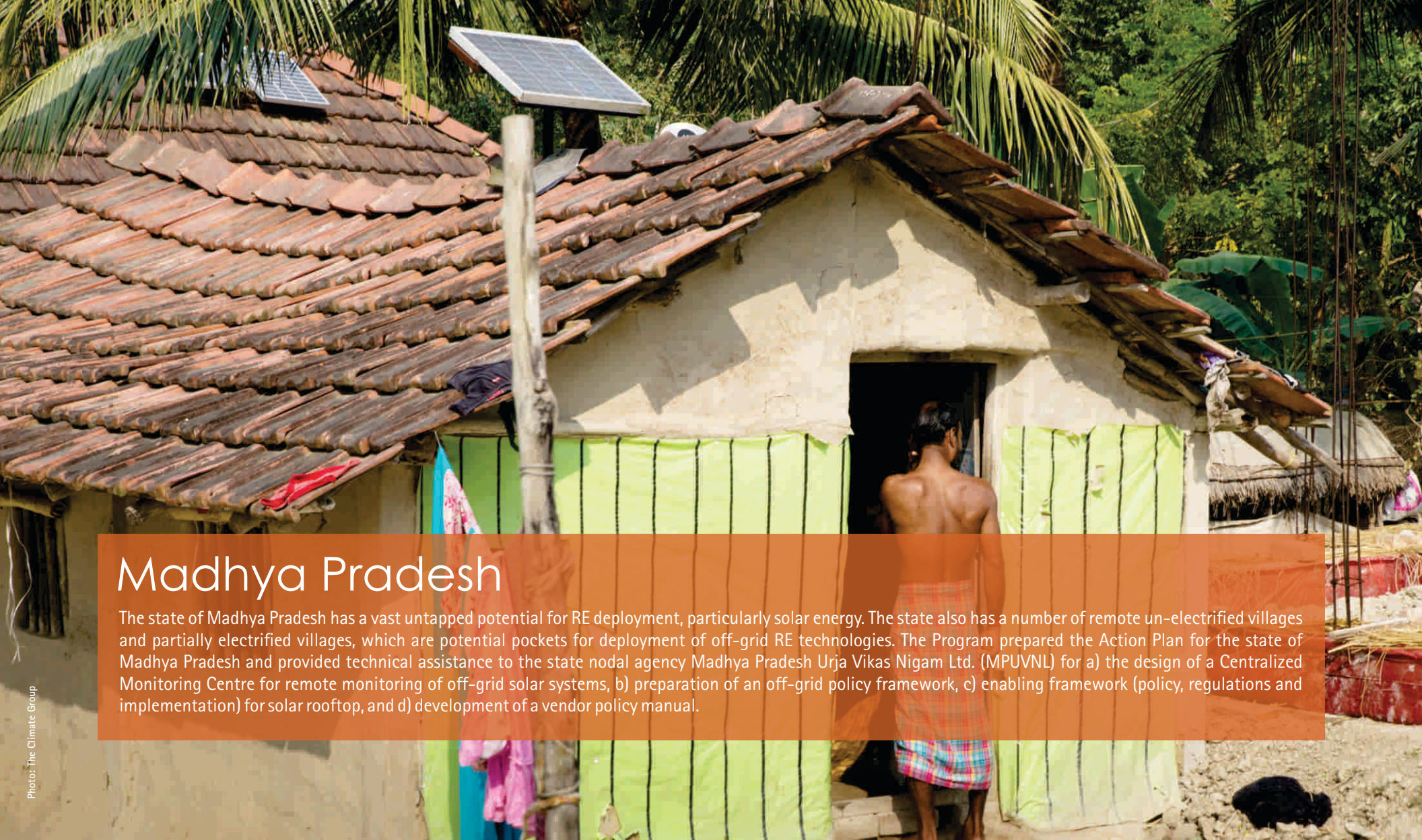
Haryana has an average electricity demand of 4,500-5,500 MW which increases to 8,000 MW during summer peak hours. Haryana was the second state in India to initiate the process of reforms and restructuring of the power sector in India. While the state's economy was predominantly based on agriculture, it is now emerging as a base for the knowledge industry including IT and biotechnology, leading to different energy consumption patterns and related challenges. Haryana offers huge potential for implementation of energy efficiency and energy conservation measures. The PACE-D TA Program is working closely with the Haryana Electricity Regulatory Commission (HERC) on energy efficiency interventions to reduce energy deficit in the state.

DSM Regulations

In 2014, the Program provided technical assistance to the HERC to develop DSM regulations to ease the state's power crunch. These regulations will promote and implement load shifting, strategic energy conservation and pricing initiatives-based programs such as "Time of Day". The regulations, notified in November 2014, emphasize the need for a DSM Cell that will be responsible for various DSM activities. They also call for distribution licensees to undertake load research to identify the target consumer segments and end-uses, and market research to estimate the potential for specific energy efficiency technologies and applications. In addition, the regulations require distribution licensees to formulate and submit a DSM plan to HERC, including an overall goal, description of DSM programs, implementation process, monitoring and reporting procedures, and indicative cost-effective assessment of each program. The PACE-D TA Program is currently providing support to HERC to develop draft guidelines on Cost Effectiveness Assessment and Evaluation, Measurement and Verification (EM&V) which are the two important components associated with the DSM regulations.

Capacity Building of Utilities

As per the notified DSM regulations, power distribution companies in Haryana will have to focus on new interventions such as creating a DSM Cell and preparing DSM plans. Hence, it is important for the state utilities--Dakshin Haryana Bijli Vitran Nigam Ltd. (DHBVNL) and Uttar Haryana Bijli Vitran Nigam Ltd. (UHBVNL)--to understand the key steps and components involved in the development of DSM plans and work towards meeting the timelines set in the regulations. The PACE-D TA Program is building the capacity of state utilities in Haryana to prepare a range of DSM-related interventions. The Program organized a capacity building workshop on "Identification and Development of DSM Projects" for DHBVNL and UHBVNL at Panchkula in July 2015 where it provided an overview of the DSM regulatory framework and program implementation to the utilities. It also deliberated on how to identify DSM programs and prepare cost effective assessment for different consumer categories such as residential, commercial, agriculture, and municipalities. The Program is currently in the process of finalizing the identified DSM projects for further implementation in consultation with both distribution utilities and HERC. Learnings and experience from DHBVNL and UHBVNL will be disseminated to distribution utilities in other states, thereby helping them to tap the DSM potential and ensure energy savings across India.



Madhya Pradesh

The state of Madhya Pradesh has a vast untapped potential for RE deployment, particularly solar energy. The state also has a number of remote un-electrified villages and partially electrified villages, which are potential pockets for deployment of off-grid RE technologies. The Program prepared the Action Plan for the state of Madhya Pradesh and provided technical assistance to the state nodal agency Madhya Pradesh Urja Vikas Nigam Ltd. (MPUVNL) for a) the design of a Centralized Monitoring Centre for remote monitoring of off-grid solar systems, b) preparation of an off-grid policy framework, c) enabling framework (policy, regulations and implementation) for solar rooftop, and d) development of a vendor policy manual.

Photo: The Climate Group

Off-grid Policy Framework

The Program developed an off-grid RE policy framework for improving the proliferation of off-grid RE technologies across sectors, departmental programs and other developmental initiatives in the state. Development of an off-grid RE policy for Madhya Pradesh is expected to enhance the focus on off-grid electrification and also catalyze new off-grid energy delivery models.

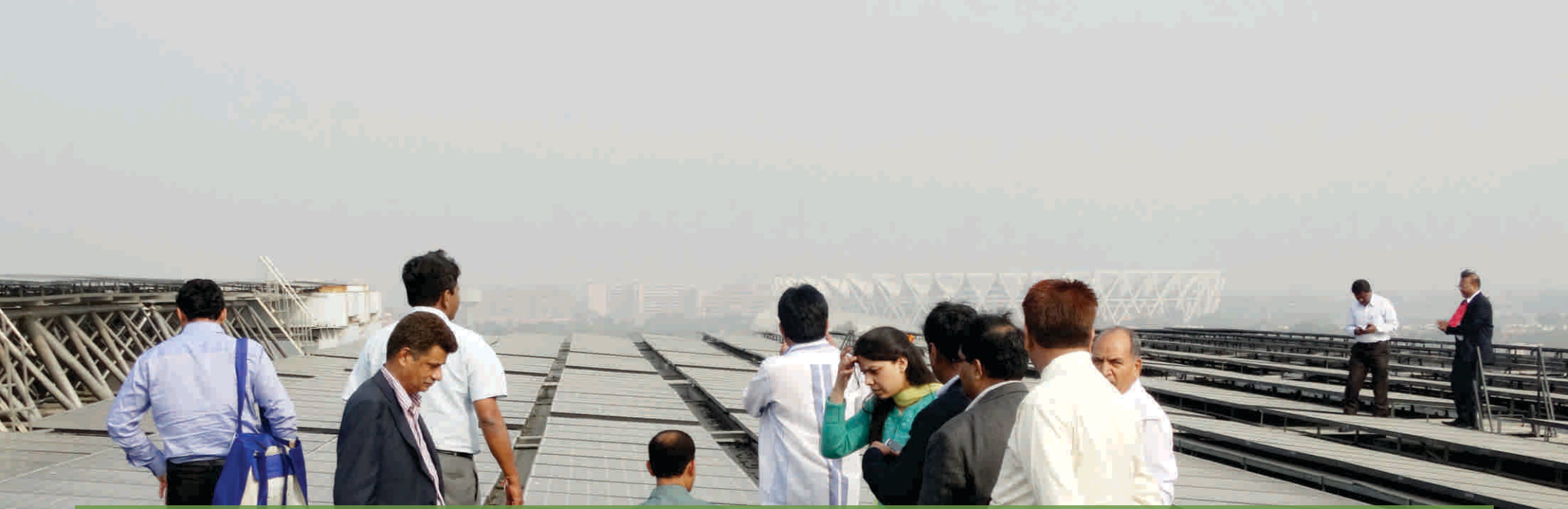
Centralized Monitoring Centre

Madhya Pradesh currently has 650 off-grid PV systems, totaling 4 MW, installed across the state by various vendors. The systems, ranging between 1 kWp and 100 kWp, are either standalone or hybrid with grid supply as a backup. As per the directives of MNRE, off-grid systems with installed capacity of more than 5 kWp, need to be installed with remote monitoring devices. The PACE-D TA Program is working with MPUVNL to establish a Centralized Monitoring Centre which will assist the agency in monitoring the performance of these off-grid solar installations. The Program has prepared a conceptual framework and a detailed project report for CMC implementation. It has also developed a detailed terms of reference for the appointment of an IT service provider and outlined the bid process for MPUVNL to select the IT service provider. The proposed off-grid CMC system is the first of its kind in India. While the system is focused on monitoring the performance of off-grid PV systems, it can also be adapted to monitor other off-grid applications such as bio-gasifiers and solar pumps. Once successfully implemented by MPUVNL, other state nodal agencies can also use the CMC model to monitor off-grid systems and assess the outcomes of their programs in an effective manner.

Enabling Framework for Solar Rooftop

The Program provided advisory support to develop the state Net Metering policy and provided comments to the Net Metering regulations. Similar to the TA support to Karnataka and Rajasthan, the Program is also providing technical assistance for the development of the interconnection framework that includes detailed processes, forms, formats and systems to encourage and support customers in designing, developing, and installing solar rooftop systems. Capacity building of stakeholders on Net Metering and related frameworks will enable the Government of Madhya Pradesh meet the state's solar rooftop target of 2.2 GW by 2022.

Solar rooftop deployment will play a key role in meeting India's national solar target of 100 GW by 2022, making it one of the largest RE producer. The PACE-D TA Program's various interventions on solar rooftop will provide a significant fillip to India's solar rooftop market and support the country to meet its national solar rooftop target of 40 GW by 2022.



Knowledge Sharing between States

The Program organizes knowledge exchange workshops to highlight cross-cutting challenges and opportunities, and facilitate knowledge sharing among key partner agencies including state nodal agencies (SNAs), distribution utilities, electricity regulatory commissions, and electricity departments of various states. The first knowledge exchange workshop was organized on February 24-26, 2014 in Puducherry. The workshop put forward the key RE and EE initiatives considering state specific priorities and focused on understanding the existing policies, regulations and programs under implementation. The second knowledge exchange workshop was organized on February 18-19, 2015 in New Delhi. Representatives of SNAs and electricity regulatory commissions from Haryana, Karnataka, Madhya Pradesh, Tamil Nadu, and Rajasthan participated in the workshop. The discussions focused on solar rooftops, solar pumping, CMC, Solar Energy Training Network (SETNET), and the Bureau of Energy Efficiency's initiatives to promote energy efficiency, including municipal DSM, ECBC and financing. The workshop also included a site visit to the solar rooftop and EE project at *Paryavaran Bhawan* (Office of Ministry of Environment, Forest and Climate Change) to get first-hand experience of a nearly zero-energy building and solar rooftop installation.