



MULTILATERAL DEVELOPMENT BANKS' COLLABORATION:
INFRASTRUCTURE INVESTMENT PROJECT BRIEFS

Morocco: Noor Ouarzazate Concentrated Solar Power Complex



Overview

The Noor II and III Concentrated Solar Power Plants of Ourzazate signal progress in Morocco's commitment to increase its share of renewable energy generation from its current rate of 28 percent to 52 percent by 2030. Both projects are part of the Noor Concentrated Solar Power Complex, which will generate power for more than 1.1 million Moroccans by 2018 and reduce greenhouse gas emissions by approximately 690,000 tons of CO₂ equivalent per year. The African Development Bank (AfDB), the European Investment Bank (EIB), the World Bank's International Bank for Reconstruction and Development (IBRD), the Kreditanstalt für Wiederaufbau (KfW), the French Development Agency (AFD), the Union and the Clean Technology Fund (CTF), and other development finance institutions have jointly provided \$1.6 billion in loan/grant financing for these projects.

This series showcases how the Multilateral Development Banks' collaboration supports the development and implementation of infrastructure investment. This support comes in the form of public sector loans, private sector finance, sector and transaction advice, guarantees, and output-based aid.

Background

Morocco is located in North Africa, covering a land mass slightly larger than California. Its population of 34 million (2014) is relatively young—over 45 percent is under the age of 24—and is growing at 1.4 percent annually. The country has capitalized on its proximity to Europe and relatively low labor costs to build a diverse, open, market-oriented economy with low inflation rates (under two percent). Morocco's GDP grew at 2.7 percent in 2014 and its per-capita income growth in recent years has contributed to eliminating extreme poverty and significantly reducing poverty—the World Bank estimates that poverty rates fell from 8.9 to 4.2 percent between 2007 and 2014—although disparities persist and employment remains low.

Morocco's energy needs far exceed its oil and gas production. As a result, as of September 2014, Morocco was the largest energy importer in the Middle East and North Africa (MENA) region, depending on non-domestic sources for over 97 percent of its domestic energy demand. In response, the country committed to increasing its share of renewable energy generation to 42 percent of national capacity by 2020 and 52 percent by 2030. Morocco currently generates 28 percent of its energy from renewable energy sources, and plans to achieve the set targets through a combination of solar, wind and hydropower generation. Under the Moroccan Solar Plan (MSP—now referred to as Noor), the country plans to develop 2,000 megawatts (MW) of solar capacity by 2020.

Project Description

The Noor Ouarzazate Concentrated Solar Power (CSP) Plants II and III are part of Phase 2 of the Noor-Ouarzazate Solar Complex, which is located less than six miles from the town of Ouarzazate. Once completed, it will have a generation capacity of 580 MW from solar plants using CSP and photovoltaic technologies. The first phase, Noor I, which generates 160 MW, was commissioned in February 2016.

The Noor Ouarzazate CSP Plants II and III projects were developed under a public-private partnership with competitively selected private sponsors that are responsible for engineering, financing, procurement, construction, ownership, operation and maintenance of the plants. The Plants consist of a 200 MW parabolic trough CSP facility and a 150 MW tower CSP facility. The project sponsors for Noor Ouarzazate II are Acwa Power (70 percent), Sener Ingeniería y Sistemas (five percent) and the Moroccan Agency for Solar Energy (MASEN) (25 percent); for Noor Ouarzazate III, they are Acwa Power (75 percent) and MASEN (25 percent).

Multilateral Development Banks' Role

Total investment cost of Noor Ouarzazate II is \$1.1 billion, while Noor Ouarzazate III's is \$900 million. Seven development finance institutions provided debt financing through an on-lending structure. Sponsors are providing \$400 million in equity.

Multilateral and bilateral financing support was provided through loans to the utility MASEN, which then lends to the project companies. Loan amounts from development finance institutions for both projects are:

- €100 million — AfDB
- €150 million — EIB
- €83 million — European Commission (grant)
- €235 million + \$80 million — IBRD, of which €58.6 million and \$20 million are used for construction of Noor-Ouarzazate II. The balance funds are part of a viability gap fund for the operational phases of Noor-Ouarzazate I, II, and III plants
- €50 million — Agence Française de Développement (AFD)
- €654 million — Kreditanstalt für Wiederaufbau (KfW)
- \$238 million — Clean Technology Fund, mobilized by AfDB (50%) and IBRD (50%)

Outcomes

The Noor Ouarzazate Concentrated Solar Power (CSP) Plants II and III will increase the installed capacity and electricity output, especially during peak hours, of the Noor-Ouarzazate Solar Complex. Once completed, the complex will supply power to 1.1 million Moroccan households by 2018, increasing Morocco's energy security and avoiding greenhouse gas emissions of around 690,000 tons of CO₂ equivalent per year. This reduction is equivalent to the sum of greenhouse gas emissions from over 145,000 passenger vehicles driven for one year (U.S. EPA Greenhouse Gas Equivalencies Calculator).

As part of the project design, MASEN is expected to use each bidding process for the plants under the Morocco Solar Plan to encourage development of local manufacturing capacity. Based on the experience with Noor I, MASEN expects that a significant part of the projects' costs would be sourced locally. This is intrinsic to CSP technology and should help stimulate development of Morocco's industrial base and create jobs. In the area around Ouarzazate, local authorities and the population will continue benefiting from the economic and social development opportunities that the project can bring, as successfully demonstrated in Noor Ouarzazate I, particularly with regard to playing a catalyst role in the development of this semi-desert region.

At the regional and even global level, the project is expected to have transformational effects not only on Morocco and its energy system but also on the MENA region. The Noor complex will contribute to the development of a local research/development base. Morocco's work on this project is expected to lead to advances in CSP technology and a subsequent reduction in price for the technology that will make it more viable globally.

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