

**PROJECT INFORMATION DOCUMENT (PID)  
APPRAISAL STAGE**

Report No.: PIDA7726

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| <b>Project Name</b>                           | MA- Noor Ouarzazate Concentrated Solar Power Project (P131256)   |
| <b>Region</b>                                 | MIDDLE EAST AND NORTH AFRICA   |
| <b>Country</b>                                | Morocco  |
| <b>Sector(s)</b>                              | Other Renewable Energy (95%), Public administration- Energy and mining (5%)  |
| <b>Theme(s)</b>                               | Climate change (40%), Infrastructure services for private sector development (25%), Regional integration (10%), Technology diffusion (25%) |
| <b>Lending Instrument</b>                     | Specific Investment Loan   |
| <b>Project ID</b>                             | P131256  |
| <b>Borrower(s)</b>                            | MASEN  |
| <b>Implementing Agency</b>                    | MASEN  |
| <b>Environmental Category</b>                 | A-Full Assessment  |
| <b>Date PID Prepared/Updated</b>              | 25-Jun-2014  |
| <b>Date PID Approved/Disclosed</b>            | 25-Jun-2014  |
| <b>Estimated Date of Appraisal Completion</b> | 27-Jun-2014  |
| <b>Estimated Date of Board Approval</b>       | 30-Sep-2014  |
| <b>Decision</b>                               | June 11, 2014  |

**I. Project Context**

**Country Context**

In 2009, Morocco made the strategic decision to maximize use of its domestic renewable resources to increase its energy security and reduce its dependence on imported fossil fuels within the framework of its overall domestic industrial integration policies. Morocco is currently the largest energy importer in the Middle East, depending on non-domestic sources for over 97 percent of its domestic energy demand.

As a result, the country adopted a progressive energy sector development plan that committed to increasing the country's share of renewable energy generation to 42 percent of national capacity by 2020, and to improving energy efficiency by 12 percent by 2020 and 15 percent by 2030, thus reducing greenhouse gas emissions. Morocco plans to meet this renewable energy target by developing 2,000 megawatts (MW) of solar capacity, under the Moroccan Solar Plan (MSP), 2,000 MW of wind capacity and 400 MW of small hydro, to take advantage of the country's excellent renewable energy resources.

Morocco made the strategic decision to focus its solar program on using Concentrated Solar Power (CSP) technology. The country has been one of a growing number of countries that have made a significant commitment to it, and is actively pursuing a successful program to increase its penetration within its borders. The technology is particularly useful in Morocco because it can provide carbon-neutral, firm capacity that can be dispatched during the country's evening peak electricity demand.

Advancing development of this technology requires public investment that so far Morocco and a few other countries where the technology is most useful have been willing to make. More broadly, recent trends demonstrate a clear shift of investment patterns in renewable energy technologies over the past several years, increasingly in emerging markets as such countries recognize the linkages between low-carbon green economies and a future of energy access and security. Support from developed countries for technology investments in emerging markets has come mostly in the form of vital concessional bilateral and multilateral financing for projects similar to the proposed Project herein.

Although Morocco's strategic decision to focus on CSP could yield additional significant returns, these benefits, by themselves, are insufficient to justify CSP's economic costs to the country using the Bank's traditional project-level analysis. However, the country's focus on CSP is a choice with broader implications to the global public interest in developing this technology, which is one of the few carbon-neutral technologies that can provide baseload power. One of the significant challenges of climate change is to develop and deploy low carbon technologies at an accelerated pace, so that the global greenhouse gas emissions peak within a decade, and significantly decrease thereafter. Morocco's investment in this project, and the Morocco Solar Plan, contributes to global knowledge of CSP technology and to lowering its deployment costs.

Aside from Morocco, a wide range of international stakeholders and governments are supporting the development of CSP as part of a range of limited carbon-free technology options for electricity generation (e.g., geothermal, hydropower, nuclear, wind power) with the aim of combating climate change. CSP has demonstrated its capacity to supply power on a reliable basis. Among renewable energy technologies, CSP is a technology of particular interest as (a) generation is more predictable than for most renewable energy options (lower intermittency) when combined with thermal storage; and (b) associated storage is closer to economic viability than for other renewable energy options. As of early 2014, approximately 2,136 MW of CSP plants were operational world-wide and 2,527 MW were under construction. An additional 10,134 MW of capacity had been announced.

Based on the Bank's analysis for the proposed Project, CSP's average capital costs could fall by approximately 48 percent as a result of Morocco's and other countries' investments in CSP in the next few years. Such reduction would make the technology globally competitive with traditional technologies by 2030, with significant global benefits. The economic rationale for the proposed Project rests on the following: (i) the project will contribute to the global public good related to lowering the costs of CSP and (ii) Morocco stands to benefit from lower costs in future CSP projects.

### **Sectoral and institutional Context**

Morocco is largely dependent on fossil fuel imports for its primary energy use and is the largest

energy importer in MENA. Morocco has some oil, natural gas, and coal reserves, but Morocco imports well over 95 percent of its domestic energy needs, making it the largest energy importer in the MENA region. Despite having a per capita energy consumption rate (0.52 tons of oil equivalent (Toe), 2011 est.) that is less than a third of the world average (1.7 Toe, 2011 est.), Morocco's future economic development, which is heavily focused on energy-intensive industries (e.g., chemicals, construction, etc.), building its infrastructure base, and tourism, will likely increase its long-term energy needs. As a result, Morocco is particularly vulnerable to fluctuations in international energy prices and to supply shocks that could range from availability of supply and political externalities (e.g., international embargo on Iranian oil) to logistical issues such as late deliveries, pipeline disruptions, and bad weather.

The increasing fiscal burden of the country's domestic energy pricing policies is adding pressure on the public budget. Until recently, Morocco, like many countries in the MENA region, followed a domestic energy pricing policy that universally subsidized end-users. Prices were historically fully indexed to market rates until 2000 when energy markets experienced significant increases and volatility. Since then, the Government of the Kingdom of Morocco (GoM) adopted an administrative pricing policy that fixed the domestic costs of energy and covered the difference between this price and cost-recovery rates from the national budget.

However, the GoM adopted administrative prices, particularly for electricity, that were close to levels in the European Union, and, as a result, Morocco had one of the lowest subsidy rates in the MENA region (see Figure 5). Nonetheless, the fiscal impact of this subsidy policy continued to exert pressure on the national budget and, in 2014, the GoM instituted reforms that aimed to reduce this pressure through indexation of fuel prices. These reforms were in line with a multi-year program the GoM agreed to with the International Monetary Fund (IMF) to improve the country's long-term macroeconomic performance. In December 19, 2013, the World Bank approved a US \$300 million Development Policy Loan (DPL) on inclusive green growth to support a package of reforms to enhance Morocco's institutional, regulatory and fiscal framework to support a shift towards green growth.

To increase energy security and as described above, Morocco has adopted ambitious renewable energy targets and established a strong regulatory and institutional framework. Morocco made the strategic decision to use CSP with thermal storage as the primary tool for implementing the MSP. Given the technical limits on the amount of intermittent capacity that can be reliably absorbed by an electric grid, this technological choice, which does not exhibit the same intermittency characterizing the logical alternative solar technology (i.e., PV), would likely facilitate integration of the 2,000 MW of intermittent wind power. Morocco has an abundance of sites with ideal conditions for developing solar generation projects. As a result, the country has a long-term interest in lowering the capital costs of CSP to take advantage of this domestic resource in meeting its internal electricity needs and developing the increasing potential for green energy exports from Morocco and the MENA region into Europe.

Bulk of domestic electricity demand is satisfied by generation based on imported fossil fuel and imported electricity. Morocco's power sector is dominated by l'Office National de l'Electricité et de l'Eau Potable (ONEE). ONEE was originally established in 1963 as a legally and financially autonomous public entity, responsible for electricity service in the country. With the exception of renewable energy produced under the framework of Law 13/09 by Morocco's solar agency MASEN, ONEE acts as the single buyer in the sector, owns and manages the entirety of the

transmission system, generates 39 percent of the power in the country, and distributes almost 60 percent of the electricity to 4.5 million customers.

The country's 6,910 MWs of generation capacity consists predominantly of thermal generation. The electricity not supplied by ONEE comes from Independent Power Producers (44 percent) and imports from Spain (15-18 percent). In some important cities (i.e., Rabat, Casablanca, Tanger, and Tetouan) as well as in some geographically limited public utility distribution areas, private municipal concessions were established to manage retail electricity supply to customers within the concession areas. The Moroccan Solar Energy Agency (MASEN) was established by Law 57/09 to develop and manage the 2,000 MW of solar power facilities envisioned under the National Plan Against Climate Change and the MSP. The GoM committed to financially support MASEN during implementation of the MSP in a General Convention signed at MASEN's inception.

Electricity demand in 2012 grew by approximately 8 percent and forecasts point to doubling of demand by 2020 and tripling by 2030. Although ONEE and the relevant stakeholders in the GoM are acutely aware of the need to curb this growth and are considering demand-side management and energy efficiency initiatives, there is still a need for a rapid build-up of the country's generation capacity. Morocco's 2012-2016 generation expansion plan calls for installation of 2,000 MW of gas-fired generation and 2,000 MW of coal-fired generation, in addition to the 2,000 MW of solar and wind generation each called for by the MSP.

## II. Proposed Development Objectives

The project development objectives (PDO) of the proposed Ouarzazate Phase II project are (i) to scale-up generation of solar-based electricity in Morocco through an increase of the Ouarzazate "Solar Complex" capacity; and (ii) to mitigate greenhouse gas emissions and local environmental pollutants.

## III. Project Description

### Component Name

Component 1: Construction of Noor II and III

### Comments (optional)

### Component Name

Component 2: Cost Mitigation Mechanism

### Comments (optional)

## IV. Financing (in USD Million)

|   |         |                       |               |
|---|---------|-----------------------|---------------|
| Total Project Cost:                                   | 2677.00 | Total Bank Financing: | 400.00        |
| Financing Gap:  | 0.00    |                       |               |
| <b>For Loans/Credits/Others</b>                       |         |                       | <b>Amount</b> |
| Borrower  |         |                       | 357.00        |
| International Bank for Reconstruction and Development |         |                       | 400.00        |
| African Development Bank                              |         |                       | 135.00        |

|  |         |
|--|---------|
| Clean Technology Fund                        | 238.00  |
| EC European Commission                       | 122.00  |
| EC European Investment Bank                  | 473.00  |
| FRANCE French Agency for Development         | 68.00   |
| GERMANY KREDITANSTALT FUR WIEDERAUFBAU (KFW) | 884.00  |
| Total  | 2677.00 |

## V. Implementation

The Project will be implemented by a dedicated Special Purpose Vehicle (SPV) that is to be established following the procurement of the Noor II and III CSP plant.

## VI. Safeguard Policies (including public consultation)

| Safeguard Policies Triggered by the Project    | Yes | No |
|--|-----|----|
| Environmental Assessment OP/BP 4.01            | x   |    |
| Natural Habitats OP/BP 4.04                    |     | x  |
| Forests OP/BP 4.36                             |     | x  |
| Pest Management OP 4.09                        |     | x  |
| Physical Cultural Resources OP/BP 4.11         |     | x  |
| Indigenous Peoples OP/BP 4.10                  |     | x  |
| Involuntary Resettlement OP/BP 4.12            | x   |    |
| Safety of Dams OP/BP 4.37                      | x   |    |
| Projects on International Waterways OP/BP 7.50 |     | x  |
| Projects in Disputed Areas OP/BP 7.60          |     | x  |

### Comments (optional)

## VII. Contact point

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