

**INTEGRATED SAFEGUARDS DATA SHEET
APPRAISAL STAGE**

Report No.: ISDSA9064

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I. BASIC INFORMATION

1. Basic Project Data

Country:	Morocco	Project ID:	P131256
Project Name:	MA- Noor Ouarzazate Concentrated Solar Power Project (P131256)		
Task Team Leader:	Fanny Kathinka Missfeldt-		
Estimated Appraisal Date:	25-Jun-2014	Estimated Board Date:	30-Sep-2014
Managing Unit:	MNSEE	Lending Instrument:	Specific Investment Loan
Sector(s):	Other Renewable Energy (95%), Public administration- Energy and mining (5%)		
Theme(s):	Climate change (40%), Infrastructure services for private sector development (25%), Regional integration (10%), Technology diffusion (25%)		
Is this project processed under OP 8.50 (Emergency Recovery) or OP 8.00 (Rapid Response to Crises and Emergencies)?			No
Financing (In USD Million)			
Total Project Cost:	2677.00	Total Bank Financing:	400.00
Financing Gap:	0.00		
Financing Source			Amount
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
Environmental Category:	A - Full Assessment		

Is this a Repeater project?	No
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2. Project Development Objective(s)

The project development objective (PDO) is to increase (a) installed capacity (MW) and (b) electricity output (MWh), especially during peak hours, of the Noor-Ouarzazate Solar Complex.

3. Project Description

The proposed Project is designed to support the development of the second phase of the Noor Solar Complex (500 MW). The first phase, the Noor I Project, consists of 160 MW and is currently under construction. The second phase will consist of two distinct plants: (a) a 150-200 MW parabolic trough CSP plant (Noor II); and (b) a 100-150 MW tower CSP plant (Noor III). Both plants would be constructed on lots adjacent to Noor I that have already been acquired by the Moroccan Agency for Solar Energy (MASEN). No new land acquisition will be required for Noor II and III's sites.

The Project is expected to consist of the following components: (a) the construction of the Noor II and III CSP plant by a Public-Private Partnerships (PPP) between MASEN and a competitively selected private partner(s); and (b) help reduce the fiscal impact of this subsidy by lowering the Government of Morocco's cost of capital through a financing mechanism to improve the long-term sustainability of the Project.

Noor II and III have the same associated facilities as Noor I (the water pipeline linking the Mansour Eddahbi dam reservoir with the Noor Solar Complex, the 225 kV Ouarzazate Errachidia transmission line, and infrastructures ancillary to the project site itself) except for the 225 kV Ouarzazate - Tazarte transmission line. The project will entail limited additional land acquisition in the context of associated facilities to the Noor Solar Complex that remain to be built, namely the Ouarzazate - Tazarte transmission line and the water pipeline from the Mansour Eddahbi Dam to the site of the Noor Solar Complex. The safeguards documentation for the water pipeline has been disclosed at the World Bank's infoshop and in-country on 19th of March 2014, and the Environmental and Social Impact Assessment (ESIA) and the Resettlement Policy Framework (RPF) for the Ouarzazate – Tazarte transmission line has been disclosed on X June 2014 to infoshop and on X June 2014 in-country.

The Framework Environmental and Social Impact Assessment (FESIA) prepared under the Ouarzazate Phase I (now the "Noor I") Project has been revised and updated to cover the environmental and social safeguards issues for the Noor II and Noor III Projects. The FESIA has also been disclosed in-country and at the infoshop on June 26, 2014.

4. Project location and salient physical characteristics relevant to the safeguard analysis (if known)

The Project is to be located in the Ghessat council and at the «Tamzaghten Izerki» village, about 10 km north east of Ouarzazate city, a town of approximately 50,000 inhabitants situated in south-central Morocco, at about 160 km south-east of Marrakesh. The site is well suited for solar projects, especially for the development of CSP, for the following reasons:

The site disposes of excellent solar resources. On-site measurement stations have allowed data collection since 2010, including solar insolation, indicating that the site's direct normal irradiation

(DNI) is significantly higher than typical site qualification limits and used in the preliminary modeling. This conclusion is based on: (a) comparisons of the Noor Solar Complex site data with insolation data from the Andasol site in Granada, Spain and the Solar Energy Generating Systems (SEGS) site in the Mojave Desert, California, United States; and (b) an analysis of 30 years of satellite data. These analyses indicate that 2010 was an atypical year.

The site disposes of sufficient water resources. Although the area around Ouarzazate is a desert environment, a reservoir of the Mansour Eddahbi dam, with a capacity of 480 Mm³ is located approximately at 14 km from the CSP Noor Solar Complex site. Water use for Noor II and III is limited by the fact that the projects are required to use dry-cooling only. The Noor Complex's impact on the overall water resources in the region is minimal. Its water consumption has been estimated at approximately 0.8 percent of the regular annual volume of the Mansour Eddahbi dam and 0.5 percent of the overall water resources available in the region once the construction of the Tiouine dam further north is completed. It should be noted that the Tiouine dam is not directly linked with the Noor Solar Complex site, and only the Mansour Eddahbi dam can provide water directly to the site.

The site is easily accessible. The site is accessible via paved road originating from the National Highway 10 ("Route Nationale No.10") or RN10 that runs from the port city of Agadir, at approximately 350 km to the site, through to the city of Ouarzazate. The Agadir port is located at a relatively short distance and for the Noor I project is being used to import and transport heavy equipment from abroad to avoid the Atlas Mountains. The use of the Casablanca port requires crossing the Atlas Mountains.

The site is close to the power grid. The existing grid and planned reinforcements by the Office National de l'Electricité et de l'Eau Potable (ONEE) will allow evacuation of the full capacity of the power plants at peak output conditions. Furthermore, Noor II and III power plants will be fitted with thermal energy storage capabilities allowing the optimization of peak outputs to meet the network carrying capacity within reasonable limits.

5. Environmental and Social Safeguards Specialists

Emmanuel Ngollo (AFTSG)

Andrea Liverani (MNSSU)

Taoufiq Bennouna (MNSEE)

6. Safeguard Policies	Triggered?	Explanation (Optional)
Environmental Assessment OP/ BP 4.01	Yes	The project has potential adverse environmental risks in its area of influence mainly due to water consumption and risk of toxic fluid leaks. Unlike conventional power plants, these CSP plants do not generate any air pollution. The updated FESIA (Framework Environmental and Social Impact Assessment) covers the environmental and social safeguards issues for the Noor II and Noor III Projects. As this project is a scale-up activity to the solar thermal plant under construction, cumulative environmental impacts especially on the

		ecosystems and soil/groundwater will be assessed in the respective ESIA's for each power plant.
Natural Habitats OP/BP 4.04	No	The Project is located on the existing site dedicated for the construction of the Noor Solar Complex where under the first phase (Ouarzazate Phase 1, Noor 1) no natural habitat was affected and the OP 4.04 was not triggered.
Forests OP/BP 4.36	No	There are no forests located near or on the site as the terrain is marked by a desert environment.
Pest Management OP 4.09	No	Since there is no agricultural area involved nor any patch of weed requiring the use of chemicals, this policy will not be triggered.
Physical Cultural Resources OP/BP 4.11	No	There are no physical cultural resources on the area of influence of the Noor Solar Complex.
Indigenous Peoples OP/BP 4.10	No	There are no indigenous people on the area of influence of the Noor Solar Complex.
Involuntary Resettlement OP/BP 4.12	Yes	<p>OP 4.12 was triggered for Noor I and will continue to be triggered for the present project. The large part of the land acquisition needed for the project (mainly for the actual Solar Complex) was carried out during phase I (2,500) hectares. The land acquired for the site consisted entirely of communal land and is of uninhabited, arid, non-agricultural nature with limited revenue potential. Although the sale was based on a willing-buyer/willing-seller agreement, the Bank required a Land Acquisition Plan (LAP) to be prepared and disclosed. Since the first acquisition an additional 15 hectares have been acquired for Noor I due to soil erosion risks. These have been purchased following a willing-buyer/willing-seller agreement.</p> <p>The only Associated Facility for which a detailed routing remains to be fully defined is the 225 kV Ouarzazate-Tarzate transmission line. Most of it is expected to be undertaken on a voluntary, willing-buyer, willing-seller basis. Under the project the approach to land-take is governed by assessing whether a voluntary versus an involuntary land-take has taken place. This is determined based on prior review of documentary evidence of the land acquisition process followed to ensure full compliance with OP 4.12. Such documentary evidence will take the form of RAP, or Land Acquisition Plan if no resettlement is involved. Subsequent disclosure of such evidence</p>

		will be based on relevant Bank policies
Safety of Dams OP/BP 4.37	Yes	The needs of raw water for the Noor I cooling system and ancillary use for the site will be satisfied and dependent upon the pumping of water from the existing Mansour Eddahbi dam reservoir. The cooling for the Noor II & III projects will be dry cooling and therefore does not require as much water from the dam reservoir as Noor I. The project's performance will be dependent upon the performance of the existing dam. Failure or misuse of this dam may have adverse results on the projects' operation. The monitoring and maintenance procedures as well as past assessments of the Mansour Eddahbi dam (requirements that comply with the Moroccan policy and law on safety of dams, as regulated by the Water Act 10-95) satisfy the requirements of OP 4.37. On this, the mechanism to address the triggered policy is well elaborated in the ESMP of the water pipeline that was disclosed at the Bank's Infoshop on March 19, 2014.
Projects on International Waterways OP/BP 7.50	No	There are no international waterways nearby or associated with the Noor Solar Complex.
Projects in Disputed Areas OP/BP 7.60	No	The site is not located in a disputed area.

II. Key Safeguard Policy Issues and Their Management

A. Summary of Key Safeguard Issues

1. Describe any safeguard issues and impacts associated with the proposed project. Identify and describe any potential large scale, significant and/or irreversible impacts:

Noor II and III CSP and its associated facilities' environmental considerations include land disturbance/land use impacts; impacts to soil, water and air resources; impacts to wildlife and sensitive species; visual, cultural, paleontological, socioeconomic, and environmental justice impacts (meaning a fair distribution of environmental benefits and burden of impacts) and potential impacts from hazardous materials.

Land Disturbance/Land Use Impacts: the Project and its associated facilities may entail limited interference with existing land uses (agriculture and grazing activities) or impact the use of nearby specially designated areas (wilderness areas with oueds, areas of critical environmental concern, or special recreational camping areas).

Impacts to Soil, Water, and Air Resources: Construction of Noor II and III facilities on such large areas of land will require grading, and results in soil compaction, potential alteration of drainage channels, and increased runoff and erosion. Engineering methods can be used to mitigate these impacts.

Parabolic trough and central tower systems typically use conventional steam plants to generate electricity, which commonly consume water for cooling. In arid settings such as the Ouarzazate desert environment, any increase in water demand can strain available water resources. Therefore, MASEN decided to use of dry cooling for Noor II and III despite the relatively higher cost of this technology. The required raw water from the dam's water reservoir will be pumped, conveyed and stored in two water tanks (capacity 15,000 m³ each) at a site adjacent to the Noor Complex. The quantities of water needed to feed the cooling system (dry) of both power plants of the CSP solar complex, estimated at 230,000 m³/yr for Noor II and 125,000 m³/yr for Noor III, could cause conflicts in water requirements for irrigation, potable and industrial needs.

The construction and operation of Noor II and III facilities could generate particulate matters, which can be a significant pollutant particularly for the nearby classified/sensitive areas such as the Biosphere reserve of the South Moroccan Oasis during windy conditions.

Ecological Impacts: The use of large areas of land for the Noor solar power facilities will adversely affect native vegetation and wildlife in many ways, including loss of habitat; interference with rainfall and drainage; or direct contact causing injury or death (flying birds). These potential impacts on the avifauna will be evaluated and documented in the EIAs for each technology, and mitigation measures proposed. However, the following mitigation/management actions can be taken and will be confirmed in the detailed SESIA that is to be prepared by the winning bidder for the project:

- (i) preconstruction monitoring to determine the presence of "threatened, rare, endemic" bird species.
- (ii) Monitoring should take into account seasonal variation, fly paths and birds' behavior;
- (iii) During construction the position and height of the receiver tower should be taken into account at CSP plants developed with a central receiver tower;
- (iv) Ensure that birds do not get in contact with evaporation ponds i.e. ponds should be covered with wire mesh or netting to reduce the possibilities of a) attracting; b) drowning and c) poisoning;
- (v) Motivate the need for new power lines to be marked with anti-collision marking devices & constructed with bird friendly designs to prevent electrocution.

Other impacts: The CSP in Noor II and III will employ oils or molten salts, hydraulic fluids, coolants, and lubricants that may be hazardous and present spill risks. Proper planning and good maintenance practices will be used to minimize impacts from these hazardous materials.

CSP solar tower systems have elsewhere been associated with interference with aircraft operations (if reflected light beams of the solar tower are misdirected into aircraft pathways). However, in the case of the Noor Solar Complex, the plant site is located outside of any flight path and thus aircraft operations are not expected to be impacted.

Like all electrical generating facilities, Noor II and III solar facilities will produce electric and magnetic fields. Construction and decommissioning of Noor II and III facilities will involve a variety of possible impacts normally encountered in construction/decommissioning of large-scale industrial facilities. Since new electric transmission lines and related facilities (expansion of the existing stations in Ouarzazata and Tarzate and construction of the new CS evacuation station) are needed to service the newly developed solar plant, construction, operation, and decommissioning of the transmission facilities will also cause a variety of environmental impacts.

2. Describe any potential indirect and/or long term impacts due to anticipated future activities

in the project area:
<p>Potential indirect impacts occur during construction, operation, and dismantling of CSP plants.</p> <p>Noor II and III will generate no direct air pollution or greenhouse gas emissions during operation. Some power is, however, required in the morning for warming up the heat transmission fluid (HTF) in order to reduce plant start-up times and provide fluid freeze protection, which will generate limited indirect greenhouse gas emissions. Estimates for lifecycle CSP greenhouse gas emissions range from 0.08 to 0.2 pounds of carbon dioxide equivalent per kilowatt-hour, which is far less than the lifecycle emission rates for natural gas (0.6-2 lbs of CO₂E/kWh) and coal (1.4-3.6 lbs of CO₂E/kWh).</p> <p>The primary indirect environmental, health, and safety issues relate to how the core materials (parabolic troughs and mirrors, tower receiver and heliostat reflectors) are manufactured, installed, and ultimately, dismantled and disposed of. Construction of water pipeline (for cooling system and ancillary use), could also cause some habitat loss and fragmentation, while limited long-term alteration would result during the operational lifetime of the Noor Solar Complex as water is obtained from off-site location.</p> <p>The Project incorporates worker safety and security measures to mitigate the use and manage the impacts of hazardous materials (molten salts, heat-transmission fluid, fossil fuel, etc.), fire hazards and other soil pollution on the environment and human health. To ensure that plant facilities comply with the minimum standards to provide worker security and protect the environment, HSSE personnel will permanently monitor the complex's facilities and report all incidents that may occur during construction and operation of Noor II and III power plants.</p>
3. Describe any project alternatives (if relevant) considered to help avoid or minimize adverse impacts.
<p>Alternatives to the CSP plants are conventional fuel power plants, as CSP provides the same quality of power as these plants (especially base load). The alternatives for the Noor Solar Complex have been determined through least cost expansion modeling of the energy sector by ONEE using the WASP model. This modeling shows that the main alternative to the Noor I project is a heavy fuel-fired plant. The main alternative to the Noor II and Noor III power plants are LNG-fired power plants (and heavy fuel-fired power plants during the first years of Noor II and Noor III operation). These plants would have more significant environmental impacts than the proposed CSP technology.</p>
4. Describe measures taken by the borrower to address safeguard policy issues. Provide an assessment of borrower capacity to plan and implement the measures described.
<p>MASEN has the necessary structures in place to manage and implement safeguard policies (with 4 specialists in the Sustainable Development Department) pertaining to the construction and operation of the current phase (Noor I) of the Noor project. Additional technical support is being provided by highly qualified international consulting firms. With the expansion of the Noor Solar Complex to include the Noor II and III plants, the capacity for effective safeguards management and implementation and worker health and safety will need to continue to be strengthened.</p>
5. Identify the key stakeholders and describe the mechanisms for consultation and disclosure on safeguard policies, with an emphasis on potentially affected people.
<p>The updated Framework Environmental and Social Impact Assessment (FESIA) has been disclosed in-country (and through the World Bank InfoShop) in French on June 25, 2014. Additional consultations were held on 9 June 2014 prior to its finalization. All comments provided</p>

during these consultations will be recorded, and included in the final FESIA where appropriate. Communication and dissemination campaigns form an integral part of activities promoted under this project. Once finalized, the main elements of the FESIA will be disclosed in a form appropriate and understandable to public and in MASEN and all provincial public place facilities.

MASEN will be provided with technical support and capacity building activities to: (i) prepare MASEN's action plan for preparing Environmental Safeguards Documents and reports; (ii) establish a monitoring and evaluation system that ensures that project activities are carried out in a sustainable manner from an environmental and social standpoint; (iii) develop adequate management plans to build a long-term CSP operational frameworks for the Noor complex; (iv) improve the Noor project's environment and social management system from a cost-effective and multi-partnered approach; and (v) implement measures to enhance positive environmental and social impacts of the Noor Project such as the use of alternative opportunities to reduce environmental and social impacts and provide mitigation measures for the CSP construction and operation.

B. Disclosure Requirements

Environmental Assessment/Audit/Management Plan/Other	
Date of receipt by the Bank	19-Jun-2014
Date of submission to InfoShop	26-Jun-2014
For category A projects, date of distributing the Executive Summary of the EA to the Executive Directors	26-Jun-2014
"In country" Disclosure	
Morocco	26-Jun-2014
<i>Comments:</i>	
Resettlement Action Plan/Framework/Policy Process	
Date of receipt by the Bank	19-Jun-2014
Date of submission to InfoShop	26-Jun-2014
"In country" Disclosure	
Morocco	26-Jun-2014
<i>Comments:</i>	
If the project triggers the Pest Management and/or Physical Cultural Resources policies, the respective issues are to be addressed and disclosed as part of the Environmental Assessment/Audit/or EMP.	
If in-country disclosure of any of the above documents is not expected, please explain why:	

C. Compliance Monitoring Indicators at the Corporate Level

OP/BP/GP 4.01 - Environment Assessment			
Does the project require a stand-alone EA (including EMP) report?	Yes [<input checked="" type="checkbox"/>]	No [<input type="checkbox"/>]	NA [<input type="checkbox"/>]
If yes, then did the Regional Environment Unit or Sector Manager (SM) review and approve the EA report?	Yes [<input checked="" type="checkbox"/>]	No [<input type="checkbox"/>]	NA [<input type="checkbox"/>]
Are the cost and the accountabilities for the EMP incorporated in the credit/loan?	Yes [<input checked="" type="checkbox"/>]	No [<input type="checkbox"/>]	NA [<input type="checkbox"/>]

OP/BP 4.12 - Involuntary Resettlement		
Has a resettlement plan/abbreviated plan/policy framework/process framework (as appropriate) been prepared?	Yes []	No [] NA [×]
If yes, then did the Regional unit responsible for safeguards or Sector Manager review the plan?	Yes [×]	No [] NA []
OP/BP 4.37 - Safety of Dams		
Have dam safety plans been prepared?	Yes [×]	No [] NA []
Have the TORs as well as composition for the independent Panel of Experts (POE) been reviewed and approved by the Bank?	Yes []	No [] NA [×]
Has an Emergency Preparedness Plan (EPP) been prepared and arrangements been made for public awareness and training?	Yes []	No [] NA [×]
The World Bank Policy on Disclosure of Information		
Have relevant safeguard policies documents been sent to the World Bank's Infoshop?	Yes [×]	No [] NA []
Have relevant documents been disclosed in-country in a public place in a form and language that are understandable and accessible to project-affected groups and local NGOs?	Yes [×]	No [] NA []
All Safeguard Policies		
Have satisfactory calendar, budget and clear institutional responsibilities been prepared for the implementation of measures related to safeguard policies?	Yes [×]	No [] NA []
Have costs related to safeguard policy measures been included in the project cost?	Yes []	No [×] NA []
Does the Monitoring and Evaluation system of the project include the monitoring of safeguard impacts and measures related to safeguard policies?	Yes [×]	No [] NA []
Have satisfactory implementation arrangements been agreed with the borrower and the same been adequately reflected in the project legal documents?	Yes [×]	No [] NA []

III. APPROVALS

Task Team Leader:	Name: Fanny Kathinka Missfeldt-	
Approved By		
Regional Safeguards Advisor:	Name: Maged Mahmoud Hamed (RSA)	Date: 26-Jun-2014
Sector Manager:	Name: Charles Joseph Cormier (SM)	Date: 26-Jun-2014