

PROJECT INFORMATION DOCUMENT (PID) CONCEPT STAGE

Report No.: PIDC1118

Project Name	MA-Clean and Efficient Energy Project (P143689)
Region	MIDDLE EAST AND NORTH AFRICA
Country	Morocco
Sector(s)	Other Renewable Energy (50%), Transmission and Distribution of Electricity (50%)
Theme(s)	Climate change (90%), Infrastructure services for private sector development (10%)
Lending Instrument	Specific Investment Loan
Project ID	P143689
Borrower(s)	Office National de l'Electricite et de l'Eau Potable (ONEE)
Implementing Agency	Office National de l'Electricite et de l'Eau Potable (ONEE)
Environmental Category	B-Partial Assessment
Date PID Prepared/ Updated	11-Sep-2013
Date PID Approved/ Disclosed	12-Nov-2013
Estimated Date of Appraisal Completion	13-Jun-2014
Estimated Date of Board Approval	28-Aug-2014
Concept Review Decision	Track II - The review did authorize the preparation to continue

I. Introduction and Context

Country Context

1. Morocco's economy has been growing steadily for over a decade due to sound macroeconomic management and sustained development in non-agricultural sectors. The country's economy proved relatively resilient vis-à-vis the recent global economic slowdown. However, sluggish external demand, high prices of imported commodities, and lower agricultural output, combined with significant domestic economic rigidities have exposed the fragility of the Moroccan economy. In 2012, the GDP grew at a modest 2.7% compared to 5% of the previous year. To reduce its vulnerabilities, Morocco signed a US\$6.2 billion precautionary and liquidity line (PLL) with the International Monetary Fund to help protect the country against swings in oil prices and potential fallout from the downturn in Europe.

2. Morocco has embarked on a path of political and economic reforms to respond to increasing

social demands. The reforms focus on strengthening governance and justice, consolidating public finance, reducing energy subsidies and deepening decentralization to improve the economy's competitiveness and create jobs.

Sectoral and Institutional Context

3. The national utility Office National de l'Eau et de l'Electricité (ONEE) is the key stakeholder in the power sector. Despite progressive liberalization of the sector, ONEE remains the single buyer of power. It also owns and operates the transmission system, generates around 40 percent of the electricity, and distributes almost 60% of the electricity generated. Several independent power producers (IPPs) generate more than 40% of the electricity and hold power-purchase agreements (PPAs) with ONEE. A number of private distribution concessions are in place in important cities such as Rabat, Casablanca, Tangier and Tetouan.

4. The Government is reviewing the electricity tariff structure to better reflect the real cost of power generation. The current increasing block-tariff structure is considered cumbersome and inadequate to compensate for ONEE's generation costs. The regulated electricity retail tariffs are high compared to most of the countries in the region, but they remain low compared to European countries. The Ministry of General Affairs and Governance is conducting a comprehensive study, which is expected to start a tariff reform process in the country.

5. The Renewable Energy Law No 13-09 of February 2010 introduced competition in power generation by allowing the private sector to sell their generated electricity directly to consumers through the Medium Voltage and High Voltage grid. This legal provision, however, has not had any major effects yet because some of its implementation Decrees have not been approved.

6. Electricity demand in Morocco has been increasing rapidly at around 6% per, and it is expected to continue growing at a similar rate. Peak demand has followed a similar trend and experienced an 8% increase in 2012, thus outpacing economic growth. Morocco is largely dependent on imported fossil fuels (95 percent) to satisfy its energy demand, in particular petroleum products which represent 62 percent of the country's energy needs. Morocco uses expensive heavy-fuel oil for power generation to supply its two peaks that are being observed around 7-9 am and between 8-10 pm.

7. To reduce fossil-fuel dependency and enhance energy security, the government has adopted a national target to increase the share of renewables (hydro, wind and solar) in the energy mix to 42% and to reduce energy consumption by 12 to 15 % by 2020. The development of the renewable energy and energy efficiency potential has become a national priority, which aims to position the country on a green growth path. The Moroccan wind and solar plans (2,000 MW of new installed capacity each) have been launched to develop the country's vast unexploited wind and solar resources. To achieve these objectives, the government strengthened the regulatory framework by adopting key pieces of legislation, e.g. Renewable Energy law 13-09, and creating specialized institutions, e.g. Moroccan Agency for Solar Energy (MASEN). So far, private and public sectors have committed investments of around US\$ 2 billion to develop the Moroccan wind and solar plans, which have an estimated total cost of US\$ 12.5 billion. The current share of installed renewable energy is 25% due to the large installed hydroelectric capacity, but planned investments in solar and wind energy are expected to be the main driver to reach the 42% target by 2020.

8. Technical losses are increasing due to growing strain in the national transmission network.

ONEE's electricity losses in transmission are estimated at 5%, while losses in ONEE's distribution activity are around 15%. These figures are slightly higher than other countries in the region such as Egypt and Jordan due in part to the country's successful rural electrification program. Also, transmission lines are increasingly loaded due to increasing electricity demand, in some cases beyond levels that would be considered efficient from a reliability and system security perspective. As a result, energy losses are increasing while interruptions and voltage drops are increasingly frequent. The increase of technical losses and use of expensive heavy-fuel oil for power generation aggravates the delicate financial situation of the national electricity utility, ONEE, which has seriously deteriorated over the last two years.

Key issues to be addressed by the proposed project:

- Rapid demand growth strains the operation of existing generation and transmission assets. While investments in generation capacity and transmission networks have increased during the last five years, congestion problems remain. The grid is not well meshed and generation facilities are concentrated in the north-western and north-eastern regions (Tangier-Jorf and Jerada-Ain Beni Mathar). System peak and electricity demand growth in Morocco's eastern and southern regions without the corresponding expansion of generation and transmission assets introduces power exchanges closer to stability limits due to a reduction of the system's operational margins. The electricity system would significantly benefit from a policy encouraging reductions in electricity consumption during times of peak electricity demand. This project aims at alleviating concentration of peak coincidence electric loads, in particular those for cooling, by implementing discriminate tariffs for some customer categories.
- Underutilized potential for mid-size solar energy projects. Morocco's technologically and economically viable solar energy potential is yet to be harvested at distribution level. This is of interest as these projects are able to partially match load profiles in particular regions. The quality of power supplied to some of the locations with the highest solar energy potential is poor and the situation is expected to get worse if additional costly grid investments are not planned. This typically results in frequent power outages in the area, damages to consumer devices and electronic equipment malfunctioning. This project will help ONEE develop mid-size solar photovoltaic (PV) installations in the south-eastern region of the country.
- Potential grid instability from integrating wind and solar power at a large-scale without corresponding investments. If the 4,000 MW of wind and solar power capacity develops as planned by 2020, this large amount of intermittent generation introduced into the system could cause severe voltage stability problems on the grid by offsetting the demand-supply equilibrium at the required operational timescale (seconds to hours). There are various concerns regarding the integration of renewable energy in Morocco: transient stability of wind power after voltage dips originated by a correctly cleared fault, power balance viability with high renewable production in the system, and voltage control. To compensate, these variations in wind generation may require additional reserves, however, investments in strategies and decisions support systems are needed to make renewable energy more grid-compatible. This project aims to help ONEE, as operator of the power system, to optimize the dispatch given the high level of renewable energies that are to be exploited in the coming years.

9. In summary, despite significant investments in generation and transmission capacities, the

Moroccan power system is seriously challenged by rapidly increasing demand, shortage in peak power supply and the need of integrating increasing levels of renewable energy. To respond to these challenges, the system needs further reinforcement to enable it to absorb large amounts of renewable generation while meeting the increasing demand.

Relationship to CAS

10. The proposed project is in line with Program Area 3.2 “Low carbon energy policy and energy sector restructuring” of the Morocco Country Partnership Strategy (CPS) 2010-2013. The project will support the government’s goal of enhancing energy security by tapping into unexploited solar energy resources to diversify the country’s energy mix. Under CPS’s Pillar 3 “Sustainable development in a changing climate”, the project will reduce Morocco’s vulnerability to energy supply disruption while increasing penetration of renewables to transition the energy system to a low carbon path.

II. Proposed Development Objective(s)

Proposed Development Objective(s) (From PCN)

12. The PDO is to support the Borrower to increase supply of clean energy and to meet demand more efficiently among targeted customers.

Key Results (From PCN)

13. The results indicators of the new investments include:

PDO level results indicators:

- Generation Capacity of Renewable Energy constructed – solar (MW) (core indicator)
- Incremental energy generation (MWh)
- Electricity losses per year in the project area (%) (core indicator)
- Projected energy capacity savings (MW) (core indicator)
- Avoided CO2 emissions (tons/year)
- Number of project beneficiaries (core indicator)
- Average interruption frequency per year in the project area (number) (core indicator)

Intermediate results indicators:

- Completed awareness campaign on bi-hourly smart meters (Yes/No)
- Number of consumers subscribing to bi-hourly tariff (number)
- Co-financing by source (US\$ million)

III. Preliminary Description

Concept Description

14. The project is expected to reduce network losses and peak load demand by introducing three complementary demand-oriented activities: a demand-side management program, a renewables dispatch desk and a mid-sized solar PV program. These activities and a technical assistance form the components of the project, which are detailed herewith:

- Component 1 – Demand-Side Management (DSM) program: Given the high proportion of low-voltage in total consumption during peak hours (63%), Morocco introduced an optional time-

of-use tariff system for residential, industrial and agricultural clients with monthly consumption above 500 kWh/month. The proposed project intends to support the installation of bi-hourly meters to all ONEE clients consuming more than 500 kWh/month (49,000 residential and 11,000 industry/agricultural clients) to contribute to shave the national peak load and, hence, to reduce expensive fuel-oil use for power generation during peak hours. The bi-hourly meters will not only have bi-hourly reading functions, but also smart meter features such as remote disconnection and fraud detection.

- **Component 2 - Renewables dispatch desk:** This component includes the supply and installation of software and hardware to ensure optimal power dispatch and system protection in view of the planned integration of intermittent large-scale renewable energy sources by 2020. Dispatch optimization will be carried out according to supply/demand forecasts and hence, reduce investment needs in generation and transmission. The renewables dispatch desk will be installed in the National Dispatch Center located near Casablanca. This component will represent a significant step in the modernization process of the National Dispatch Center.
- **Component 3 – Mid-size solar PV program:** This component includes the construction and the operation and maintenance (O&M) of several mid-size solar photovoltaic (PV) plants in the range of 10-25 MW in Morocco's south eastern region. This program aims to show the viability of medium-scale distributed projects with optimal solar resources and closer to regional demand centers, which are far from other generation assets. The coincidence of local demand with solar resource availability on a daily basis is expected to reduce the stress on the high-voltage network and losses. The Clean Technology Fund (CTF) contribution to this program will ensure the economic and financial viability of the first mid-size solar PV projects in Morocco and have a transformational effect in a new market segment for renewable energies in the country. The CTF Morocco investment plan will be updated accordingly.
- **Component 4 – Technical Assistance and Capacity Building:** The technical assistance will include support for (i) developing an awareness campaign to roll-out of bi-hourly meters within the demand-side management program (Component 1) (ii) drafting bidding documents for mid-size solar PV plants (Component 3) and (iii) training ONEE staff on IPP/PPP contracting structure to be adopted in future phases of the solar PV program.

IV. Safeguard Policies that might apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
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	

V. Financing (in USD Million)

Total Project Cost:	155.00	Total Bank Financing:	125.00
Financing Gap:	0.00		
Financing Source			Amount
Borrower			5.00
International Bank for Reconstruction and Development			125.00
Clean Technology Fund			25.00
Total			155.00

VI. Contact point**World Bank**

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