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Joint AfDB-WB Submission Document

Morocco: Noor-Midelt Phase 1 Concentrated Solar Power Project

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Abbreviations and Acronyms

AfDB	African Development Bank
BOT	Build, Own, and Transfer
CCGT	Combined Cycle Gas-fired Turbine
CESMP	Construction Environmental and Social Management Plan
CSP	Concentrated Solar Power
CTF	Clean Technology Fund
CO_2	Carbon dioxide
DNI	Direct normal irradiance
EIB	European International Bank
ESIA	Environmental and Social Impact Assessment
FEED	Front-End Engineering and Design (FEED)
FESIA	Framework Environmental and Social Impact Assessment
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GoM	Government of Morocco
IBRD	International Bank for Reconstruction and Development
IFI	International financial institution
IP	Investment Plan
KfW	Kreditanstalt fur Wiederaufbau
LCOE	Levelized cost of energy
LLC	Limited liability company
LNG	Liquefied Natural Gas
MASEN	Moroccan Agency for Sustainable Energy
MENA	Middle East and North Africa
NDC	Nationally-Determined Contribution
NIF	Neighborhood Investment Facility
NO_x	Nitrous oxide
NPV	Net Present Value
ONEE	Office National de l'Électricité et de l'Eau Potable
PV	Photovoltaic
PDO	Project Development Objectives
PPA	Power Purchase Agreement
PPP	Public-private partnership
RES	Renewable Energy Sources
RfP	Request for Proposal
SO_2	Sulfur dioxide
SPC	Solar Power Company or Special Purpose Company
WB	World Bank

Weights and measures

GW	gigawatt
kWh	kilowatt-hour
m^2	square meter
m^3	cubic meter
MW	megawatt
TWh	terawatt-hour

Currencies

€	Euros
$	United States Dollars

A. Strategic Context

Global and Regional Context

1. Climate Change has come to be recognized as one of the most critical challenges ever to face human-kind. Since it is a global problem, it needs a global response that embraces the interests and needs of all countries. Among others, it is imperative to stabilize Greenhouse Gas (GHG) concentration in the atmosphere at a level that would prevent dangerous human interference with the climate system. The Intergovernmental Panel on Climate Change says the world faces an average temperature rise of around 3°C this century if greenhouse gas emissions continue to rise at their current pace and are allowed to double from their pre-industrial level.

2. To tackle this threat, there is a need to adopt global and local energy policies, and develop alternative, zero- carbon sources of energy. Renewable Energy Sources (RES), including, Concentrated Solar Power (CSP), have been proven to be appropriate in the Maghreb region.

3. Implementation of the Paris Agreement requires a massive scale-up of renewables and market data indicate that it is happening, with all forecasts being consistently exceeded in recent years, thanks to rapidly declining costs and strong support policies. Worldwide, renewable power-generating capacity has increased three fold between 2000 and 2015, reaching 1985 GW. In 2015, renewable power generation capacity additions amounted to 152 GW, exceeding for the third consecutive year the commissioning of conventional power generation capacity. It is in this perspective that on 19 September 2015, Morocco ratified the Paris Agreement, and submitted its Nationally Determined Contribution (NDC), with a target of reducing GHG emissions, including land use, land use change and forestry, by 17% below "business as usual" by 2030. With sufficient international support, Morocco is also committed to going much further, namely to reduce GHG emissions by 42% compared to "business as usual by 2030, with renewable energy, including solar energy, contributing to the ambitious NDC climate mitigation goals.

4. In 2015, investments in renewable power generation capacity were higher in emerging markets than in the developed world, indicating a shift in investment to the developing world. That shift to the developing world is particularly marked for the CSP technology, with most of the capacity additions in 2015 taking place in South Africa and Morocco, whereas the two largest markets (Spain and USA) stagnated. Support from developed countries in the form of bilateral/multilateral financing and concessional climate financing has been instrumental in this shift of investment in low carbon technologies to the developing world. Despite dramatic cost declines for solar photovoltaic (PV) and wind, the CSP market is expected to increase rapidly from 5GW in 2015 to 22 GW by 2025[1], as the CSP technology has advantages compared to other renewable technologies. In particular, it can provide reliable power even when the sun is not shining and contributes to making a power system more flexible, a feature essential to integrate a high level of renewable energy into the grid. This is especially true in the Middle East and North Africa (MENA), a region with abundant solar resources, a vast stock of unused land and proximity to international markets with ambitious emissions reduction targets such as Europe. The International Energy Agency (IEA)[2] estimated that up to 11 percent of the world's

[1] CSP Today, 2015
[2] IEA, Technology Roadmap Solar Thermal Electricity, 2014 Edition

power generation in 2050 could come from CSP, with capacity reaching 800-1000 GW—25% of which could be installed in the MENA region.

5. Although CSP has a promising future, as indicated by IEA and IRENA[3] forecasts, as the only RES technology which can increase the flexibility of a power system, the perception that it is an expensive technology, due to its high up-front capital cost, can hinder the rapid deployment of the technology. Therefore, CSP projects need government support and concessional financing, as indicated by research undertaken by the Climate Policy Initiative (CPI) for the Climate Investment Funds (CIF), until CSP capital costs[4] come down sufficiently to make the technology affordable to developing economies and markets have factored in the value of CSP compared to other renewable technologies. Moreover, there is growing evidence that CSP programs have direct and indirect positive effects on the economy, beyond enhancing energy security and mitigating climate change, such as creating jobs.

Country Context

6. Morocco's primary energy demand has been growing at 4.8 percent per year over the last 10 years, approximately the same rate of growth as Gross Domestic Production, GDP (and even faster at times). The energy intensity, although low in comparison to Organization for Economic Cooperation and Development (OECD) countries and many developing countries, has remained stable, as energy efficiency efforts have been offset by increasing access to electricity and increasing living standards. Morocco's energy mix is dominated by oil, which represented 55% of total primary energy supply in 2014. Coal accounts for 27%, followed by electricity net imports (8%), natural gas (6%), and RES (4%). Given that Morocco has no endogenous fossil fuel resources, it is extremely dependent on imports, which represent 95% of its primary energy demand in 2014—a rate that stopped declining since 2013, which will make reaching the 2025 objective of 85% difficult.

7. In 2009, Morocco made the strategic decision to maximize use of its domestic RES and adopted a National Energy Strategy, with a view to reducing the country's import dependency, lowering the energy intensity of the economy and mitigating climate change. The RES target, initially set at 42 percent of installed power generating capacity in 2020, was increased to 52 percent by 2030 in its nationally-determined contribution (NDC). Until now, the CSP technology has dominated the Moroccan solar power development. Such choice is justified by the fact that the CSP technology is the only RES that allows for storage (thermal storage) thus providing electricity during peak hours (which corresponds to night hours in Morocco) and answering to Moroccan needs in terms of electricity generation. The second phase of the RES deployment, aims to encourage the large scale development of PV, to take advantage of the impressive cost declines that have been observed around the world. PV is a promising technology in Morocco, because of the technology's increasing competitiveness, the country's good radiation, and the good match of the technology with the load structure in some sectors and geographical areas. While Morocco agreed to carry part of the burden for its NDC, significant external support is still needed to cover the new investments, consistent with COP21

[3] The International Renewable Energy Agency

[4] A report by IRENA indicates that the installed costs per kW of CSP plants have been trending downwards since 2011 and foresees overall capital cost reductions by 2025 of between 20% and 45% for parabolic trough plants and exceeding 38% for solar towers. By 2025, the technology could be competitive with fossil fuel generation on a LCOE basis.

Paris Agreement's "common but differentiated" responsibilities between developed and developing countries.

8. Morocco's geographical location close to Europe's market as well as the existing transmission lines through the MENA region and across the Mediterranean basin could facilitate the energy trade in the region, while boosting the development of local solar industries, raising capacities and contributing to the development of a qualified workforce.

Sectoral and Institutional Context

9. In 2015, Morocco's total installed power generation capacity was approximately 8,159 MW, of which RES accounted for 34 percent, followed by coal-fired generation (31 percent), gas-fired generation (26 percent), and diesel/gasoil (10 percent). Nonetheless, Morocco's power generation is still dominated by fossil fuels (representing 73 percent of the production), which makes Morocco a CO_2-intensive country, emitting 50% more CO_2 per kilowatt-hour (kWh) than the world average, despite low CO_2 emissions per capita and the fact that it has imported from Spain, during the last few years, a significant amount of its electricity supply. Persisting strong growth in electricity demand is a major challenge for the sector. Indeed, electricity demand has been growing rapidly at 6.5% p.a. on average since the beginning of the century and reached 34 terawatt-hour (TWh) in 2015. This strong growth is due to strong GDP growth, but the growth rate has largely exceeded GDP growth, as the rate of electrification has increased to 99% at the end of 2014-- compared to only 50% ten years ago (and 18% in 1995)--, the population has increased and the standard of living improved[5].

10. Despite intensification of energy efficiency efforts, electricity demand growth is projected to continue at around 6% p.a. until 2025, with demand reaching 50 TWh in 2020 and 95 TWh by 2030. This requires massive capacity additions, averaging 1000 MW per year, if Morocco does not want to increase its reliance on imports. The *Office National de l'Électricité et de l'Eau Potable* (ONEE) capacity expansion plan calls for capacity additions of 1.8 GW in 2016-17. Until 2017, coal dominates capacity additions and RES take an increasing role. Beyond 2020, when LNG infrastructure makes additional gas supplies available, Combined Cycle Gas-fired Turbine (CCGTs) will dominate capacity additions with 2700-3000 MW to be added in five years. By 2025, natural gas could make up 31% of national generation. This outlook demonstrates clearly the pressures on Morocco to step up RES development, to avoid massive GHG emission increases, and to accelerate programs to reduce electricity demand to the grid.

11. The electricity market is structured around a national utility, ONEE, placed under the administrative and technical control of the Ministry of Energy, Mines, Water and the Environment (MEMEE). ONEE operates throughout Morocco's electricity value chain, including generation, transmission, distribution, dispatching and balancing the grid, and acts as single buyer of the electricity supplied to the market from ONEE's own plants (29%), from those of Independent Power Producers (IPPs) (52%)—with the exception of those under Law 13-09-- and from imports (17%). A small number of private industrial producers generates power for their own needs (less than 1%), but that number (as well as the corresponding volume) is expected to increase with support of an enabling environment that will encourage liberalization of the mid- and low-voltage markets for RES. This is expected to also result in

[5] The level of electricity consumption per capita was still very low at the beginning of the century, and despite the strong increase in demand, it is still well below the world average at only 850 kWh per capita.

increased generation by IPPs in coming years, when most planned natural gas, coal, wind and solar plants are expected to be commissioned under IPP schemes.

12. The Moroccan Agency for Solar Energy was created in 2010 by Law 57-09 to oversee the development and operation of the solar power program Noor, as well as the creation of a local solar industry, encourage R&D in the field of solar energy, and contribute to local social and economic development. The Moroccan Agency for Solar Energy is a limited liability company ("*société anonyme*") with all shares, directly or indirectly, held by the GoM. Law 37-16, approved by Parliament in September 2016, changed the Moroccan Agency for Solar Energy's name to Moroccan Agency for Sustainable Energy (MASEN) and extends its role and responsibilities to cover all forms of renewable energy, except pumped hydro. After a maximum of 5-year transition period, all of ONEE renewable energy assets will be transferred to MASEN.

13. Until now, CSP technology has dominated Morocco's solar power development, as it is the RES technology responding to Morocco's needs in terms of electricity generation profile. The 160 MW Noor-Ouarzazate I parabolic trough CSP plant was inaugurated on 4 February 2016. Construction of the second phase, consisting of a 200 MW parabolic trough plant and a 150 MW tower plant, was launched the same day. The third phase at Ouarzazate is a solar PV power plant for which the developer was recently selected, while two other sites have been selected for CSP and PV development. Many of the sites coming up for development are likely to be equipped with a combination of the two technologies. The combination of PV and CSP in the system can optimize the use of PV generation during daytime, leaving CSP to provide mostly night-time generation through thermal storage. CSP could also provide balancing support during the day to support further investments that can lead to the addition of more variable PV and wind generation.

B. Project Rationale for the Involvement of the Clean Technology Fund

14. The MENA CSP Clean Technology Fund Investment Plan (CSP CTF IP) was originally endorsed by the CTF Trust Fund Committee (TFC) in December 2009 and was updated in November 2010, May 2013 and June 2014. The first projects to be approved under the MENA CSP CTF IP were the Noor-Ouarzazate I (160 MW) project in June 2011 and the Noor II and III project (350 MW) in June 2014, (respectively the first and second phases of the 580 MW Noor-Ouarzazate plant that includes 70 MW of PV in addition to CSP). The low-cost debt provided by the CTF (US$197 million) and other international financial institutions reduced the Levelized Cost of Electricity (LCOE) for Phase I by about 25 percent compared to financing available from commercial banks[6].

15. The CTF loans to the first and second phases of Noor-Ouarzazate amounted to US$197 million and US$238 million respectively. In June 2014, at the time of the Investment Plan (IP) Update, to address project delays in countries other than Morocco, a technical assistance program was set-up with a budget of US$10 million seeking to promote capacity building across the MENA countries.

16. The potential for GHG emissions saving will be increased through replication given its tremendous transformational potential. The proposed project will be installed in the second solar site in Morocco's Solar Plan and will help develop a sound foundation for the successful implementation of Morocco's Solar Plan. The full Morocco Solar Plan is expected to reduce

[6] CIF Annual Report - 2014

GHG emissions by 200 million tCO_2 equivalent. At the regional level, it is the most ambitious project to involve a Public-Private Partnership (PPP), and will serve as a model for the other countries participating in the MENA CSP CTF IP and beyond. At the global level, Noor-Midelt will be the largest project under preparation to test the hybrid CSP/PV solution.

17. The development of solar energy will help diversify the energy mix and enhance energy security. Morocco's Solar Plan will also contribute to industrial development, competitiveness and job creation. A study of local manufacturing potential[7] indicates that the full program could create 30,000 jobs.

18. The implementation potential and readiness are good. Public policies and institutional arrangements are very supportive of the Noor-Midelt Solar Complex project. Morocco's first NDC sees a central role for solar energy in achieving its GHG reduction target. The AfDB and the World Bank are committed to enhancing the policy framework for the sector, supporting reforms to improve the sector's financial viability and promoting the development of renewable energy on a large scale. MASEN has already proved that it is capable of handling the complex process of selecting well qualified strategic investors to develop the solar plants and of setting up the required contractual framework. The prequalification process has already been launched and has attracted strong interest.

C. Project Development Objectives (PDO)

19. The PDO is to increase innovative solar power generation in Morocco.

D. Project Beneficiaries

20. The project has a variety of beneficiaries at local and global level. Moroccan households and businesses are expected to benefit through the future supply of reliable green energy. The government will also be able to increase its energy security, gradually develop a local solar industrial and a research/development base, develop interior regions of the country, and create urgently needed jobs.

21. 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-Ouarzazate, MASEN anticipates that procurements equivalent to at least 35 percent of the Noor-Midelt costs would be sourced locally, which should help stimulate development of Morocco's industrial base and create jobs. In the area around Midelt, local authorities and the population will continue benefiting from the economic and social development opportunities that the project can bring, as successfully demonstrated in Ouarzazate, particularly with regard to playing a catalyst role in the development of the region.

22. 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**.** Morocco is expected to significantly contribute to the scale-up of CSP technology with strong learning effect, and to subsequent reductions in the technology's costs, thus achieving wider global

[7] Ernst & Young et Associés, Fraunhofer Institute for Solar Energy Systems ISE, and Fraunhofer Institute for Systems and Innovation Research ISI. January 2011. *Middle East and North Africa Region: Assessment of the Local Manufacturing Potential for Concentrated Solar Power (CSP) Projects*. The World Bank and the Energy Sector Management Assistance Program.

benefits. Morocco is well suited to shift the global technology cost curve, facilitating its long-term economic viability and making it more attractive regionally and globally.

E. PDO Results Indicators

23. The PDO results indicators are:

a. installed power generation capacity (MW) at Noor-Midelt Phase 1,

b. electricity production (measured in GWh) by the Noor-Midelt phase 1,

c. electricity production (measured in GWh) during peak demand hours by Noor-Midelt phase 1,

d. avoided CO_2 emissions (tons),

e. direct project beneficiaries (number), of which female (%), and

f. proportion of project cost raised from private sector equity (%)

F. Project Description

24. The first phase of Noor-Midelt consists of two separate plants, each with 150-190 MW CSP capacity and a minimum of 5 hours of thermal storage. The capacity of the PV component, which is expected to provide daytime generation, is left to the bidders' discretion, but cannot exceed night-time net capacity from CSP by more than 20 percent. Bidders are expected to optimize their design based on expected plant performance criteria that will be provided in the Request for Proposal (RfP).

25. MASEN is expected to adopt the same Build, Own, Operate and Transfer (BOOT) project structure and implementation approach followed for the Noor-Ouarzazate Solar Complex. The Project is expected to be implemented by competitively selected private sector sponsors. The selected sponsors are expected to form a Special Purpose Company (SPC), for each plant, that will design, construct, own, operate, and maintain the proposed plants, and sell the electricity generated to MASEN under 25-year Power Purchase Agreements (PPAs). MASEN in turn will enter into 25-year PPAs with ONEE to sell this power at the wholesale cost of power on the grid. Although a single procurement process is contemplated to award both plants comprising the Project, the process will be designed to allow award of the plants to different bidders.

G. Implementation

Institutional and Implementation Arrangements

26. The proposed Project will be implemented through PPPs between MASEN and private sponsors that will form SPCs, which will be the Project's Implementing Entities, to design, construct, own, operate, and maintain Noor-Midelt I and II. The sponsors are selected through a 2-stage competitive procurement process. The first stage involves preliminary technical bids to meet MASEN's minimum functional specifications. This allows MASEN the opportunity to evaluate the technical proposals and any innovative approaches offered by bidders to meet

the requirements. It also allows more clarity on risk allocations and makes the draft legal agreements available to bidders before formulation of the financial bids.

27. The second stage involves revised technical bids and financial offers, in the form of a proposed LCOE to be paid by MASEN for electricity produced by Noor-Midelt Phase 1**.** In order for bidders to provide financial offers, MASEN needs to indicate, during this second stage, the terms of the debt financing MASEN will provide the selected SPC. As MASEN aims to reach commercial closing (i.e., reaching agreement on all of the commercial issues) contemporaneous with award, MASEN needs to know the final terms of debt financing that will be made available to it from IFIs prior to concluding this second stage bid process.

28. Once selected, the winning bidder(s) is/are expected to enter, through the SPCs, into a suite of agreements with MASEN to provide the contractual basis for the PPP. The structure of the PPP is largely based on typical commercially-financed, limited recourse transactions for infrastructure projects. MASEN will enter into a power purchase agreement (PPA) with the selected bidder(s) to purchase the entire output of Noor-Midelt Phase 1 at the competitively determined LCOE. MASEN will, in turn, enter into a power sales agreement (PSA) to sell this power to ONEE at the high-voltage system tariff. GoM will compensate MASEN for the difference (or "gap") between the PPA and the PSA, according to a *Convention* signed between GoM and MASEN in October 2010 and *specific Conventions* to be signed upon creation of the SPCs.

29. MASEN is expected to enter into a supply agreement with the SPCs to provide water, lands, and provide the common infrastructure facilities to be used by the plants. MASEN is also expected to take a 25 percent equity interest in the SPCs. MASEN participation in the day-to-day activities of these vehicles is expected to be limited to the typical role of a minority shareholder. The shareholding of MASEN is also expected to raise investor confidence.

30. MASEN is expected to enter into a lending arrangement with the SPCs to pass to them the proceeds of the IFI financing made available to MASEN for Noor-Midelt Phase 1. These proceeds are expected to comprise the bulk of the debt financing of the projects and cover up to eighty (80) percent of Noor-Midelt Phase 1's costs. The remaining twenty (20) percent of Noor-Midelt Phase 1's costs will be covered by commercial equity provided by the SPCs' shareholders, including MASEN.

Results Monitoring and Evaluation

31. MASEN will regularly monitor implementation of Noor-Midelt Phase 1 by the SPCs in accordance with the agreed contractual obligations that will be put in place prior to making any disbursements from the CTF, AfDB, and IBRD loans. PDO level results indicators and intermediate indicators will be monitored by MASEN and reported to the World Bank, the AfDB and other IFIs in project reports covering a period of one calendar semester. MASEN will submit the project reports to the IFIs 45 days after the end of each calendar semester. The reports will cover, among other things, financial statements, physical progress, and procurement.

32. The CTF, AfDB and IBRD loan agreements provide for periodic submission of interim unaudited financial reports, supported by a technical audit report prepared by an independent verification expert. The audit report will particularly focus on (i) achievement of milestones set

out in the relevant engineering, procurement, and construction (EPC) contract and (ii) compliance with the contract's pricing provisions.

Sustainability

33. The sustainability of the project is ensured by the existence of a dedicated agency staffed with top professionals to develop the country's renewable energy potential, namely MASEN, and its association with a financially strong and technically capable private developer to develop the Noor-Midelt Solar Complex**.** This partnership will ensure that the plant will be constructed, operated and maintained according to industry standards. The successful experience of Noor-Ouarzazate indicates that this institutional framework is working.

34. MASEN's Law and the conventions signed or to be signed between the GoM and MASEN provide for the GoM to support not only the Noor-Midelt Solar Complex but also the complete solar program. MASEN buys Midelt solar production and sells it to ONEE at a price equivalent to the currently lower coal generation cost; however the gap between the two prices is covered by law by GoM, which guarantees financial sustainability of the Morocco Solar Plan, on a project-by-project basis. As solar costs decline, the gap between the two prices is lower for Midelt than for Ouarzazate.

Schedule

35. The prequalification process was launched on 18 July 2016, with submissions in November 2016. Under the current schedule, MASEN plans to launch the first stage Request for Proposal (RFP1) in May 2017. Financial close is expected in 2018. Construction should start shortly after, with plant commissioning expected by end 2020 / early 2021.

H. Donor Coordination

36. Several donors are active in the Moroccan energy sector. Besides the AfDB and the World Bank, the Agence Française de Développement (AFD), Kreditanstalt fur Wiederaufbau (KfW), the European Investment Bank (EIB) and the European Commission (EC) are involved. Coordination currently takes place through regular project-specific meetings of donors and executing agencies, as well as regular thematic meetings. These meetings are an opportunity to coordinate these parties' actions with the actions of other institutions. Given the importance of solar energy in Morocco's development agenda and its significance to mitigating climate change, a number of IFIs and donors are assisting the GoM implement its Noor solar plan. Technical Assistance has been provided to develop grid codes and adapt the power system, as well as to prepare long-term energy scenarios. Those efforts are coordinated between all stakeholders and donors.

37. Many donors were involved in the financing of the Noor-Ouarzazate Solar Complex and they worked closely on project preparation and implementation, through joint missions and regular meetings. Similar arrangements are in place for Noor-Midelt Phase 1, as the list of donors is the same as for Noor-Ouarzazate. Their ability to collaborate and coordinate their activities has therefore been demonstrated.

I. Technical Analysis

38. Front-End Engineering and Design (FEED) to meet MASEN's minimum technical specifications will be carried out by the awarded bidders who will construct, own, and operate Noor-Midelt solar power plants. Both first phase plants will be of solar hybrid PV/CSP configuration and will be designed, manufactured, installed, erected, operated and maintained in such a way that they will achieve high availability and reliability with minimum generation costs. Noor-Midelt solar plant's specifications request the power plants to be optimized to maximize peak-hour generation in order to displace combined-cycle gas turbines fueled by expensive imported LNG. The plants will follow environmentally sound practices and comply with the recommendations of the Framework Environmental and Social Impact Assessment study ("FESIA"). Fuel and water consumption will be minimized for both plants. Fuel-burning equipment will be used only for auxiliary support functions (i.e. Plant start-up and safe operation).

39. Among the options available to the bidders for the CSP component, the parabolic trough choice is considered a proven and fully commercial technology, and the plant presents no unusual construction or operational challenges for a power plant of that size. Parabolic trough is the CSP technology with the most commercial operating experience. At the end of 2016, around 4,400 MW of installed CSP capacity used the parabolic trough technology and accounted for 82 percent of today installed CSP capacity. The solar tower technology is still an evolving technology with more limited operational record than parabolic trough due to the reduced number of projects under construction and operation. Solar tower also has higher capital costs than parabolic trough. The total capacity in operation has recently increased to almost 660 MW. Moreover, there are several large scale solar towers under construction, such as Noor-Ouarzazate II in Morocco. However, solar tower has important benefits that make it very attractive and potentially better than other CSP technologies: (i) higher conversion efficiency from solar thermal energy to electricity since they can achieve very high temperatures with manageable losses by using molten salt as a heat transfer fluid. This allows higher operating temperatures and steam cycle efficiency, and reduce the cost of thermal energy storage by allowing a higher temperature differential (ii) molten salt towers have lower water consumption requirements; (iii) greater potential for cost reduction and local manufacturing. These advantages are driving the increasing share of solar tower projects planned worldwide and according to several expert sources, solar towers might become the technology of choice in the future.

40. The hybrid solution combines advantages of PV and CSP in the same plant and helps to mitigate the disadvantages of each technology. It considers the least cost planning results, by providing a consistent very affordable production from PV, while CSP plants can optimize their output by increasing their solar multiple (i.e., increasing the size of the solar field) and using thermal storage to extend their operating hours into the evening when Morocco's electricity demand peaks. Thus, the combined technology yields a much higher capacity factor than PV plants alone at a much reduced price than CSP plants alone. The hybrid plant, thanks to the CSP generation, could also provide reserve capacity and other ancillary services to mitigate system regulation issues and imbalances caused by intermittent plants.

J. Financial Management

41. As part of the Noor-Ouarzazate process, MASEN established an accounting and financial management system satisfactory to the IFIs. This system is based on rules applicable

to commercial law of the Kingdom of Morocco. MASEN's financial statements are submitted annually to an independent external audit. Similar to the approach adopted for Noor I, interim unaudited financial report, which will cover all the activities and sources of funds of the project, will be prepared for the Project twice a year by MASEN and transmitted to the World Bank and the AfDB forty-five (45) days after the end of each period. The external annual audit report of the Project's accounts and the management letter covering recommendations to improve the internal controls and the accounting system will be transmitted by MASEN to the IFIs no later than six (6) months after the end of each exercise. Moreover, the annual audit report of the Project's accounts will be carried out in accordance with the AfDB and WB guidelines by an acceptable auditor and according to terms of references acceptable to the AfDB and WB, as well as other donors.

42. The SPCs, which will be the Project Implementing Entities, will not be identified until after conclusion of the procurement process and award of Noor-Midelt Phase 1. As such, appraisal of their accounting and management system is not possible until then. However, the CTF, AfDB and IBRD loan agreements require, as a condition to disbursement under the agreements, that the SPCs establish an accounting and financial management system acceptable to the IBRD and the AfDB. It is envisaged that this system would provide for preparation of annual financial statements and periodic expenditure reports by component, category, and source of funding. Once established, the SPCs will be audited annually by an independent external auditor acceptable to the AfDB, WB and other donors, and the audit report will be shared with the donors no later than 6 months after the end of the related year. MASEN is expected to reflect these requirements in the conditions to effectiveness or disbursement of the PPA(s), the financing agreement(s) governing the on-lending arrangements of IFI funds, or other similar contracts entered into with the SPCs.

K. Procurement

43. The Project's procurement consists of the competitive selection of private sector sponsor(s) for a partnership with MASEN to design, build, own, operate, and transfer the Noor-Midelt I and II plants. The procurement process follows the requirements World Bank's Procurement Regulations for Borrowers for Goods, Works, Non-Consulting and Consulting Services dated July 1, 2016 and applicable to Investment Project Financing (IPF). Once selected, the sponsors would then be free to procure goods, works, and consulting/non-consulting services required to implement the contemplated arrangement from eligible sources using the sponsors' own procedures.

44. A procurement capacity and risk assessment is presently being carried out by the donors. It is an update of the previous assessment carried for Noor Ouarzazate II and III. MASEN has the status of "Société Anonyme" (limited liability Company), ruled under private law, with public capital and a Management Board. It has its own procurement rules which are well-structured with a manual of procedures including a specific "Procurement" module. The procedures for selection of private partner for PPP operations, developed with IFI under previous CSP projects are now fully integrated into MASEN procurement procedures. MASEN has become familiar with the procurement procedures and requirements of donors for the selection of private partner for PPP arrangement

L. Social Assessment

45. **Employment:** It is expected that the project will create up to 2000 full-time jobs per plant during the peak construction period, which will last up to two years per plant. During operation, 100 permanent jobs for the power plants and 50 jobs for the common infrastructure will be created. To the extent possible, positions will be filled through local hiring, using the services of the national employment agency ANAPEC *(Agence Nationale de Promotion de l'Emploi et des Compétences)*. The cooperation between ANAPEC and MASEN has already proven efficient and effective during the implementation of the NOORo projects in Ouarzazate. ANAPEC can hire locally, or using a larger national network for jobs for which skills are not available locally. Requirements on the management of labor, labor safety, relationships of employees with local populations, community health and safety regarding labor, will be included in bidding documents and contracts.

46. **Labor influx:** The settlement of non-local workers and their followers will be managed by the developer and the contractors following requirements that will be laid out in the Construction Environmental and Social Management Plan (CESMPs). The implementation of these CESMPs will be supervised by MASEN. It is expected that most of the non-local workers will settle in Midelt, a provincial hub with an estimated population of around 55,000 (2012). Midelt has an existing tourism infrastructure that should be able to absorb most of the service requirements created by the influx of workers. MASEN will have to ensure that: (i) the settlement and service requirements of non-local workers benefit the local communities and the local economy, (ii) does not interrupt the local communities around the site, (iii) that possible negative impacts are mitigated, and (iv) that recourse in case of non-compliance is integrated into the management of the CESMP.

47. **Local development:** MASEN is currently preparing a local development plan, based on a socio-economic analysis undertaken in the project area. The local development plan will ensure local communities benefit from the project beyond labor and services provided to the project, with a special focus on women. The plan will lay out a framework to prepare targeted small-scale rural development interventions planned in a consultative and participatory manner, and financed by MASEN or through other programs. The interventions may finance both infrastructure and 'soft' activities, such as training, provision of extension services, etc. and includes actions targeted at women. A similar local development plan was provided in the framework of the NOORo I, II and III projects in Ouarzazate and have been welcomed by the local communities.

M. Environmental Assessment

48. **Environmental impacts and mitigation measures:** The Project has limited environmental impacts, especially considering the size of the power plants to be constructed. It should be noted that, as a renewable energy facility, the environmental impacts of the underlying facilities are significantly lower than an alternative conventional fuel thermal power plant. Most importantly, the Project will contribute to reduce air pollution as it is not emitting greenhouse gases or other local pollutants. The project avoids 1.3 million tons of CO2 per year.

49. **Water Consumption.** The Hassan II dam, with a capacity of 400 million m3, is located just 14 km from the site and will supply the water to the complex. However, in order to minimize water consumption, the plants will be designed to use dry cooling, so the requirement for water will be reduced and each plant is not expected to require more than 520,000 m3 (0.13

percent of annual dam capacity). Therefore, the Noor-Midelt Complex's impact on the overall water resources in the region is minimal, representing a consumption of approximately 0.5 percent of the Regular Annual Volume of Hassan II dam.

50. **Safeguards documentation.** The Framework Environmental and Social Impact Assessment (FESIA) covers all of the Noor-Midelt solar power sites and the different solar technologies (CSP parabolic trough, solar tower, PV and PV concentrated) under consideration by MASEN. The FESIA was prepared in a participatory manner including all required stakeholder consultation. The FESIA includes a description of: (i) the legal and regulatory framework applicable to the plants, (ii) applicable IFI environmental and social, health and safety policies, alternative options considered, (iii) a state of the environment at the plants' location and surrounding region, (iv) potential impacts and associated compensation measures to be considered, and (v) a Framework Environmental and Social Management Plan (FESMP). The FESMP includes institutional settings, general mitigations measures, monitoring plan and responsibilities for the mitigation and management of the potential impacts from the plant's activities during construction and operation.

51. The FESIA will guide the preparation, adoption, implementation and monitoring of the Specific Environmental and Social Impact Assessments (SESIAs) for each adopted solar technology, which, as noted above, are to be prepared and implemented by the bidders for each of solar power plants located on the Noor-Midelt site, once their initial designs are determined. The SESIAs will include a detailed Construction Environmental and Social Management Plan (CESMP) in accordance with the provisions of the FESIA, including the processes, rules and standards defined in the FESIA, and will be subject to the review and concurrence by donors before its final approval and implementation by MASEN and the Developer. After the SESIAs' review and disclosure prior to the start of construction, the Developer is expected to contract environmental and social safeguards, as well as health and safety, coordinators, that will have direct responsibility for implementing the agreed environmental, health and safety measures at the Midelt plants' site during construction and operation. These coordinators will, inter alia, prepare a monthly Health, Safety and Environment report during the construction and operation phases of Noor-Midelt, and MASEN will provide a summary of this information for the IFI review during the supervision phase of the proposed Project.

The World Bank

The African Development Bank

Clean Technology Fund (CTF) Annex

Morocco: Noor-Midelt Solar Power Project

I. Introduction

1. Morocco has embarked with success on the energy transition pathway and has become one of the world leaders in solar energy, particularly CSP. According to REN 21—a renowned global renewable energy policy multi-stakeholder network--, at the end of 2015, Morocco ranked first in terms of new CSP capacity additions and fourth in terms of total installed CSP capacity. With support from the World Bank, the AfDB and other IFIs, as well as from the CTF, MASEN has launched successfully the development of the Noor-Ouarzazate solar complex, with inauguration of the 160 MW first phase and initiation of the construction of the 350 MW second phase in February 2016.MASEN keeps the momentum going with the preparation of the present project Noor-Midelt Phase 1, which will be followed by Noor-Midelt Phase 2 soon after commissioning of Phase 1. By 2030, Morocco intends to add at least 6,000 MW of RES, in order to reach its target of 52% of power generation capacity from renewables.

2. The CSP tenders in Morocco were among the lowest cost in the world, on an LCOE basis, and well below the initial estimates. The successful bidding process under Noor-Ouarzazate I, II and III seems to have validated: (a) the novel institutional framework developed by MASEN for private sector involvement through IPPs; and (b) the premise underlying the CTF MENA CSP Initiative that scale up will intensify competition and contribute significantly to capital cost reduction. Given its success, Morocco is arguably the country best placed among the MENA countries for pursuing the development of the CSP technology. Morocco has attributes that make it particularly promising for scale-up of solar technologies with particular focus on CSP: abundant sunshine, low humidity and plenty of unused flat land close to road networks and transmission grids. These attributes, together with access to the EU electricity markets through the existing interconnection with Spain, makes Morocco one of the most suitable places globally to get cost reduction for CSP and accelerate global CSP deployment

3. In order to leverage its position of leader in the CSP market and keep the momentum of the Noor-Ouarzazate success story, MASEN is moving on with the development of the sites identified in the Noor solar program and the Midelt site is now under development. In line with Morocco's National Energy Strategy, the next sites will be equipped with the hybrid CSP/PV technology, to take advantage of the impressive PV cost declines that have been observed around the world. The combination of PV and CSP can optimize the use of PV generation during daytime, leaving CSP to provide mostly night-time generation through thermal storage. CSP could also provide balancing support during the day to support the addition of more intermittent PV and wind generation

4. The first phase of Noor-Midelt consists of two separate plants, each with 150-190 MW CSP capacity and a minimum of 5 hours of thermal storage. The PV component is expected to provide daytime generation and its capacity will be determined together with the developers to optimize the plant design. MASEN is expected to adopt the same BOT project structure and implementation approach followed for the Noor-Ouarzazate Solar Complex. The Project is expected to be implemented by one or more competitively selected private sector sponsors.

II. Morocco and the CTF MENA CSP Investment Plan

5. The WB and the AfDB, together with other donors, such as the EIB, AFD, KfW/BMU and the EC, have worked together to accelerate CSP deployment in the MENA region. A significant part of this initiative is the CTF MENA CSP IP, which was endorsed in December 2009, updated in 2010, 2013 and June 2014. Following the June 2014 IP update, the IP disposed of US$553 million of financing from the CTF to support the development of 800 MW of CSP capacity as part of the MENA CSP scale-up initiative, excluding the amount already used for approved projects (the 160 MW Noor-Ouarzazate I plant commissioned approved in 2011 and commissioned in February 2016). Since then, a $238 million CTF loan has been approved for the 350 MW Noor-Ouarzazate II and III projects, for which construction started in February 2016. To address project delays in countries others than Morocco, a technical assistance (TA) program was set-up, at the time of the latest IP Update, with a budget of $10 million.

6. The TA funds were used to launch a Knowledge and Innovation Program (MENA CSP KIP)[8]. This three-year Program is designed primarily as a resource to address knowledge and awareness gaps, to link projects with sources of finance and technical advice, and to promote innovation to enable CSP investments in MENA to move forward faster, and in more countries. The knowledge generated in MENA could also facilitate CSP investments elsewhere in the world, creating a virtuous circle of CSP investments and cost reductions through global economies of scale and learning. Program includes the following components: Just-in-Time Assistance, Web-based Knowledge Exchange, In-Depth Technical Support, Face-to-Face Knowledge Exchange and Cooperation and Capacity Building and Training.

MENA CSP CTF IP Indicative Financing Allocation Plan - June 2014 Update

	Projects/ Capacity (MW)	CTF financing (US$ million)	Unitary CTF financing (US$/kW)	Project Status in 2016 and comments
Morocco	Noor I 160	197	1230	Approved in 2011
	Noor II&III 350	238	680	Approved in 2014
	Phase I of Midelt or Tata 100	**TBD**	**TBD**	Site preparation at Midelt. Two CSP-PV hybrid plants of 150-190 MW CSP each RFQ launched
Egypt	Kom Ombo 100	123	1230	Kom Ombo site now used for PV, rather than CSP
Tunisia	Akarit50	62	1230	Project frozen

[8] For further information on the World Bank/Climate Technology Fund MENA CSP Knowledge and Innovation Program, please contact **menacsp@castalia-advisors.com**

Jordan	IFC Up to 100 MW (incl CPV)	50	500	No progress for CSP or CPV
Libya	100	20	200	No activity
Total Projects	960	**TBD**	**TBD**	
Technical Assistance	NA	10		

7. A workshop was held in Ouarzazate in May 2016 to initiate discussions on the use of the remaining funds, as a basis for updating the CTF MENA CSP IP. The workshop was attended by representatives of all the countries that are part of the CTF MENA CSP IP, namely Egypt, Jordan, Morocco and Tunisia, as well as by representatives of Algeria and Libya, and all the IFIs involved in financing projects in the IP.

8. The discussion on the status of each project and the changes in the selected projects for use of the CTF funds under the MENA CSP IP translate into a tentative MENA CSP CTF financing plan which is presented in the table below.

MENA CSP CTF IP Indicative Financing Allocation Plan –

Proposed Update as discussed at May 2016 workshop

(Excluding approved projects)

	Projects/Capacity (MW)	**CTF financing (US$ million)**	**Unitary CTF financing (US$/kW)**
Morocco	Noor-Midelt Phase 1 300-380 CSP	TBD	TBD
Egypt	West Nile BOO 100	123	1230
Tunisia	Site to be decided 50	62	1230
Jordan	No CSP project visible	0 (TBC)	0
Libya	No project identified	0	0
Total Project excl approved	450-530	TBD	TBD
Total IP incl approved projects	960-1040	TBD	TBD

III. Assessment of the Proposed Project with CTF Investment Criteria

Demonstration Potential at Scale

9. *Scope of avoided GHG emissions through replication.* The country program calls for the installation of several GW of solar installed capacity by 2030. This level of solar capacity

would result in emission savings of 6.7 million tons per year in 2030 and 200 million tons over the lifetime.

10. *Transformation potential.* The proposed project has high transformational potential at the country, regional and even global level:

- *At the country level*, the project will help consolidate MASEN's reputation as a solid institution for solar development in Morocco (and more generally RES) and a trusted partner to private developers interested in solar energy. This transformation is essential as the program requires funds well beyond the public sector financing capability and the country's capacity to raise debt. The experience of Noor-Ouarzazate has built MASEN's capability (learning by doing) to prepare, manage and implement complex projects and competitively select strong private partners to achieve its ambitious solar development target and the Project will further strengthen that capability. The contractual arrangements developed during the selection of the partner for Noor-Ouarzazate has set the standards for future transactions as they have adequately addressed possible conflicts of interest by adequately ring fencing the different functions entrusted by the government to MASEN; the same arrangements are being used for Noor-Midelt and applied to a different technology mix. Successful construction of Noor-Midelt will test a new technology concept, leading to more investments locally and cost reduction.

- *At the regional level*, the Noor program is considered as a model for solar energy development, serving as an example on how to attract private sector participation, mitigate risk and secure financing. The successful commissioning of Noor-Ouarzazate I and construction launch of the second phase of Noor-Ouarzazate has reinforced interest of international and local players in the development of local capacity in manufacturing and support services triggered by the MENA CSP IP. Furthermore, Morocco's success in its ambitious solar program has been followed by the announcement of similarly ambitious solar development targets in many countries of the region. Moreover, it has established Morocco as a serious partner for the formation of an integrated Euro-Mediterranean electricity market, resulting in the signature during COP22 of a declaration for the preparation of a roadmap for exchange of green electricity between Morocco and Europe.

- *At the global level*, Noor-Midelt is one of the largest CSP projects announced to date. Noor-Ouarzazate already attracted the developers' attention to the solar potential in the MENA region. The successful completion of the transactions under the Noor-Ouarzazate project have shown that mitigation of institutional and market risks are possible through adequate contractual arrangements, even in developing countries. Noor-Midelt will solidify this image, while further contributing to cost reductions worldwide. Noor-Midelt will contribute to achieving the target of the CTF MENA CSP IP, and to localizing manufacturing capacity in the region to reduce cost and contribute to local value creation.

11. In order to enhance and complement the transformational impact that the Project helps to bring about in its own right, the technical assistance program is available in parallel, which is targeting the improvement of local manufacturing capabilities in MENA, including Morocco, and the improvement of the administrative and legal framework in MENA to help put in place CSP projects, in addition to knowledge sharing to that the lessons learnt from the Noor program

in Morocco can be leveraged elsewhere. The MENA CSP KIP was set-up for that purpose, as described above.

Development Impact

12. *Improved reliability***.** The development of solar energy will have significant benefits in terms of the reliability and security of electricity supply to Moroccan consumers, which is a high priority for the Government. CSP is a technology that is of particular interest to utilities as it is more predictable than most renewable energy options and is easy to integrate into conventional electricity systems. Noor-Midelt will therefore contribute to decarbonized electricity supply, without endangering the climate.

13. *Improved energy security***.** Further development of renewable resources will increase energy security as Morocco is currently 97 percent dependent on imports for its primary energy sources. Generation mix diversification will also strengthen the resilience of the power sector to future shocks such as fuel price spikes or increased variability of hydro power generation due to climate change. This has the added co-benefit of increasing Morocco's resilience to climate variability.

14. *Regional energy market integration*. While Noor-Ouarzazate production will initially be for local consumption, as RES capacity increases, a growing share of the electricity produced under Morocco's Solar Plan will be available for exchanges with Europe and other neighboring countries. Creation of an integrated Euro-Maghreb electricity market would support a high level of RES penetration in Morocco and interconnected countries. If the work under way under the Union for the Mediterranean (UfM) electricity platform creates the appropriate framework, the commissioning of Noor-Midelt could mark the initiation of such an integrated market.

15. *Development of local industry***.** The Morocco Noor Program is not just a program to ensure security of energy supply and transition to a low carbon energy sector, but it is also an "integrated energy/industry" program in the sense that it aims at developing local industry and services to serve the solar plants developed under the Noor Program. To support the MENA CSP IP and assess derived economic benefits, a study commissioned by the World Bank (STA, 2016/17) analyzed the potential of local manufacturing of CSP components across the five countries of the MENA CSP IP, namely Algeria, Egypt, Jordan, Morocco and Tunisia, and evaluated the potential economic benefits in particular with respect to the labor and the foreign trade impact. Below are the results for Morocco:

- *Average share of local manufacturing in the CSP value chain:* Assuming 1,000 MW CSP capacity installed by 2020 and 2,300 MW in 2025, the total potential of local content of CSP plants will increase constantly and could reach 45 percent in 2020 and up to 52 percent in 2025.

- *The economic impact on GDP:* Beyond electricity production, the economic impact of CSP development in Morocco is a function of local content and size of installed CSP capacity. If 2.3 GW of CSP is installed until 2025, then the economic benefit would be 5.2 Bn US$. Almost 3 Bn US$ comes from the construction and operation of power plants whereas more than 2 Bn US$ comes from the component manufacturing in the supply chain.

- *Labor impact:* Over the period 2010-20**,** the cumulated total jobs of full-time equivalent for construction, manufacturing and O&M of CSP plants for 1 GW will reach over 24,000. In the long-term, between 26,000 and 73,000 FTE jobs can be created cumulatively in Morocco. In 2020, between 2000 and 5000 people would be working in the CSP industry and in 2025, between 2000 and 10000 people could potentially be employed.

- *Foreign trade impact:* Additional impacts on job creation and growth of GDP could come from export of CSP components.

16. The MENA CSP KIP promotes innovation to enable CSP investments in MENA to move forward faster and ensure that the prerequisites exist for creation a local industry.

17. *Gender***.** Among the PDO level results indicators, the direct project beneficiaries (number) will be measured, including the percentage which are female. A methodology has been developed for the Noor-Ouarzazate project to identify female beneficiaries, and the same methodology will be used to measure the female beneficiaries of Noor-Midelt. MASEN is preparing a local development plan that will include actions targeted at women. The World Bank also plans to undertake, in cooperation with AfDB, analytical work, including focus groups, to address the gender impact of the Project.

Implementation Potential

18. *Public policies and institutional set-up*: The Government of Morocco has undertaken a substantial effort to promote renewable energy, establish an adequate legal framework and set up a dedicated company to implement the Noor Solar Plan. The implementation of the solar program was entrusted to the Moroccan Agency for Sustainable Energy (MASEN), a fully state-owned limited liability company created on 26 March, 2010. In early 2016, MASEN's mandate was expanded to all RES and renewable energy assets will be gradually transferred from the national utility ONEE to MASEN. MASEN is governed by a Board of Directors (Directoire) and a Management Board (Conseil d'Administration).

19. The commitment of Morocco to climate change mitigation is evidenced by its hosting of the COP22 in Marrakech in November 2016. Morocco's success with the Noor-Ouarzazate solar complex was showcased throughout the COP, and many high-level delegations visited the plant at Ouarzazate. Morocco was given as an example for developing countries in the fight against climate change. The country is considered a world champion for RES and ranks fourth worldwide, in terms of CSP capacity in operation, under construction or under development.

20. Morocco issued its first NDC ahead of COP22. The NDC sets a target of 42% for CO_2 emission reduction in the conditional scenario compared to a "business-as-usual" scenario, which goes beyond the level indicated in the INDC of the previous year. Achieving this target requires a rapid scale-up of renewable energy sources (RES) and the reconfiguration of the power system, so that it can accommodate a high RES penetration. As announced during COP21, the NDC raised the target for RES, from 42% in 2020, to 52% of installed power generating capacity in 2030. CSP plays a key role, as the only zero-carbon technology that contributes to the power system flexibility necessary to address supply variability of wind and PV. Other measures included in the NDC are energy efficiency and fossil fuel subsidy reform, as well as the introduction of natural gas in the energy mix.

21. *Sustainability of Transformation.* WB and the AfDB are engaged with the GoM to enhance the overall sector policy framework and advance reforms aimed at improving the sector's commercial environment and financial sustainability. As the roles and responsibilities are redefined in the power sector, reforms will be undertaken, with the support of WB, AfDB and other IFIs, to ensure sustainability and financial viability of the sector, while meeting energy security and climate mitigation objectives at least cost. In particular, the power system needs to be adapted to accommodate a high RES penetration level, and ONEE, as Transmission System Operator (TSO,) has a key role to play.

22. More broadly, the development of the country's vast solar resources is inscribed in a broader policy of green growth. WB and AfDB, as well as other donors, are leveraging a set of actions aimed at building capacity within Morocco and providing the adequate incentives for policy reforms enabling a higher penetration for renewable energy, as well as reaping the derived benefits in terms of local value and job creation. A Climate Innovation Center has been created, with financial support from InfoDev, to spur innovation. Germany has been providing assistance to develop RES training program at both university and technical vocational level.

23. *IFI and Donor Coordination*: Given the importance of solar energy in Morocco's development agenda and its significance to mitigating climate change, a number of IFIs and donors are assisting the GoM implement its Noor solar plan. Technical Assistance has been provided to develop grid codes and adapt the power system, as well as to prepare long-term energy scenarios. Those efforts are coordinated between all stakeholders and donors are collaborating through various mechanisms, including regular meetings to cover their respective development assistance programs. This is exemplified by the various sources of financing mobilized for Noor-Ouarzazate and now Noor-Midelt, as well as technical assistance provided to MASEN to manage the power plant development process.

24. *Leverage***:** The CTF loan would leverage concessional debt from international financial institutions and a significant amount of private sector participation in the Project equity. In subsequent phases of Noor-Midelt and over time, it is recognized that mobilizing an increasing share of private sector capital along with concessional climate finance, will be important to achieve the NDC goals.

Additional Cost/Risk Premium

25. The CTF concessional loan will help reduce the gap with the grid parity and the fiscal burden on the government, which, in turn, would allow to further support additional solar and other renewable energy development going forward. Furthermore, the CTF support is essential to achieve the profound transformation of the power sector required to achieve the NDC goals, in particular by bringing down the CSP capital costs. The CTF funds will also encourage MASEN to take greater calculated risks and seek to achieve technology breakthroughs, where boundaries are being pushed in terms of development that go beyond what many private companies would be willing to undertake.