



Rewa Solar (India): Removing Barriers to Scale

In the last few years, IFC has prioritized an approach to creating bankable private sector infrastructure opportunities that we call “Scaling”—focusing not on single asset development, but on a holistic approach that creates a pipeline of infrastructure projects.

The essence of the Scaling approach is to develop a robust public-private partnership (PPP) model for a single deal and then replicate it. This spreads costs, enhances impact, and encourages programmatic, competitive tendering, with faster delivery and lower prices—genuinely creating new markets.

In some countries, this approach involved working with governments to design a process. In others, IFC has worked with investors and bankers, corralling views and facilitating dialogue. In each case, the ideas at the heart of Scaling—focusing on aggregation and investing upstream to achieve credibility downstream—were adapted to specific country circumstances. In all cases, the Scaling effort in process design and organization had a meaningful and long-lasting impact.

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Here we consider the case of one of these experiences—Rewa Solar in India—in more detail. This case study accompanies four other case studies and an Executive Summary, and provides insights and key takeaways that are directly applicable to other countries.

The Rewa solar project was an ambitious attempt by the state government of Madhya Pradesh to push the boundaries of India's private renewable energy market with IFC and broader World Bank Group support. Not only was the project done at scale, as a 750MW Ultra Mega solar park, but it sold solar power across state boundaries for the first time ever under India's Open Access rules. Scale was achieved at project level, with IFC supporting all the private sector component investments in the solar park. Finally, the project brought international investors into a state-led Independent Power Producer (IPP) for the first time and developing a paradigm for future Open Access transactions.



I The Project

The Rewa project shows how sustained engagement from project conceptualization to design and bidding, and ultimately financing, can help create a market, well beyond the impacts of an initial set of transactions. Here, we see a package of interventions across the World Bank Group that work together to provide a total solution: the formulation of an approach for implementing large scale grid-tied solar; a package of public sector finance for early stage derisking, IFC advisory support to concession out three solar power projects, and a package of \$437 million in commercial financing to prove the ultimate bankability of the overall enterprise.

With a capacity of 750MW, the Rewa Solar Project or Ultra-Mega Power Project (UMPP) will be one of the world's largest solar photovoltaic (PV) projects. The Project, in the Rewa district of the state of Madhya Pradesh in India, will sell its power to the Madhya Pradesh Power Management Company Limited (MPPMCL) and Delhi Metro Rail Corporation (DMRC) under a 25-year Power Purchase Agreement (PPA). Auctioned in March 2016 by Rewa Ultra Mega Solar Limited Company (RUMSL), with the support of IFC's Transaction Advisory Department, it generated an unprecedented market response: 20 bids totaling 7,500 MW (10x the capacity being auctioned) and for the first-time, the presence of international bidders in state-level auctions.

The auction ended with the award of three different units of 250 MW each that together make the UMPP project: Mahindra Susten (Unit 1), Acme Solar (Unit 2) and Solenergi (Unit 3), and resulted in the first large-scale project in India in which the renewable energy tariff of 5.5 US¢/kWh breached grid parity (i.e. the tariff was lower than the cost of electricity produced across the grid as a whole, including fossil fuels). Once completed, the project will help India avoid a million tons of greenhouse gas emissions per year and bring it closer to its goal of 100 GW of solar energy by 2022.

IFC's Infrastructure Investment Department arranged an investment of US\$437 million in the form of INR denominated loans (own account and mobilization) split into three different transactions (one for each of the 250 MW units that made up the UMPP), and that were processed simultaneously, proving the bankability of the scaling concept, and paving the way for replication across the sector.

II Context: Making the Market

Central Government support for renewables and state-level reforms

India is the third largest producer of electricity and fourth largest consumer of electricity in the world, with an installed capacity of 356GW. However, it is still ranked among the lowest in the world in per capita consumption, with over 300 million people lacking access to electricity. It is also still heavily dependent on thermal power (i.e. coal, gas and diesel) which accounts for 67 percent of installed capacity. Approximately 15 percent of installed capacity is sourced from hydro and nuclear power plants. Renewable energy is still in a nascent stage but has grown rapidly and comprised 18 percent of installed capacity in 2017.

The Government of India sees renewable energy as a vital path to meeting its energy needs and has set a capacity target of 175GW by 2022. Wind and solar energy have received special support because of the abundance of these resources in India, rapidly declining equipment costs, lower construction risk and scalability. In the solar sector, the Indian government is providing important incentives: import duty exemption for solar panels; financing of national grid extensions to accommodate solar parks; the obligation for utilities to procure 8 percent of their energy from solar sources by 2022; and the waiver of inter-state transmission charges and losses for solar purchases.

Beyond generation, the Indian government fully controls the national transmission system through the Power Grid Corporation of India (PGCIL). As of March 2019, the private sector provides 46 percent of installed generation capacity with the rest divided among central and State led public sector undertakings. To fix its ailing distribution companies, the Government of India proposed a comprehensive restructuring scheme (called the UDAY Scheme) that foresees different measures to help reduce operating losses and improve financial conditions.

State Government efforts to improve off-taker creditworthiness

The state of Madhya Pradesh is largely agrarian and lags in power infrastructure although it is fast catching up with investments to meet growing demand. The Government of Madhya Pradesh has autonomy to decide on tariffs, generation structures and contractual arrangements. The Government of Madhya Pradesh has taken on several initiatives to improve the operational and financial performance of the power sector. Through an aggressive scale up of generation, the State has eliminated its energy deficit, which stood at 17 percent in 2012. The State has also made sizeable capital investments in transmission infrastructure that have reduced losses significantly (23 percent in 2016, down from 40 percent in 2009).



MPPMCL is the State entity that runs the three distribution companies and is the main project off-taker. MPPMCL is subsidized, and its “A” credit rating is based on an irrevocable guarantee from the Government of Madhya Pradesh. To improve the financial sustainability of the distribution companies, the State has signed up to the UDAY scheme to receive support from the Central Government. Under the UDAY scheme, the Government of Madhya Pradesh will take over 75 percent of the debt of the distribution companies and refinance the remaining 25 percent; receive new financial resources for working capital; increase tariffs; and achieve pre-determined targets for collection efficiency and loss reductions.

National and state-level reforms converge to enable the creation of a new market

The convergence of the central government renewable energy incentives and support to distribution companies and the Government of Madhya Pradesh’s efforts to meet the growing demand for electricity and improved financial sustainability created an environment that enabled the development of solar generation at a large scale. Furthermore, the Government of Madhya Pradesh showed further commitment by providing many enablers for the Rewa Project. Foremost among those is a robust payment security mechanism to mitigate the payment risk of the project.

III Transaction Evolution

From a public initiative to a PPP

The World Bank Group's engagement in Rewa started with the World Bank. Recognizing the need to leverage private financing to achieve the Government of India's solar generation targets, the World Bank directed its resources to the removal of key barriers to private investment. The Bank played a fundamental enabling role by financing key environmental and social management and institutional strengthening activities, as well as the solar park's evacuation infrastructure. RUMSL, the project implementing agency, mandated IFC for its international expertise as a PPP transaction adviser to help structure the Rewa solar project and mobilize private investment to be deployed in parallel to the World Bank loan.

IFC subsequently advised on the structuring of the power project as a PPP. The Transaction Advisory Department led the entire project preparation and structuring process, dovetailing with the preparation of the World Bank loan. The department was familiar with World Bank policies and procedures and its participation in the structuring of the Rewa solar program ensured that the projects' design conformed to the requirements of the World Bank. This applied, in particular, to environment and social performance standards and safeguards as well as project management and supervision procedures.

Optimizing the use of public resources

Building on the enabling policies of the Government of India, the Government of Madhya Pradesh took the bold initiative to develop the project without seeking the direct subsidy made available by the central government to private developers to enable a lower tariff, and without having access to a highly-rated intermediary to buy the power. IFC accepted this challenge, structuring with the state utility as the direct off-taker and without direct capital subsidies.

The project benefited from a World Bank and Clean Technology Fund (CTF) financing with favorable terms. These loans, approved in March 2017, financed the common evacuation infrastructure at the Rewa solar park, including three 220/33kV substations and connected 220kV transmission lines to transfer power from the solar plant to the 400/330 kV substation being constructed by Power Grid. It was estimated that the favorable World Bank and CTF loan terms helped directly reduce the tariff by about 4 to 5 paisa (US cents 0.07)/kWh. Beyond this, however, the upfront comprehensive solution that it provided also helped bidders develop confidence in the project structure, without which the overall effort could not have been brought to fruition.

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Based on analysis presented by IFC, the Government of Madhya Pradesh adopted a moderate charge for the three projects for land and common infrastructure in the solar park, allowing for deferred payment over the life of the project for land acquisition, construction of internal evacuation infrastructure, local area development costs, and solar park administration costs.

Figure 1 below provides an overview of the project structuring process.

Figure 1: Project Preparation Process



Source: Rewa Solar: Bringing an Investment Ready Project to Market, Colombo, Sri Lanka, December 6, 2017

Getting the best price without subsidies

To remove the need for direct public support, IFC focused on mitigating risks in the project design. Apart from the normal technical, legal, environmental and regulatory due diligence, the team analyzed various interdependent issues to maximize competition and drive prices down including land availability, grid capacity, and the optimal size of the project required to tap scale economies. The project structure included bankability features such as an enhanced payment security mechanism, guaranteed energy offtake and termination compensation.

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The team complemented this with extensive bidder consultation to ensure all concerns were adequately addressed.

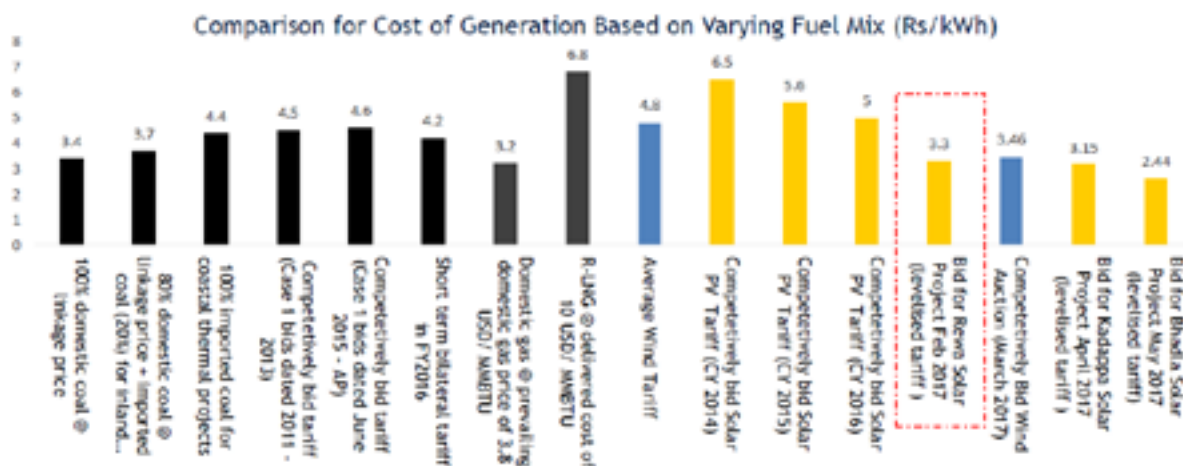
IFC also helped re-design the internet-based reverse auction process, triggering greater competition. The bidders could bid separately for each 250MW unit size, with the lowest initial tariff selected as starting price for a reverse auction process. The bidders submitted bids followed by a 30 hour long online auction which progressed in increments of 1 paisa initially (0.015 US\$ cents) and then 0.1 paisa, with a twenty-minute span between bids.

Twenty firms participated in the reverse auction which concluded with a starting tariff of INR2.96/KWh (US\$4.4 cts/KWh). The winning bidders were Mahindra Susten, part of the Mahindra Group; Acme Solar, a large solar IPP with a good track record; and Solenergi Pvt. Limited, a company owned by Actis Solar. Accounting for an escalation of 5 paisa per year for the first 15 years, the levelized tariff is about INR 3.3 /KWh (US\$4.9 cts/KWh). This was a record at the time, and over 30 per cent lower than the prices obtained for the competitively bid solar PV projects in previous years

Processing the financing

Once the projects were awarded, the winning developers approached IFC for financing. IFC processed the financing of the three projects concurrently. The financing was in the form of INR-denominated loans with a final maturity of 20 years. IFC financed around 75 percent of the projects' cost, with the remaining 25 percent coming from shareholder loans and equity. IFC provided substantially the same financing terms to the three projects, with some variations.

Figure 2: REWA tariff vs. other India renewables



Source: Rewa IRM Package

IV Creating the Conditions for Scaling

Implementing a project of this challenging scale involved creating a solid economic case and making it bankable. This included creating demand for a large project by enabling committed and creditworthy offtake across state lines. In turn this meant improving the financial sustainability of the main state off-taker, introducing international project finance standards and best practices, and ensuring that the projects reached the market with a sufficient level of preparation to ensure robust investor interest and strong competition.

Unlocking the Open Access Rule to create a market

The Open Access rule, in place since the enactment of the Electricity Act of 2003, gives off-takers with capacity above 1MW the ability to source power from suppliers other than the utility to which they are connected. This could include buying power from power generators in other states.. Despite this enabling regulation, open access had not been so far used for inter-State procurement of solar power.

Rewa operationalized these rules by ensuring the buy-in of the State government and presenting a convincing economic case to the out-of-state off-taker, which was the Delhi Metro Rail Corporation (DMRC). To make the overall business case to DMRC, IFC presented its analysis around cost savings and helped address DMRC's concerns about handling generation intermittency associated with solar power especially considering that its load profile also varies intra-day, during weekends, during nights and seasonally. IFC designed and developed consensus with Load Dispatch Centers, and bidders to arrive at a unique optimal power scheduling arrangement that provided a solution for intermittent generation and power demand scheduling. Rewa became the first example of the operationalization of the Open Access rule for solar without intermediation.

Designing for different risk profiles and client goals

Both off-takers are large and complex government entities with different credit risk, peak schedules and total demand. MPPCL (rated A- by CARE) is representative of India's larger public utility profile: operationally inefficient and subsidy dependent. DMRC (rated AA+ by CRISIL) is a profitable entity, currently in expansion mode. IFC faced the added complexity of managing different negotiating approaches of off-taker teams and managing different risk allocations for common items in project documents such as tariff, scheduling and deemed generation allowances. Risk mitigation also varied for items such as Termination of PPA, curtailment and Force Majeure.



Carrying out extensive bidder consultations

The team extensively consulted and negotiated project agreements with off-takers, potential bidders, lenders and policy makers. Documents such as the PPA, grid agreements, qualification and selection criteria for bidders were discussed in detail among the stakeholders. This iterative and transparent process resulted in addressing more than 500 queries from different actors. RUMSL and IFC organized a site visit for all bidders and aided with further visits. IFC evaluated all comments received and many changes were made based on the comments received. The auction, held after 5 road shows and pre-bid meetings, reflected complete buy-in by domestic and international investors and lenders.

Structuring balanced risk allocation in accordance with international standards and comprehensive project preparation to de-risk projects

To ensure bankability and mobilize sufficient investor interest, risk allocation followed international standards, including guaranteed energy offtake, a take-or-pay PPA backstopped by a Government guarantee, a three-tier security payment system and termination compensation.

Additional provisions improved Rewa's bankability vis a vis other state led projects significantly. At least 90 percent of the land had to be available 30 days after PPA signing. Land consents and clearances were signed off among landowners. There were strict timelines, known in advance, for development of the transmission link (under the responsibility of PGCIL) and evacuation infra (under the responsibility of RUMSL) and adequate compensation for any delays. Finally, a common Environment and Social

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standards protocol was signed by both IFC and the World Bank in loan agreements.

These steps were key in streamlining the process towards a successful private sector bid. The project attracted both international and domestic developers and was perceived to be on par with national level project bankability.

Going the extra mile when clients needed it the most

IFC also assisted the client with a complex set of activities that were not in IFC's usual scope of work, but which were important to implement the project. These included land procurement procedures, applications for regulatory approvals, and managing the interface with PGCIL. RUMSL was a new entity formed only two years before the award of the projects and had limited capacity to handle complex project management of greenfield developments.

Sealing the deal

IFC was present at every stage of the project cycle to nurture the market into existence. Building on the work of IFC's Transaction Advisory Department on the concession documentation and project structure, IFC's Infrastructure Department stepped in to ensure that the entire debt of the three projects could be raised, providing financing on its own account, and mobilizing a significantly larger third party tranche to close the financial plan and prove the overall project bankability. Given the scale and ticket size, IFC's presence was also key to attract lenders that could come into the deal at a competitive price. As a result of the strong project structure and a strong syndication effort, IFC was able to mobilize US\$2.4 for each US\$1 of IFC financing.

Extra payoffs from creating a market appear down the line

The preparation template and institutional capacity created under Rewa has had an important market creation impact. Rewa has helped open a new market for inter-state open access consumers for solar projects by encouraging other bulk consumers to buy power from solar projects across state boundaries to supplement state utilities. The first of these projects is a 1,500 MW development in Madhya Pradesh to supply electricity to Indian Railways. In addition, the successful outcome of the project provided impetus to the implementation of new national tariff-based competitive bidding guidelines for solar projects. These guidelines incorporated several structural aspects of the Rewa transaction. Finally, the success of Rewa encouraged other state governments to implement similar projects, starting with the state government of Odisha, which mandated IFC to develop solar parks of 1,000 MW. It has also led to discussions of a multi-State programmatic engagement with IFC.



V Lessons Learned

Balanced risk allocation can have a larger impact on scaling than subsidies: In the Rewa case, the focus was on reducing final prices through systematic risk mitigation, rather than buying down costs through direct subsidies. In this way, the project achieved a tariff that was 24 percent below the lowest tariff for national entities and avoided the need for subsidies—even though part of the offtake was by a State utility with weak creditworthiness.

At the same time, targeted use of scarce public resources can leverage private capital effectively: The effort benefited from a World Bank loan that financed the construction of shared infrastructure in various solar parks, including Rewa. This proved to be a good use of limited public resources and served to further de-risk projects.

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With careful conflict of interest management, it is possible to engage at multiple levels in transaction design and implementation: Multiple teams within the WBG were involved at different points on the REWA transaction and managing conflict of interest—real and perceived—was paramount. The World Bank and IFC Transaction Advisory Department worked as separate units pre-bid with no intervention from the IFC investment team. Similarly, post bid, IFC Transaction Advisory did not engage on behalf of the government or IFC on any aspect of PPA or lender negotiation with bidders. IFC clarified cross-function roles with the client, to avoid slipping into a 'common advisory role' during overlapping stages of the process.

Extensive consultation is key for increasing investor interest: An intense iterative process followed with bidders, investors, procurers, transmission utility, regulators and system operators helped streamline project agreements that were implemented post-bid. The success of implementation is reflected in these documents being cited as reference documents in the national guidelines for all solar bids in India.

Project preparation pays off: Feedback from bidders indicate that the “pre-baked” nature of land, grid evacuation and project documents resulted in lower target returns on equity and cost of capital overall, probably contributing a 20 paisa (about 5 percent) decrease in bid price. Another 20 paisa was attributed to provisions such as Termination payments and deemed generation, that solidified the dependability of cash flows.



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