

Rajasthan Renewable Energy Transmission Investment Program



Solar For A Sustainable Future

In Bhadla, northwest Rajasthan, desert sands bake in the tropical sun. Temperatures here regularly reach 46° Celsius (C)–to 48°C. Today though, this arid landscape is enhanced by sleek solar panels, tilted sunward. The panels are part of a major investment in renewable energy on the part of the Government of India, and supported by the Asian Development Bank (ADB).

India has been hailed for its leadership in advancing climate action and expanding clean energy. However, it is still heavily dependent on imported fossil fuels to meet its growing energy demand. Coal still contributes the majority of India's electricity capacity and generation.

To ensure a sustainable future for the country, the government has significantly increased its renewable energy targets. At the Conference of Parties 21 in Paris in 2015, the government committed to shifting its power mix to 40% non-fossil fuel-based energy resources by 2030. It also plans to quadruple the country's renewable energy capacity to 175 gigawatts (GW) by 2022 and 275 GW by 2027; and to revise the target of grid-connected solar power from 20 GW to 100 GW by 2022. These commitments brought about a rapid installation of renewable energy capacity. By 2016–2017, renewable energy capacity additions already exceeded thermal capacity additions. Rajasthan's Bhadla Solar Park contributes to this new renewable capacity.

Realizing India's Renewable Energy Potential

Government's recent estimates put India's exploitable solar energy potential in the range of 750 GW. Close to the equator, India's geography bestows it with solar irradiation ranging from 4–7 kilowatt-hours per square meter per day (kWh/m²/day) across the country. Rajasthan, India's largest state, has an even higher solar incidence as well as vast tracts of barren land—among the most ideal conditions for solar power in the world.

Knowing its strategic advantage, Rajasthan has aggressively invested in renewable energy generation. ADB is helping Rajasthan harness its renewable energy potential, with the \$800 million Rajasthan Renewable Energy Transmission Investment Program (RRETIP), which finances a power transmission

“To develop a solar park of, say 2,000MW capacity, we will require about 5,000 hectares of land... and in Bhadla we found a place of about 5,000 hectares of Government land that can be developed for this purpose.”

— B.K. Dosi, managing director,
Rajasthan Renewable Energy
Corporation



system that will deliver electricity generated from wind and solar power projects in Rajasthan to the state and national grids.

The program will help implement the state's master plan for renewable energy through a multi-tranche financing facility funded by up to \$300 million from ADB, \$200 million loan and grant from Clean Technology Fund (CTF), and counterpart funding from the state government. RRETIP's first tranche comprised of \$62 million of ADB loan, \$88 million of CTF loan, and \$2 million of CTF grant is nearing completion and will support solar and wind power transmission in different locations in Western Rajasthan including Akal, Bhadla, Bikaner, and Ramgarh.

Private sector led investment in renewable energy is supported by public sector investment such as transmission facilities for electricity evacuation, access roads, site development, security, permits, and land allocation. The project sites are mostly located in barren desert land away from human communities, thus minimizing impacts.

Since 2008, ADB in partnership with the Clean Technology Fund has been exploring opportunities to support clean power deployment in Asia. When we were working with the Government of India on identifying the best locations in India, the deserts of Rajasthan provided an attractive opportunity"

— Len V. George, ADB senior energy specialist

The investment program will eventually help add at least 4,300 GW of new renewable energy capacity to the grid. This will result in additional electricity output of 7,761 GWh per year or an estimated greenhouse gas emission reduction of 5.4 million tons of carbon dioxide equivalent / year.

Bhadla Solar Park Design, Planning, and Implementation

ADB and CTF supported Rajasthan Renewable Energy Corporation for the design and planning of the solar park infrastructure and evacuation of power that led to the establishments of large solar plants in India.

Bhadla Solar Park was a challenge in many ways. The vastness of the Thar desert was met with local constraints in terms of availability of suitable land, road design, topographic challenges, geotechnical limitation, water availability, power transmission, and social issues. Through perseverance and resilience, the concept has gained ground, the phases started to take shape and detailed engineering followed suit. The desert could be imagined to be full of photovoltaic modules—a beacon for clean power that India and the world needs. Bhadla has proved to be the right decision by Rajasthan and has paved the way for the solar parks scheme that India has eventually adopted, according to Agostinho Miguel Garcia of Sun Business Development and Chandrashekar Iyer of Meghraj Capital Advisors, part of the consortium engaged under the technical assistance to support Rajasthan Renewable Energy Corporation and Rajasthan Rajya Vidyut Prasaran Nigam Limited.

Bhadla will be one of the largest solar parks in the country and will be capable of producing 2,245 MW of renewable electricity. Currently, 745 MW is already commissioned. With India lowering its solar tariffs from Rupees (Rs.) 6.45 (~\$0.09) per kWh in 2013 to Rs. 2.44 (~\$0.03) per kWh in 2017, new solar is now one of the country's cheapest source of electricity, well below coal's average tariff of Rs. 3.20 (~\$0.04) per kWh.

Strengthening Communities Through Clean Technology

To ensure that communities near the projects benefit (beyond an expanded access to energy and infrastructure), the program also helps people find productive jobs and access better health and educational services. For example, the Bhadla Solar Park employs around 1,000 people—from engineers and construction workers, to the security guards and technicians who maintain the solar systems. About 40% of these workers hail from surrounding villages.

These carefully designed and implemented clean technology projects not only improve the quality of life for those they employ, but the benefits extend across the region and into different sectors.

The women in the villages practice beautiful arts called 'Ralli' or 'Gudari'. Encouraging and enabling women to gather in a common place in their village to work together on their craft, even if for a few hours every day, engenders a feeling of community, camaraderie, and collective power. This is a good start and needs to be sustained with new product development, accessing new markets as well as creating awareness on health and access to resources like clean energy and drinking water"

— Sumita Ghose, founder and managing director, Rangсутra

ADB and India – Partners in Climate Action

A founding member of ADB, India is now the bank's fourth largest shareholder. ADB support has made a remarkable contribution to the country's development. ADB has ramped up its portfolio of transport, urban, and energy projects in India to fill the urgent need to upgrade the country's infrastructure.

In India, ADB invests in the power sector at both the national and state levels. India was ADB's largest borrower for energy projects from 2007 to 2015, accounting for 25% of ADB's total investments in energy projects in Asia and the Pacific. Support from ADB financed the expansion and modernization of India's national electric transmission system, and helped implement power sector reforms at the state level. ADB has also increased its funding for low-carbon solutions, renewable energy, and energy efficiency.

ADB supports the expansion of solar energy across developing Asia as part of its goal to promote environmentally sustainable economic growth.

As the sun rises over Bhadla Solar Park, a new day dawns for the people of Rajasthan and India's sustainable future.