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The World Bank

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PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US$200 MILLION

AND A

PROPOSED CLEAN TECHNOLOGY FUND LOAN

IN THE AMOUNT OF US$97 MILLION

TO THE MOROCCAN AGENCY FOR SOLAR ENERGY (MASEN)

WITH THE GUARANTEE OF THE KINGDOM OF MOROCCO

FOR THE

OUARZAZATE I CONCENTRATED SOLAR POWER PLANT PROJECT

OCTOBER 13, 2011

Sustainable Development Department
Middle East and North Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective, July 25, 2011)
Currency Unit = Moroccan Dirham
MAD 7.8862 = US$ 1
EUR 1 = US$ 1.4371

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AAA	Analytical and Advisory Assistance	KfW	Kreditanstalt für Wiederaufbau
ADEREE	Agence Nationale pour le Développement des Énergies Renouvelables et de l'Efficacité Énergétique	LAP	Land Acquisition Plan
AFD	Agence Française de Développement	LCOE	Levelized Cost of Energy
AfDB	African Development Bank	LLC	Limited Liability Company
AWI	Arab World Initiative	MAD	Moroccan Dinar
CCGT	Combine Cycle Gas Turbine	MASEN	Moroccan Agency for Solar Energy
CO_2	Carbon dioxide	MIGA	Multilateral Investment Guarantee Agency
COP	Conference of the Parties	MENA	Middle East and North Africa
CPS	Country Partnership Strategy	MFS	Minimum Functional Specifications
CSP	Concentrated Solar Power	MW	Megawatt
CTF	Clean Technology Fund	MSP	Mediterranean Solar Plan
CTF IP	Clean Technology Fund Investment Plan	NIF	Neighborhood Investment Facility
DII	Desertec Industrial Initiative	NOx	Nitrogen Oxide
DNI	Direct Normal Irradiance	NPV	Net Present Value
DSM	Demand Side Management	ONE	Office National de l'Électricité
EIB	European Investment Bank	ONEP	Office National de l'Eau Potable
ESMAP	Energy Sector Management Assistance Program	O&M	Operations and Maintenance
ESMP	Environnent and Social Management Plan	ORAF	Operational Risk Assessment Framework
ESIA	Environmental and Social Impact Assessment	PAD	Project Appraisal Document
EU	European Union	PDO	Project Development Objective
EUR	Euros		
FDE	Fonds de Développement Énergétique	PEFA	Public Expenditure and Financial Accountability
FESMP	Framework Environnent and Social Management Plan	PPA	Power Purchase Agreement
FESIA	Framework Environmental and Social Impact Assessment	PSA	Power Sales Agreement

FM	Financial Management	PPP	Public-Private Partnership
FSP	Financial Statements of the Project	Q&A	Question and Answer
GDP	Gross Domestic Product	R&D	Research and Development
GEF	Global Environmental Facility	RE	Renewable Energy
GoM	Government of Morocco	RFP	Request for Proposal
GWh	Gigawatt-hour	RPF	Resettlement Policy Framework
Ha	Hectare	SDP	Social Development Plan
IBRD	International Bank for Reconstruction and Development	SICS	Solar Incremental Cost Support
ICB	International Competitive Bidding	SOx	Sulfur Oxide
IEA	International Energy Agency	SPC	Solar Power Company
IFC	International Finance Corporation	SPV	Special Purpose Vehicle
IFI	International Finance Institution	TOR	Terms of Reference
IPP	Independent Power Producer	USD, US$	United States Dollars
ISCC	Integrated Solar Combined Cycle	USc	United States Cents
ISP	Implementation Support Plan	WB	World Bank
		WBG	World Bank Group

Regional Vice President:	Inger Andersen
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Sector Director:	Laszlo Lovei
Sector Manager:	Patricia Veevers-Carter
Task Team Leader:	Silvia Pariente-David

Table of Contents

PAD DATA SHEET

Morocco

Ouarzazate I Concentrated Solar Power Plant

PROJECT APPRAISAL DOCUMENT

Middle East and North Africa
MNSSD

Date: October 13, 2011 Country Director: Simon Gray Regional Director: Jonathan Walters Sector Director: Laszlo Lovei Sector Manager: Patricia Veevers-Carter Team Leader(s): Silvia Pariente-David Project ID: P122028 Lending Instrument: SIL	Sector(s): Renewable Energy Theme(s): Climate Change EA Category: A

Project Financing Data:

Proposed terms: The IBRD loan is a Fixed Spread Loan, denominated in US$ and €, with a final maturity of thirty (30) years including a grace period of five and a half (5.5) years. The CTF loan is denominated in US$, with a final maturity of forty (40) years including a grace period of ten (10) years.

[x] Loan [ ] Credit [ ] Grant [ ] Guarantee [ ] Other:

Source	Total Amount (US$ million): US$ 1,427 million
PPP partners (incl MASEN)	US$ 379 million
CTF	US$ 197 million (of which $100 million through AfDB and $97 million through IBRD)
IBRD	US$ 200 million
AfDB	US$ 245 million
AFD	US$ 123 million
KfW	US$ 123 million
EIB	US$ 123 million
EC/NIF (grant)	US$ 37 million

Borrower: Moroccan Agency for Solar Energy, MASEN
Responsible Agency: Moroccan Agency for Solar Energy, MASEN
Contact Person: Mustapha Bakkoury
Telephone No.: +212537 754747
Fax No.: +212537 754445
Email: masen@masen.ma

Estimated Disbursements (Bank FY/US$ million)										
FY	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
CTF	40	57	-	-	-	-	-			
IBRD (indicative)	-	-	-	30	30	30	30	30	30	20
Annual (CTF+IBRD)	40	57	0	30	30	30	30	30	30	20
Cumulative	40	97	97	127	157	187	217	247	277	297

Project Implementation Period: 2012 – 2020
Expected effectiveness date: November 2012
Expected closing date: June 30, 2021

Does the project depart from the CAS in content or other significant respects?	○ Yes • No
If yes, please explain:	

Does the project require any exceptions from Bank policies?	○ Yes • No
Have these been approved/endorsed (as appropriate by Bank management?	○ Yes ○ No
Is approval for any policy exception sought from the Board?	○ Yes • No
If yes, please explain:	

Does the project meet the Regional criteria for readiness for implementation?	○ Yes • No

If no, please explain: This highly ambitious project involves potentially high risks and rewards, and has therefore been structured in an unusual manner to mitigate those risks. These risks derive from the deployment of a currently expensive technology with the potential to become a competitive non-carbon energy source of global significance.

The project is being presented to the Board before selection of the Public Private Partnership (PPP) consortium and financial closure of the PPP transaction. This is because the borrower MASEN has expressed a strong preference to have IBRD and CTF financing certainty before issuing the stage 2 bidding documents, in order to provide adequate risk-mitigation to bidders to utilize the technology.

The effectiveness conditions are designed to ensure readiness for implementation once the private partner has been selected, the solar power company has been established and the suite of legal agreements have been concluded. The unusual extensiveness of those effectiveness conditions is the corollary of Board presentation needing to be relatively early in the bidding process.

Project development objective

The development objective of the Project is to support the Borrower (the Moroccan Solar Agency MASEN) in the development of the 500 Megawatt Ouarzazate solar power plant by financing the first phase (160 Megawatt gross) through a public private partnership (PPP), to increase power generation from solar power and mitigate greenhouse gas emissions and local environment impact.

This project is intended to contribute to the higher-level objective of helping to develop a globally-available competitive non-carbon energy source. It is quintessentially a strategic demonstration project designed to spur replication, and is a flagship for the Clean Technology Fund's overarching goal of transformational impact on climate change mitigation.

Project description

The Project consists of:

Component 1: Financing the Initial Investment: (A) Development of the Plant through the formation of a PPP between the Borrower and a competitively selected partner and (B) Construction of the Associated Facilities.

Component 2: Operational Support: Supporting the acquisition of kilowatt-hours produced by the Project Implementing Entity to partially cover the difference in the price at which the Borrower would buy the electricity generated by the Plant and the price at which the Borrower would sell such electricity to ONE.

Safeguard policies triggered	
Environmental Assessment (OP/BP 4.01)	• Yes ○ No
Natural Habitats (OP/BP 4.04)	○ Yes • No
Forests (OP/BP 4.36)	○ Yes • No
Pest Management (OP 4.09)	○ Yes • No
Physical Cultural Resources (OP/BP 4.11)	○ Yes • No
Indigenous Peoples (OP/BP 4.10)	○ Yes • No
Involuntary Resettlement (OP/BP 4.12)	• Yes ○ No
Safety of Dams (OP/BP 4.37)	○ Yes • No
Projects on International Waters (OP/BP 7.50)	○ Yes • No
Projects in Disputed Areas (OP/BP 7.60)	○ Yes • No

Conditions and Legal Covenants:		
Financing Agreement Reference	Description of Condition/Covenant	Date Due
Article V section 5.01 Of CTF Loan Agreement	**Conditions of effectiveness:** (a) The Project Implementing Entity has been legally established in a manner satisfactory to the World Bank. (b) The subsidiary of MASEN, MASEN Capital, has been legally established in a manner satisfactory to the World Bank. (c) The Borrower and the Project Implementing Entity have established an accounting and financial management system satisfactory to the World Bank. (d) The Borrower and the Project Implementing Entity have adopted the Financial Management and Disbursement Manual, satisfactory to the World Bank and the Co-financiers. (e) The Borrower and the Project Implementing Entity have adopted the Governance Framework, satisfactory to the World Bank. (f) The Subsidiary Loan Agreements have been executed on behalf of the Borrower and the Project Implementing Entity and all conditions precedent to their effectiveness and to the right of the Project Implementing Entity to make withdrawals under them (other than the effectiveness of this Agreement) have been satisfied or waived. (g) The IBRD Loan Agreement has been executed and delivered and all conditions precedent to its effectiveness and to the right of the Borrower to make withdrawals under it (other than the effectiveness of this Agreement) have been satisfied or waived. (h) The Borrower and the Kingdom of Morocco have entered into the Project Specific Convention. (i) Execution and satisfaction of all conditions precedent to the effectiveness and, to the extent applicable, to the right of the Borrower to make withdrawals under them (other than the effectiveness of this Agreement), of all the following agreements: 1. the AFD Co-financing Agreement; 2. the AfDB Co-financing Agreements; 3. the EC Co-financing Agreement 4. the EIB Co-financing Agreement; and 5. the KfW Co-financing Agreements. (j) Execution and satisfaction of all conditions precedent to the effectiveness and, to the extent applicable, to the right of the Borrower or of the Project Implementing Entity to make withdrawals under them (other than the effectiveness of this Agreement), of all other agreements, to be found satisfactory by the World Bank in form and substance within reasonable time, required to finance, construct, own, and operate the Plant, including, but not limited to: 1. the EPC Contract; 2. the Operation and Maintenance Agreement; 3. the Power Purchase Agreement; 4. the Power Sale Agreement; 5. the Shareholders' Agreement; 6. the Transmission Interconnection Agreement; and 7. the Grid Access Agreement.	Before effectiveness of the loan

Article V section 5.01 Of IBRD Loan Agreement	**Conditions of effectiveness:** (a) The Project Implementing Entity has been legally established in a manner satisfactory to the World Bank. (b) The subsidiary of MASEN, MASEN Capital, has been legally established in a manner satisfactory to the World Bank. (c) The Borrower and the Project Implementing Entity have established an accounting and financial management system satisfactory to the World Bank. (d) The Borrower and the Project Implementing Entity have adopted the Financial Management and Disbursement Manual, satisfactory to the World Bank and the Co-financiers. (e) The Borrower and the Project Implementing Entity have adopted the Governance Framework, satisfactory to the World Bank. (f) The Subsidiary Loan Agreements have been executed on behalf of the Borrower and the Project Implementing Entity and all conditions precedent to their effectiveness and to the right of the Project Implementing Entity to make withdrawals under them (other than the effectiveness of this Agreement) have been satisfied or waived. (g) The CTF Loan Agreement has been executed and delivered and all conditions precedent to its effectiveness and to the right of the Borrower to make withdrawals under it (other than the effectiveness of this Agreement) have been satisfied or waived. (h) The Borrower and the Kingdom of Morocco have entered into the Project Specific Convention. (i) Execution and satisfaction of all conditions precedent to the effectiveness and, to the extent applicable, to the right of the Borrower to make withdrawals under them (other than the effectiveness of this Agreement), of all the following agreements: 1. the AFD Co-financing Agreement; 2. the AfDB Co-financing Agreements; 3. the EC Co-financing Agreement 4. the EIB Co-financing Agreement; and 5. the KfW Co-financing Agreements. (j) Execution and satisfaction of all conditions precedent to the effectiveness and, to the extent applicable, to the right of the Borrower or of the Project Implementing Entity to make withdrawals under them (other than the effectiveness of this Agreement), of all other agreements, to be found satisfactory by the World Bank in form and substance within reasonable time, required to finance, construct, own, and operate the Plant, including, but not limited to: 1. the EPC Contract; 2. the Operation and Maintenance Agreement; 3. the Power Purchase Agreement; 4. the Power Sale Agreement; 5. the Shareholders' Agreement; 6. the Transmission Interconnection Agreement; and 7. the Grid Access Agreement.	Before effectiveness of the loan
Article V section 5.02	The Additional Legal Matters consist of the following: (a) The Subsidiary Loan Agreements have been duly authorized or ratified by the Borrower and the Project Implementing Entity and are legally binding upon the Borrower and the Project Implementing Entity in accordance with their terms. (b) Each of the agreements referred to in Section 5.01 (j) above has been duly authorized or ratified by each of the parties thereto and is legally binding upon each of the parties thereto in accordance with its terms	Before effectiveness of the loan
Schedule 2, Section IA,	Not later than three months after the effective date, the Borrower shall contract an independent verification expert, satisfactory to the World Bank, under terms of reference	Not later than three months

paragraph 4 of CTF Loan Agreement	satisfactory to the World Bank, to carry out technical audits and prepare the technical audit reports regarding the implementation of Part 1.A of the Project, and of the EPC Contract referred to in Section II.B.3 of this Schedule 2 to this Agreement.	after the Effective Date
Schedule 2, Section IB, paragraph 1 of CTF Loan Agreement	To facilitate the carrying out of Part 1.A of the Project by the Project Implementing Entity, the Borrower shall make the proceeds of the Loan allocated from time to time to Category 1 of the table set forth in Section IV.A.2 of this Schedule and the proceeds of the AFD Co-financing, the AfDB Co-financing I, the AfDB Co-financing II, the EIB Co-financing, and the KfW Co-financing I available to the Project Implementing Entity as a loan or loans under one or more subsidiary loan agreements between the Borrower and the Project Implementing Entity, under terms and conditions approved by the World Bank ("Subsidiary Loan Agreements"), including the commitments of the Project Implementing Entity set forth or referred to in this Agreement and the right of the Borrower to suspend disbursements under such Subsidiary Loan Agreements in case of non compliance by the Project Implementing Entity.	Before effectiveness of the loan and each time the subsidiary loan agreement is changed or a new subsidiary loan agreement is prepared
Schedule 2, Section ID of CTF Loan Agreement	**Safeguards Covenants:** • The Borrower shall: (i) maintain within the Project Management Unit, an environmental and social safeguards unit including an environmental and social safeguard coordinator with terms of reference and qualifications, budget and material support adequate to supervise the implantation of, and compliance with the FESIA; and (ii) cause the Project Implementing Entity to establish and maintain an environmental and social unit adequate to supervise the preparation of the ESIA, further implement the ESMP and report to the Borrower on implementation of all mitigation measures including health and safety. • The Borrower shall cause the Project Implementing Entity not to authorize any commencement of civil works to build the Plant before an ESIA is prepared, adopted and disclosed in accordance with the FESIA. • The Borrower shall: (i) cause the ESIA including an ESMP for the Associated Facilities to be developed in a manner consistent with the provisions of the FESIA; and (ii) provide the World Bank with the relevant draft ESIA for any of the Associated Facilities, allow the World Bank one month to provide its comments and feedback as appropriate on such documents, and further inform the World Bank about the status of the preparation and adoption of the final ESIA, including any mitigation measures and/or environmental management plan as appropriate, for any of such Associated Facilities. • The Borrower shall disclose, and shall cause the Project Implementing Entity to disclose all relevant safeguard-related documentation regarding the Part 1 of the Project including any environmental and social impact assessment, including any mitigation measures and/or environmental management plan as appropriate, for any of the Associated Facilities. • The Borrower shall cause the Project Implementing Entity: (i) to construct and operate the Plant at all times in compliance with the ESIA and the LAP; and (ii) not to amend, suspend, abrogate, repeal or waive any provision of the ESIA or the LAP without prior consultation with, and approval of the World Bank. • The Borrower shall: (i) cause the Project Implementing Entity to prepare and disclose an environmental and social management report on a bi-annual basis during the construction of the Plant, and on an annual basis afterwards; and (ii) include such report in the Project Reports referred to in Section II.A of this Schedule 2. • Not later than three (3) months after the Effective Date, the Borrower shall provide the World Bank with a draft of the SDP for its comments and recommendations .Not later than eighteen (18) months after the Effective Date, the Borrower shall prepare a report on the implementation of the SDP and provide such report to the World Bank for its comments and recommendations.	Covenant Covenant Covenant Covenant Covenant Covenant Covenant Not later than three (3) months after the Effective Date

	• The Borrower shall ensure that no works shall commence for any Associated Facility before the implementation of a due diligence to assess any need for land acquisition and/or involuntary resettlement. In case land acquisition and/or involuntary resettlement would be required for any Associated Facilities, the Borrower shall: (i) ensure that the processes, rules and principles to be applied to said land acquisition and/or involuntary resettlement be adopted by the relevant parties, and (ii) provide the World Bank with copies of said processes, rules and principles for its review and concurrence before the commencement of any land acquisition.	Covenant
Schedule 2, Section V of CTF Loan Agreement and Schedule 2, Section IV of IBRD Loan Agreement	• Except as otherwise agreed by the World Bank, the Borrower's Equity shall remain positive on a yearly basis commencing with the Borrower's fiscal year 2012, as evidenced by the Borrower's yearly audited financial statements. • Not later than the end of each fiscal year commencing with the Borrower's fiscal year 2013, the Borrower shall furnish to the World Bank a copy of the business plan and financial projections (which shall include projected consolidated balance sheet, income statement and cash flow statement), of the Borrower and its subsidiaries for each semester of the upcoming fiscal year, as adopted by the Management Board (Directoire) of the Borrower and prepared in accordance with consistently applied accounting standards acceptable to the World Bank, in a form and substance agreed by the Borrower and the World Bank.	Covenant Covenant
Schedule 2, Section III.B of IBRD Loan Agreement	**Disbursement condition:** No withdrawal shall be made under Category 1 until the Borrower shall have provided: • evidence satisfactory to the Bank that the Plant is fully commissioned and operational; • with respect to each withdrawal application, the relevant interim unaudited financial report for the Project, including the report from the independent verification expert referred to in Section II.B.3 of this Schedule 2 to this Agreement.	First disbursement Each disbursement

I. Strategic Context

A. Global and Regional Context

1. The global community is seeking non-carbon technologies for generating electricity around the clock, to complement the limited number of available options (e.g. geothermal, nuclear). Concentrated Solar Power (CSP) has already demonstrated its capacity to supply uninterrupted power for an entire day[1], but still has a long way to travel down the cost curve. Any project designed to help jump-start this process is therefore expensive and high risk, and hence needs substantial financial support. But the global rewards to that initial support are potentially extremely high, as viable non-carbon options are currently few in number. The Ouarzazate CSP project is set in that global context.

2. CSP is a technology of particular interest to utilities as (i) production is more predictable than for most renewable energy options and (ii) associated storage is closest to economic viability, which facilitates integration into conventional electricity systems, and minimizes the need for back-up fossil-fuel generation capacity. CSP is also a technology with substantial cost-reduction potential, which would be dependent upon[2] manufacturing scale effects, learning curve effects, plant convoy effects (executing multiple identical projects in the same area), and improvements in technology. CSP does not require intrinsically expensive materials, and only a small portion of the components are protected by intellectual property rights – costs are high mainly because scale is low. Subsidies are needed to help the technology scale up in order to realize these cost reductions over the medium term.

3. The Middle East and North Africa (MENA) Region has exceptional physical attributes that, combined with eventual access to European Union (EU) electricity markets which offer subsidies for carbon-free electricity, make MENA the most suitable place globally to accelerate global CSP deployment.

4. The World Bank is working with the African Development Bank (AfDB), the European Investment Bank (EIB), the French Development Agency (AFD), the German Cooperation Agency (KfW) and other partners to accelerate CSP deployment in MENA. The MENA CSP initiative is a US$ 5.6 billion program—including US$ 750 million from the Clean Technology Fund (CTF)—to finance CSP across the region. The initiative has employment, climate change, energy security and export revenues objectives, as well as the goal of enhancing integration across the Mediterranean. The partnership includes a wide range of donors and promotes a mix of private and public investment. Deployment of highly concessional financing from the CTF, access to European green energy markets and a continued drive to fossil fuel substitution will all be key to the success of the initiative. The initiative is one of the programs under the "New Partnership for Inclusive Growth in the MENA Region" launched at the G8 summit in Deauville in May 2011.

5. Exports of green electricity from MENA to the EU have benefits for both shores of the Mediterranean:

[1] In July 2011, Gemasolar, a 19.9 MW central tower CSP plant with molten salt heat storage technology located in Spain, was the first thermosolar power plant in the world to supply uninterrupted power for an entire day.

[2] Source: Boston Consulting Group- "What's Next for Alternative Energy", November 2010.

- For the EU countries: meeting their renewable energy (RE) objectives at lower cost, access to firm dispatchable solar power and facilitation of the integration of more intermittent RE, such as wind and solar PV,
- For MENA countries: creating a source of revenues which will pay for the development of an expensive carbon-free technology (and therefore get access to a low carbon technology which the countries could not afford otherwise).

6. Exports are essential to the viability of the MENA CSP projects. However the EU regulatory framework is not yet in place to provide certainty to green electricity exports from MENA and their remuneration. The EU Renewable Energy Directive (2009/28/EC) allows for electricity imports to meet RE targets under certain conditions as spelled out in Article 9, but it will take time to make the electricity trade conditions operational, as it requires bilateral or multilateral agreements and transposition of the Directive into national laws. A political commitment is emerging in Europe to make trade of green electricity between the north and the south of the Mediterranean a reality. A France-Morocco working group has been set-up that should lead to the first experimental electricity exchange between the South and the North in late 2011[3] and the issue figured prominently at the G8 Deauville summit with several countries making a commitment to the creation of a EU-Mediterranean green electricity market.

7. EU imports of green electricity from MENA are likely in the long term, as the European Commission issued in February 2011 a roadmap to transform the EU into a competitive low carbon economy by 2050[4]. EU's 80-95 percent greenhouse gas (GHG) reduction objective by 2050 from a 1990 baseline can only be achieved through a fully decarbonized power sector. Europe can meet these objectives more efficiently by tapping resources in neighboring countries, in particular the Southern Mediterranean countries.

8. Until exports take off and become a regular and sustained source of revenues for RE plants, concessional financing is necessary to make the CSP projects happen. CTF[5] is being mobilized to finance the first gigawatt (GW[6]), but innovative financial instruments are needed thereafter. A key outcome of the Cancun Conference of Parties (COP) is the establishment of a Green Climate Fund, which signals a commitment to scaling up funding to help developing countries cope with climate change effects and embark on a low-emission development path. EU institutions are investigating various mechanisms for scaling-up climate finance.

9. The MENA CSP program has strong synergy with other initiatives that seek to develop the renewable potential in MENA, while creating the conditions for a regional market—namely the Mediterranean Solar Plan, Desertec Industry Initiative (DII), Medgrid, and the World Bank Group's Arab World Initiative. These transformational initiatives demonstrate a clear interest for building an EU-Mediterranean partnership for renewables, in line with EU's 2050 decarbonization scenario, with a joint approach to ensuring energy security, provided that the right market perspective is created for electricity imports. In the mid- to long-term, this would mean establishing a form of 'EU-Southern Mediterranean Energy Community' starting with the

[3] During the visit of French Ministry of Energy and Industry to Morocco in July 2011, there was an announcement that a bilateral agreement between France and Morocco would be signed before the end of 2011, setting the stage for electricity exports from Morocco to countries of the Northern shore of the Mediterranean.
[4] COM (2011) 112/4- A Roadmap for moving to a competitive low carbon economy in 2050.
[5] A CTF loan of $197 million was approved for the first project of the MENA CSP CTF investment plan on June 22, 2011.
[6] 1 GW=1000 MW

Maghreb countries, which would promote gradual convergence of southern Mediterranean partners' energy policies with EU policy.

10. A regionally integrated electricity market would facilitate the large scale development of CSP, and vice versa. Regional integration results in larger and more diversified power generation capacity than in isolated national markets, and permits (i) sharing of back-up reserves, and (ii) the creation of a market of sufficient size to justify the development of a local industry at scale to serve those markets. The development of such a local industry would allow for the creation of jobs, which has become an utmost priority in the region, following the Arab Spring. The job creation potential of the solar initiatives is more likely to be realized in a regionally integrated market than in isolated national markets.

B. Country Context

11. Morocco is the country with the largest proposed capacity in the MENA CSP CTF Investment Plan (IP) and the first one to launch the development of a concrete project, which furthermore will be one of the world's largest solar CSP plants. Morocco already has experience with the CSP technology[7] and has a transmission interconnection with Europe, which makes exports possible without further transmission investment, as soon as an off-take contract can be arranged that remunerates green electricity. Morocco has decided at the highest level to play a leadership role in the development of CSP and move forward with a 500 MW plant in Ouarzazate in the South of Morocco for domestic supply and export into the EU. Morocco intends to rise to the challenge of commitments made during the Cancun and Copenhagen COPs and under the Union for the Mediterranean, and has requested World Bank support to mobilize concessional financing and private investment. The other countries in the region are now watching closely to see if Morocco succeeds before deciding to follow suit.

12. Morocco is extremely dependent on energy imports and fossil fuels. The development of the renewable energy and energy efficiency potential has been made a national priority, in order to achieve the country's objectives of energy security and environmental sustainability, as well as setting the economy on a green growth path that would generate employment. As demonstrated during the Second National Energy Summit (Deuxièmes Assises de l'Énergie) in May 2011, Morocco aspires to become an energy platform between Europe and Africa, not only for energy exchanges, but also a basis for RE equipment manufacturing, innovation and skill development.

13. The Morocco Solar Plan, launched in November 2009, is the cornerstone of the country's renewable energy and climate change mitigation strategy. The US$ 9 billion plan calls for the development of 2,000 MW by 2020, starting with the ambitious 500 MW Ouarzazate project. In addition to fostering low-carbon development of the energy sector and enhancing energy security, the implementation of this plan will stimulate large investments and enhance Morocco's competitiveness. This is an integrated plan in the sense that it calls for local manufacturing, as well as related training, education and research activities, therefore boosting economic growth and contributing to job creation.

[7] The Ain Beni Mathar plant, which was one of the first Integrated Solar Combined Cycle plant (ISCC) to be operated worldwide, was commissioned on May 12, 2010. The plant has a capacity of 470 MW, including 20 MW CSP, and was in part financed through a GEF grant of US$43 million. The plant created dozens of new jobs, supports the local economy, and will help expand the skill base in Morocco to construct and operate such facilities. The success of the Ain Beni Mathar Concentrated Solar Power plant will pave the way for the deployment of a pipeline of solar energy projects in Morocco.

14. The Government of Morocco (GoM) and the International Financial Institutions (IFIs) recognize that the rolling out of this plan involves high risks in the initial stages in that the capital costs for this type of technology are high and require substantial subsidies for the first few years of the Morocco Solar Plan until exports become common practice. Morocco can afford this high cost technology only if revenues can be raised from exports. Given the first phase of the first plant (Ouarzazate I) is unlikely to export significant volumes, if at all, concessional financing is needed up-front to kick start the Morocco Solar Plan.

C. Sectoral and Institutional Context

15. The legal, regulatory and institutional framework is being set-up with several laws enacted in 2010-11, including (i) the RE law, (ii) the energy efficiency law, (iii) the law creating the Moroccan Agency for Solar Energy (MASEN) and (iv) the law setting up the Energy Efficiency Agency. MASEN is entrusted to implement the Morocco Solar Plan, including developing a local solar industry. While MASEN is expected to sell the generated electricity mostly to the national electricity company Office National de l'Électricité (ONE), the RE law allows MASEN, under certain conditions, to sell electricity to other public or private operators on national or export markets. Two conventions were signed in October 2010, to seal MASEN's relations with GoM (and in particular stating the State commitment to finance the cost of the Morocco Solar Plan[8]) and ONE (stating ONE's obligation to buy all power from MASEN, as well as its obligation for the dispatch of the solar power plants).

16. Developing the country's solar and wind resources over the next 10 years will require investment of at least US$ 13 billion, a large part of it from private investors. Morocco is taking steps to encourage the development of the country's renewable potential, with participation of the private sector, notably by: (1) initiating policy making exercises to gradually remove subsidies on fossil fuels and electricity to provide price signals to consumers to encourage energy efficiency on the demand-side and creating a level playing field on the generation side to make renewable energy technologies competitive; (2) limiting electricity demand growth through demand side management (DSM) and other energy efficiency measures (strong demand growth is partly due to inefficient use of electricity and, given that CSP and other renewable technologies have high capital costs, capacity additions are to be undertaken only when necessary, i.e. only after implementing energy conservation measures); and (3) creating a transitional support scheme until cost reduction in CSP is achieved, fossil fuel subsidies are reduced and exports are possible.

D. Higher Level Objectives to which the Project Contributes[9]

17. The principal higher level objective is to help develop a globally-available non-carbon power generation technology, which ultimately may not require fossil-fuel back-up capacity, and thus contribute to CSP cost reduction for worldwide benefit. The project will contribute to Morocco's objectives of security of supply, energy diversification, CO_2 emission reductions and employment creation through increased penetration of RE in the country's energy mix and creation of a new green industry. The project will also demonstrate the use of storage technology in CSP plants and create a strong precedent for the use of the Public Private Partnership (PPP)

[8] *« L'État s'engage, dans les conventions spécifiques pour chaque projet, au cas par cas, à assurer l'équilibre économique et financier des projets »,* Convention entre l'État et MASEN, Ouarzazate, 26 octobre 2010.

[9] It should be noted that in keeping with the global transformation objective of the CTF and other climate financing for the overall CSP program, and the regional integration objectives of developing solar energy in MENA, the higher objectives go far beyond the PDO.

business model to develop CSP power plants in Morocco and elsewhere. Furthermore, the project aims at contributing to Mediterranean regional electricity market integration.

18. The proposed project contributes to the Country Partnership Strategy (CPS 2010-2013) outcomes "...increased penetration of renewable energy to transition the energy system to a low carbon path" and "development of a local manufacturing capability for renewable technologies and energy efficient equipment—a green growth package—therefore contributing to job creation". The Morocco Solar Plan is explicitly identified as an area of Bank support in the CPS[10].

II. Project Development Objectives

A. PDO

19. The more specific development objective of the Project is to support the Borrower in the development of the 500 Megawatt Ouarzazate solar power plant by financing the first phase (160 Megawatt gross) through a public private partnership (PPP), to increase power generation from solar power and mitigate greenhouse gas emissions and local environment impact.

B. Project Beneficiaries

20. The project has a variety of beneficiaries at local and global level. The Moroccan population will benefit through the future supply of reliable green energy. Morocco will be able to increase its energy security, gradually developing R&D and green energy industries, developing interior regions of the country and creating urgently needed jobs. As part of the project design, MASEN is to use each bidding process for the plants under the Morocco Solar Plan to promote local manufacturing to the highest level possible. MASEN is targeting a level of local content of 30% of the plant capital cost which will help stimulate private sector and create jobs. In the area around Ouarzazate, local authorities and the population will benefit from the economic and social development opportunities that the project can bring, particularly with regard to playing a catalyst role in the development of this semi-desert region.

21. At the regional and even global level, the project has an envisaged transformational effect not only on Morocco and its energy system but also the MENA region and Europe, as it will establish a model for promoting RE use. The project is expected to catalyze utilization of Morocco's extensive solar potential and will provide future clean energy for European importing countries. It is also expected that solar technology will contribute to better integration of regional markets and substantially increase green electricity trade. The successful scaling-up of CSP with storage would bring CSP capital costs down and make the technology economically viable, thus making it more attractive to the region and globally as well. Finally, other global positive impacts include avoided greenhouse gases emissions of 240,000 tons of CO_2 equivalent per year.

[10] Under Pillar 3, Sustainable Development in a Changing Climate, *Program Area 3.2: Low Carbon Energy Policy and Energy Sector Restructuring and Program Area 3.4 Climate Change* and is at the core of climate change mitigation planning which is one of the outcomes of the CPS under *Program Area 3.4*. Additionally, unlocking the potential for PPPs is a key area of engagement for both WB and IFC under the CPS (*Program Area 2.8* under Pillar II "Service delivery to citizens"). The proposed project is also part of the WBG Morocco PPP initiative.

C. PDO Level Results Indicators

22. The PDO level results indicators are:
a) Installed CSP power generation capacity (MW)
b) Electricity production (GWh)
c) Avoided local air pollution (tons of NOx, SOx annually)
d) Avoided GHG emissions (tons of CO_2 annually).

III. Project Description

A. Project Components

23. The proposed project will support the following components: (1) the formation of a PPP between MASEN and a competitively selected private partner to develop a 160 MW gross concentrated solar parabolic trough plant and its Associated Facilities, the first phase of the Ouarzazate 500 MW complex; and (2) the partial funding during the first few years of the gap between the costs of CSP generation and conventional fossil fuel-fired generation, in order to alleviate the budgetary burden of the GoM support for solar energy, in case the country faces momentary financial difficulties that would make budgetary support problematic.

24. ***Component 1- Financing the Initial Investment***: Component 1 is the development and construction of a power plant 10 km east-northeast of Ouarzazate and its Associated Facilities. This site is well suited for the development of CSP because of its excellent solar resources, the availability of water, easy access, and the proximity of a robust power grid to transport the electricity to markets in Morocco and abroad for later phases. Component 1-A is the development of the Plant through the formation of a PPP between the Borrower and a competitively selected partner. The construction will start in 2012 for commissioning in mid-2014. In light of the results of the prequalification and the market response, the first-phase plant will use solar parabolic trough technology with three hours storage. Later phases will remain open to any proven solar technologies. Component 1-B is the construction of the Associated Facilities (or Common Infrastructures), which are required for the functioning of the CSP plant and are within the scope of the project, but are not financed by the Bank (further details can be found in Annex 2).

25. MASEN will implement Component 1-A of the project by means of a PPP between MASEN and private developers. This choice is motivated by the desire to gradually introduce private sector participation in the implementation of the Morocco Solar Plan. The PPP will also facilitate the implementation of contractual mechanisms ensuring that the private sector is incentivized, to the extent possible, to construct the power station without cost overruns or delays and to operate and maintain the power station adequately. A consortium of private developers is being competitively selected to create the Solar Power Company (SPC) that will enter into long-term contractual commitments to ensure the construction, financing, and operation of the plant and the sale to MASEN of solar-generated electricity at a competitively tendered price. Details of the PPP structure and arrangements can be found in Annexes 2 and 3.

26. ***Component 2- Operational support*** *"Solar Incremental Cost Support (SICS)"*: In the project's second component, the World Bank loan will be used for supporting the acquisition of kilowatt-hours produced by the SPC to partially cover the difference in the price at which MASEN would buy the electricity generated by the Plant and the price at which MASEN would

sell such electricity to ONE[11]. GoM has in principle committed, through the MASEN law and the MASEN-GoM conventions, to cover this difference from the State budget. At the request of MASEN, WB is offering a loan to cover the additional generation cost of CSP when the GoM decides to resort to this financing, instead of State financing, when economic and fiscal conditions warrant it. This solution should provide comfort to private investors in the crucial early years that funds will be available to MASEN to pay the high CSP price agreed in the Power Purchase Agreement (PPA) between MASEN and the SPC, even when GoM faces budgetary pressures. Other donors may join this component at a later stage if needed. It is estimated that the SICS would cover around four years of cash shortfall; it is expected that the funds will actually be disbursed in four to seven years, depending on the government's fiscal situation. Furthermore, in the unlikely event that export contracts were entered into with European countries for Ouarzazate I, then the average selling price at which MASEN sells the kWh would be closer to the production cost of those kWh.

27. This gapfill mechanism is a scheme similar to a "feed-in tariff fund" (to help pay the incremental costs of CSP and other renewable energies) which could be extended and replicated in Morocco, and elsewhere in the world. If replicated, this mechanism would have the advantage of significantly reducing the transaction costs and risks to the private sector associated with making climate financing or development aid available to multiple RE projects. The innovative prototype in this project could therefore attract considerable donor and private sector interest.

28. The selling price by SPC to MASEN will be bid out via the PPP tender and is expected to reflect the levelised cost of energy (LCOE) for CSP, once the grants—including grant elements of the CTF and other loans—are factored in to reduce the investment cost. Based on current cost estimates, the resulting LCOE[12] is estimated at 2-3 times the selling price by MASEN to ONE, agreed in the Power Sales Agreement (PSA), which in principle reflects the wholesale price of electricity in Morocco and which is essentially driven by coal generation. The difference between the LCOE , or buying price by MASEN, and the selling price to ONE is covered 30% by the IFIs through their low interest rate financing and 70% by GoM through grants and direct and indirect subsidies to MASEN.

29. The difference between MASEN's revenues from electricity sales to ONE and expenses for electricity bought from SPC, to be covered by the GoM amounts to approximately US$ 60 million per year during the 25 years of the PPA. Over the life of the project, the cumulated gross contribution of the GoM would amount to over US$ 1 billion. When taking into account avoided subsidies on fuel oil, as well as tax revenues, dividends and other revenues from the SPC, the actual net contribution of the Government of Morocco is US$ 800 million, nearly half the gross contribution.

30. Component 2 of the project meets the eligibility requirements in OP/BP 6.00. This policy rests on three guiding principles: (a) the expenditures are productive, which is the case here, as Component 2 will provide a key support to the economic sustainability of the Plant; (b) the impact of the operations financed under the loan on the borrowing country's fiscal sustainability is acceptable (see macroeconomic analysis in Annex 8); and (c) oversight arrangements are in

[11] It should be noted that this difference is largely due to the amortization of the high capital costs of CSP technology, rather than to actual operations costs, which are very low

[12] Some details of the LCOE analysis are not presented in the PAD because they are deemed procurement sensitive at the current stage of the bidding process, and are instead available in a confidential paper in the project file

place to ensure that the loan proceeds are used only for the purposes for which the loan is granted, which is the case here given that an independent verification expert will be retained by MASEN, and approved by the Bank to certify that the amount of the SICS is correct as per the provisions of the PPA, the PSA, the conventions and any other relevant documents.

B. Project Financing

1. Lending Instrument

31. The lending instruments are a US$ 200 million IBRD loan to MASEN (SICS Component) and a US$ 97 million CTF13 concessional loan to MASEN (PPP Component). The CTF loan will be used for Component 1-A, i.e. for on-lending by MASEN to the SPC that will be set-up with the competitively selected private partner to construct and operate the power plant. The CTF loan has a 40 year maturity, a 10 year grace period, a 0.25 percent per annum service charge and a one-time management fee of 0.25 percent.

32. The IBRD loan will be used for Component 2 of the Project, i.e. to assist MASEN in financing its PPA with the SPC, by partially covering the incremental cost of CSP over conventional power generating technologies. It will be disbursed according to a mechanism providing flexibility to GoM (and further described in Annex 3), in order to cover the difference between MASEN's revenues (sales to ONE) and expenses (purchases from the SPC under the PPA), in case MASEN and the GoM agree to call on this source of funds to compensate MASEN for the cost difference. MASEN, following discussions with the Ministry of Finance and because of the project structuring (on-lending to SPC), has selected a Fixed Spread Loan, 80% in Euro and 20% in U.S. Dollars, linked to commitment with a 30 year maturity and 5.5 years of grace period, with level repayment. The Front-end-Fee equal to one quarter of one percent (0.25%) of the Loan amount would be financed out of the Loan proceeds (capitalized).

2. Project Cost and Financing

33. The total investment cost of Ouarzazate I is estimated at about US$ 1 billion. An additional contingency has been factored in the project financing, to cover costs in excess of those estimated in the feasibility study (an important consideration for a technology with a limited track record in the size range of the Ouarzazate project). This amount is already available from the IFIs having expressed interest in the Ouarzazate I project, and could be reallocated if not needed to cover the initial investment for construction of the plant. Total project costs and financing by component are presented in Table 1:

[13] On June 22, 2011, the CTF Trust Fund Committee agreed a CTF amount of $197 million for Ouarzazate I, to be channeled partly through IBRD and partly through AfDB.

Table 1 - Estimated Project Costs and Financing by Financier and Component

Project Components *US$ million*	CTF	World Bank	AfDB	NIF grant[4]	AFD	KfW[8]	EIB	SPC/ MASEN
Component 1-A:	197[1]		197	37	97	97	97	210
- Capital expenditure:		0						
of which	*197*		*197*	*0*	*97*	*65*	*97*	*0*
debt (70%)	*0*	*0*	*0*	*37*	0	*32*	*0*	*210[5]*
equity(30%)		*0*						
- Interest during	0		0	0	0	0	0	43[9]
construction and	0	0	48	0	26	26	26	0
other	197	0	245[2]	37	123[3]	123[3]	123[3]	253
- Add'l contingency[7]		0						
- Total								
Component 1-B Associated Facilities	0	0	0	0	0	0	0	126[6]
Component 2 Solar Incremental Cost Support Component	0	200	0	0	0	0	0	0

(1) The CTF amount is channeled through AfDB ($100 million—50.8%) and WB ($97 million—49.2%).

(2) AfDB loan: EUR 200 million converted into US$ with an exchange rate of 0.815 EUR/US$.

(3) AFD, KfW, EIB: loans of EUR 100 million each converted into US$ with an exchange rate of 0.815 EUR/US$.

(4) The NIF grant is processed through EIB. This is a minimum and the exact amount of NIF grant has to be confirmed. The NIF is 100% grant. The CTF has the second highest grant element (75%).

(5) Consortium selected to create the Solar Power Company (75% of the equity).

(6) MASEN/GoM through a grant from Fonds de Développement de l'Energie (FDE).

(7) Additional contingency has been factored in case of costs in excess of those estimated in the feasibility study (an important consideration for a technology with a limited track record in the size range of the Ouarzazate project). This amount has been made available from the other IFIs to cover such contingency.

(8) Split of KfW amount between debt and equity to be confirmed

(9) The split between MASEN and PPP partners need to be agreed during negotiations with selected partner.

C. Lessons Learned and Reflected in the Project Design

34. The proposed project was designed to meet numerous challenges stemming from the client's goal to attract concessional financing and initiate private sector participation in the development of a high cost technology that also has the potential of high rewards in terms of energy security and climate change mitigation. The project design has benefited from lessons learned about using the independent power producer/PPP model to transfer technology, reduce the cost of new technologies, ensure operational performance, and reduce the risks of cost overruns and delays in construction. These lessons are as follows:

- A preliminary technological assessment to minimize technical risk;
- The coordinated mobilization of donor co-financing to demonstrate the government's ability to gradually mobilize private sector contributions for solar power development;
- A project design that recognizes (i) that the private sector cannot raise all of the financing for the development of an expensive technology that has not yet captured all potential cost declines and (ii) that ensures an efficient risk allocation;
- Introduction of a combination of capital and output subsidies to bring down initial costs while providing incentives for plant performance[14];
- Early market sounding to ensure sufficient investor interest and sound competition;

[14] Many PPPs have tested the principle of financing services delivered (in this case the kilowatt-hours produced), as opposed to only financing capital costs. As a result, governments throughout the world are using this principle. The Government of the United Kingdom's Private Finance Initiative is the flagship for these mechanisms.

- Alignment of the size of the project to MASEN's ability to mobilize financing, to ensure project feasibility;
- Selection of the best procurement approach (two-stage bidding with prequalification) to satisfy clients' needs and take technological uncertainties into account, including the development of clear and quantifiable evaluation criteria;
- Transparent and well-managed competitive bidding processes that have helped attract the interest of major international companies at the prequalification stage;
- Performance-based operational support (the second component is linked to the actual production by Ouarzazate I).

35. The project design also benefitted from exchanges of information and knowledge with other large CSP programs around the world, in particular in South Africa and India. In particular an Energy Sector Management Assistance Program (ESMAP) funded study "Regulatory and Financial Incentives for Scaling-Up CSP in Developing Countries" compares regulatory frameworks and incentive schemes in MENA, South Africa and India, and analyses financing options to reduce LCOE. Coordination with teams working on other CSP programs will continue, in particular through the knowledge platforms provided by the Climate Investment Funds (CIF), Mediterranean Solar Plan, Medgrid, Desertec Industry Initiative, etc.

IV. Implementation

A. Institutional and Implementation Arrangements

36. As shown in Figure 1 below, MASEN will sign a PPA with ONE (based on ONE's high voltage tariff) and a second one with the SPC (based on the project's full cost of CSP generation). GoM will compensate MASEN for the "differential cost" between the two PPAs, according to a Convention signed between the GoM and MASEN[15] on October 26, 2010, and an Ouarzazate I specific Convention to be signed upon creation of the SPC. The *Convention Spécifique* is an effectiveness condition of the two Loan Agreements.

37. In order to implement the Morocco Solar Plan, MASEN is, by law[16], responsible for:

- Technical, economic and financial studies for site qualification, design, development and operation of solar power projects;
- Project management;
- Marketing of the Plan to Moroccans and international investors;
- Mobilizing the required financing for the solar projects;
- Suggesting to GoM measures to ensure local content for each solar project;
- Developing the required Associated Facilities (or common infrastructure) to connect the solar plants to the network and ensuring the necessary water supply;
- Putting in place RE programs to (i) contribute to local applied research and promote technological innovation and (ii) contribute to the creation of entities for training, university level education and research.

[15] The *Convention Générale* between GoM and MASEN only specifies that GoM must ensure financial equilibrium of MASEN and does not specifically refer to a commitment to cover the cost differential.
[16] Loi N°57-09 creating "Moroccan Agency for Solar Energy", in particular Article 2.

38. ONE is mandated to take all the power generated by the power plant according to the laws, regulations and conventions signed with MASEN and GoM. This will be contractualized in a PPA between MASEN and ONE.

39. MASEN is the implementing agency for the Morocco Solar Plan and, as such, is responsible for defining all the technical, safeguards and fiduciary aspects of the project and in negotiating the financing and legal agreements with the co-financiers. The SPC will be contractually mandated by MASEN and the selected partner (after no objection of the financiers) as the implementing entity to construct and operate the plant according to Bank rules and procedures.

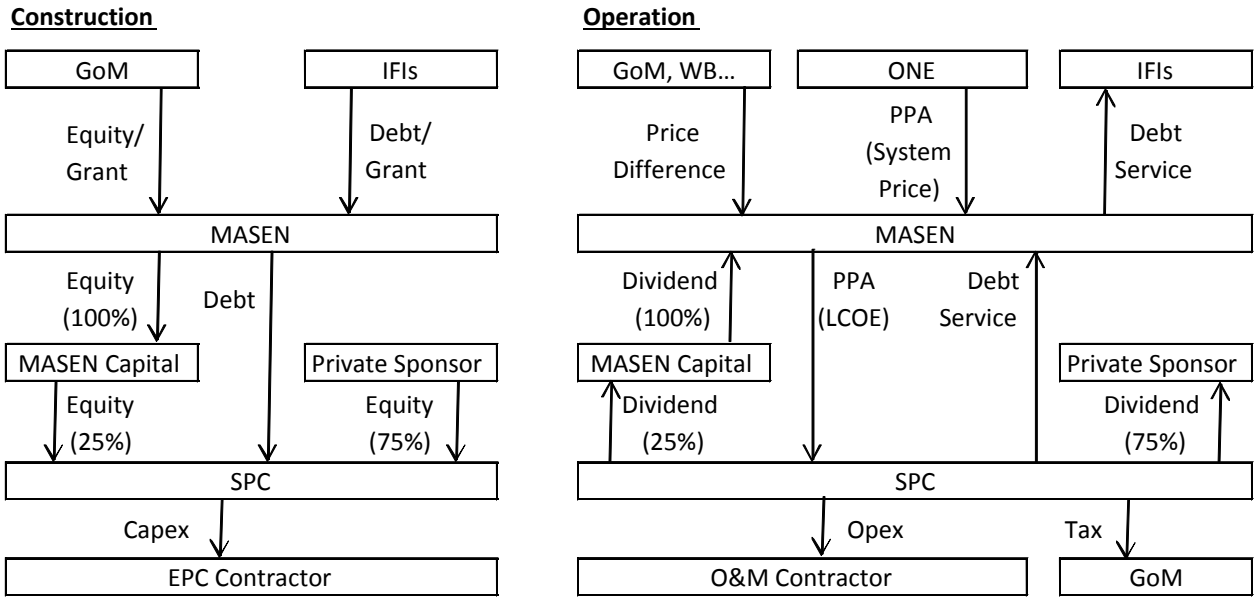
40. MASEN has initiated the selection of a private partner(s) to develop 160 MW of CSP (parabolic trough and/or tower) with three-hour storage that will help cover peak load and displace hydrocarbon-based generation (currently diesel/fuel oil and possibly natural gas in the future). The prequalification phase was completed in December 2010 and four consortia have been selected on the basis of their technical and financial capabilities.

41. The partner is being selected in a two-stage bidding process[17] that allows for discussion of the technical bids and the risk-allocation within the project (before formulation of financial bids) and ensures the soundness of the technical proposals. The four potential bidders will have a relative degree of comfort about financing availability before submitting financial bids. This was deemed important given the high level of risk in this innovative and transformational project--hence the relatively early presentation of the IBRD and CTF loans for WB Board approval. The suite of contracts ultimately agreed between GoM, MASEN, ONE and the selected private partner will be subject to joint IFI review before financing is declared effective (the contractual structure is further described in Annexes 2, 3 and 5). MASEN will own 25% of the SPC, through its wholly owned subsidiary MASEN Capital. The selected private partner will own the remaining 75% of the SPC.

42. The contractual arrangements and flow of funds during construction and operation are presented in Figure 1:

[17] The bidding documents are subject to non-objection by the World Bank and the other IFIs.

Figure 1 - Contractual Arrangements and Flows of Funds



B. Results Monitoring and Evaluation

43. MASEN will regularly monitor project implementation by the SPC as per its contractual arrangements to be in place before effectiveness of the CTF and IBRD loans. PDO level results indicators and intermediate indicators will be monitored by MASEN and reported to the World Bank and other IFIs in project reports, covering a period of one calendar semester. MASEN will submit the project reports to the Bank 45 days after the end of each calendar semester. Among other items, the project reports will cover financial statements, physical progress, and procurement.

44. As per the CTF loan agreement, the interim unaudited financial report shall include the technical audit report prepared by an independent verification expert. The technical audit report shall be focused in particular on: (i) the achievement of the milestones set forth in the EPC Contract; and (ii) compliance with pricing provisions set forth in the EPC Contract As per the IBRD Loan Agreement for Component 2, the interim unaudited financial report shall include a report prepared by an independent verification expert certifying that the amount of the relevant SICS is correct as per the provisions of the PPA, the PSA, the Conventions and any other relevant document.

C. Sustainability

45. The sustainability of the project is ensured by the creation of a dedicated agency staffed with top professionals to develop the Morocco Solar Plan, namely MASEN, and its association with a financially strong and technically capable private developer to develop Ouarzazate. This partnership will ensure that the plant will be constructed, operated and maintained according to industry standards.

46. MASEN's Law and the conventions signed or to be signed between the State and MASEN[18] provide for government support for not only Ouarzazate I but also the complete 2,000 MW program. MASEN buys high cost CSP production and sells it to ONE 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 energy develops, along with other renewables, the State budget to cover subsidies for fossil fuels will decline, as the economy becomes less dependent on imported fossil fuels, freeing additional financial resources to subsidize solar energy if still needed. Increases in coal prices (and other fossil fuel prices) would also reduce the need for solar subsidies, if the selling price to ONE was to be indexed to fossil fuel prices[19], and contribute to the sustainability of the project.

47. Sustainability could be at risk in case of insufficient concessional climate financing and discontinuation of the State support, while exports have not yet materialized. Sufficient financing has been secured for Ouarzazate I, with an attractive financing package (20 percent grant element). However this could prove more difficult for next phases if the Green Climate Fund as envisaged at the Cancun Conference of Parties, is not set up fast enough. By law, the State is committed to supporting the Morocco Solar Plan, but changing social and economic conditions[20] could erode that commitment. This is why export arrangements need to be secured as fast as possible. Several European countries are now working with Morocco to secure export contracts as soon as possible, and WB and AfDB management at the highest level are supporting this dialogue.

V. Key Risks

48. At this stage of the development (before selection of the PPP partners), the risk rating of the project is high. However, the project's envisaged transformational effect on not only Morocco and its energy security but also the entire region is substantial. The project is expected to catalyze utilization of Morocco's extensive solar potential and establish a model in the region for promoting RE use. It is also expected to stimulate job creation at a critical time of political and economic uncertainty for Morocco and other MENA countries. Beyond the MENA region, this project is expected to have a global demonstration effect. The impact of IFI's support to such an endeavor is likely to demonstrate commitment to not only the region but also to the climate change agenda in developing countries. This commitment finds form in the proposed partnership between Morocco and the international community for investment in the country's future, reducing the carbon footprint of the energy system, and for CSP scale-up. Risks to the PDO were assessed using the ORAF table in Annex 4 and can be summarized as follows:

- *Selection of financially or technically weak private partner(s) to establish the PPP, or lack of bidders*. The probability of this event is low but its consequences could be very detrimental to the project. This risk was very high in the initial stages of the project but

[18] "*L'État s'engage, dans les conventions spécifiques pour chaque projet, au cas par cas, à assurer l'équilibre économique et financier des projets*", Convention entre l'État et la Société "Moroccan Agency for Solar Energy", Ouarzazate, 26 octobre 2010. A project specific convention will be signed between MASEN and the government; it is an effectiveness condition to the loans.

[19] This may raise affordability issues which could be dealt with by targeted transfers through a Social Protection mechanism.

[20] Public finance is expected to deteriorate throughout 2011. By end June 2011, the budget deficit stood at around 5 percent of GDP, much higher than the targeted 3.6 percent set by the 2011 Budget Law. As basic food and fuels subsidies strongly increased over the first half of the year compounded with the revalorization of salaries to ease the pressure of the social protests, the deficit might have been much higher had not the efforts been implemented by the government to improve tax collection and curtail nonpriority recurrent expenditures. The budget deficit is expected to increase to between 5.5 percent and 6 percent of GDP this year 2011.

was reduced after the successful completion of the prequalification process, resulting in the selection of four strong consortia with CSP experience and familiarity with PPPs. MASEN secured high quality advisory services from reputable financial, technical and legal advisors. Furthermore, subsequent phases of the selection process will continue to be carefully supervised by the Bank and other co-financiers with the assistance of advisors.

- *Weak implementation capacity of MASEN and its partners.* The risk of weak implementation capacity is mitigated by MASEN's rapid competence build-up and the choice of a private partner experienced in designing, developing and implementing technologically challenging solar projects. Given MASEN's lack of experience with World Bank and other donors procurement practices, the risk of procurement is rated high. Although becoming less likely, this occurrence could have a high negative impact on the project.
- *Technological risk.* Based on market response during the prequalification process, MASEN has selected parabolic trough technology for the proposed Ouarzazate I, which is less risky than towers. However, the risk of freezing of either the heat transfer fluid or the molten salt is much higher for parabolic trough than for the tower technology. Therefore, at this stage, the technological risk is rated high. Several mitigation measures were formulated by MASEN, such as (i) two-stage bidding process, where the partner will be selected after thorough discussion of technical issues and risks, (ii) requirement, as part of the technical bid, to have project implementation experience demonstrated with evidence from actual completed projects, (iii) existence of bonding requirements and liquidated damages, should the plant not be able to produce, (iv) an engineering, procurement and construction (EPC) contract that will pass a significant amount of technological risk to the construction company and equipment supplier.
- *Insufficient and inadequate coordination among co-financiers.* The joint co-financiers' missions that took place during project preparation showed that MASEN could find differences in procedures, evaluation methods and processing schedules to be challenging. The subsidiary loan agreement between MASEN and SPC need to be coordinated with the IFI loans, a process that can be complicated and lengthy, further compromising the ambitious schedule proposed by MASEN (see point below). Donors agreed in principle, and if MASEN agrees, to hire joint technical and legal advisors to support them during consortium selection and preparation of loan effectiveness. Donors have agreed to disburse CTF funds first and to adopt joint disbursement principles for Component 1-A. The preparation of a Financial Management (FM) and Disbursement Manual, approved by the IFIs, is an effectiveness condition.
- *Tight schedule proposed by MASEN.* The schedule adopted by MASEN for the transaction is highly challenging and could lead to difficulties in (i) carrying the transaction according to Bank and/or co-financiers rules, (ii) the bidders ability to submit a well prepared bid, and (iii) the project reaching financial close according to the timetable driven by MASEN. The risk is high and the right balance between speed and technical/procurement/ environmental and social and fiduciary safeguards will be given attention during transaction processing.
- *Committing Bank financing prior to finalizing the contractual details of the PPP structure*. MASEN expects to secure signed commitment from WB and several other

IFIs[21] if possible at a very early stage of Ouarzazate I to provide financing certainty to the bidders, which is justified given the risks to the private sector due to the highly innovative proposed PPP structure and the high incremental cost of the technology; this will also reduce time required for financial close. Lengthy negotiations with the private partner would lead to either delayed draw down or no draw down of World Bank loans. MASEN is aware of this risk and is working with its advisors to prepare contingency plans to bring about necessary remedies if market response is less than expected. Mitigation measures considered by the Bank include: (i) significant supervision will be put in place post signature of CTF/IBRD loans until they become effective, and (ii) the effectiveness of such loans will be subject to a list of World Bank conditions including, inter alia, execution and satisfaction of all conditions precedent to the key transaction documents in a form and substance acceptable to the Bank, inclusive of the loan from MASEN to the SPC. To conclude, the impact of a poor structure could be serious and the associated risk is rated high.

49. Moreover, a risk to the higher level objective of supporting the development of a globally available competitive non-carbon energy source is the cessation of government support while exports have not yet developed to a large scale and insufficient concessional funding is available. Increased social unrest or financial hardship, if the European crisis or the Arab Spring movement were to spread to Morocco, could lead to discontinuation of the Morocco Solar Plan, if no other sources of support was available (such as revenues from exports or concessional funds), threatening the replicability and the transformational potential of Ouarzazate I if it becomes a single stand-alone project. Concessional financial support and exports to the EU are the two key variables for the financial viability of most CSP projects, and therefore for the replicability of Ouarzazate and the sustainability of the Morocco Solar Plan. Concessional financing is therefore critical to kick start the process and, as exports expand, the need for concessional funds will be reduced. Recognizing this risk, MASEN has spent time and effort to mobilize the IFIs with as much concessional finance as possible, starting with the CTF and NIF, and is active in all climate financing events and activities, including the past COPs in Copenhagen and Cancun and the preparation of the forthcoming COP in Durban. MASEN has also been active in preparing the ground for exports, with the help of the World Bank, the AFD and other IFIs. France has set-up a high level working group to develop an appropriate framework for exports from Morocco to France and possibly other European countries, and an agreement is expected to be signed before the end of 2011. Germany has expressed the interest in setting up a similar contractual framework. During the G8 Deauville summit in Spring 2011, a commitment was made to create a Euro-Mediterranean electricity market, which would facilitate trade in green electricity between the Southern and Northern shores of the Mediterranean. Finally, another mitigation measure is the kind of mechanism the World Bank is offering with the second component of the present operation, namely the SICS, offering flexibility to GoM to alleviate undue burden on the State[22]. Although mitigation measures are being put in place, the risk is real and is rated high until a stable framework for exports is institutionalized and a permanent mechanism for climate finance such as the Green Climate Fund is established.

[21] The project is co-financed by the African Development Bank (AfDB), the Agence Française de Développement (AFD), the German Aid Agency KfW, the European Investment Bank (EIB) and the EC Neighbourhood Investment Facility (NIF). The AFD loan has already been approved by its Board. The other approvals are expected as follows: EIB in October 2011, KfW in November 2011 and AfDB in December 2011.
[22] For the Ouarzazate I project, the IBRD loan of $200 million covers approximately one quarter of the net GoM contribution over the 25 years of the PPA. Other IFIs are considering putting in place budgetary support that would complement the IBRD mechanism and further alleviate the burden on GoM. The amounts are small compared to the reward and the risk is a worthwhile one to take.

50. The confluence of the foregoing risks makes the project's risk rating, before completion of the development process, high.

VI. Appraisal Summary

A. Economic and Financial Analysis

51. All CSP projects developed or under consideration to date are supported by governments through a wide range of incentives because the technology is not economically viable under current economic conditions and considering high discount rates. These projects are financed because of their expected transformational impact, even though they are not economic on a stand-alone basis. Ouarzazate is no exception. The cost effectiveness analysis, carried out by ONE, and cost-benefit analysis, carried out during the project evaluation indicate that Ouarzazate is not economically justified under prevailing economic conditions. Considering a 10 percent discount rate: (a) CSP candidates are not part of the optimal generation mix taking into account the base case assumptions considered in the least cost study; and (b) internal economic rates of return (EIRRs) of the project range from one to three percent, depending if the generated electricity sales are valued at the considered sale price to ONE (PPA MASEN-ONE) or at the long marginal cost of the system. Assumptions and detailed analyses are provided in Annex 8.

52. However, CSP plants are closer to cost effectiveness and their EIRRs are higher if assumed discount rates are low. Many economists advocate lower discount rates in economic evaluation of environmental and climate change projects. The debate is contentious and appropriate discount rates are still a matter of debate. Several countries, mostly developed ones, have adopted discount rates lower than 5 percent for climate change projects.

53. Without storage, the proposed CSP unit would almost not contribute to peak demand. In all cases studied, the storage slightly reduces the EIRR. However, incorporating storage in this first project is strategically essential to ensure that CSP would in the future contribute to meeting the electricity demand reliably and continuously, one of Morocco's major strategic choices and reasons to undertake this costly project. Without storage, the project would be significantly less transformational.

54. The program is a strategic choice that will benefit Morocco by increasing its energy security, gradually developing R&D and green energy industries, developing interior regions of the country and creating urgently needed jobs. It is also expected that solar technology will contribute to better integration of regional markets and substantial increase of green electricity trade. This potential transformation is the main reason for the support provided by all parties involved in the project.

55. The results of the financial analysis[23] indicate that, even with concessional financing, bilateral grant and multi-lateral and bi-lateral financing, the financial viability of the project is contingent upon a very high sale price of the generated electricity. This price is more than double the average wholesale price in Morocco and requires a high level of government contribution, external financing and/or export to higher value markets (which are under discussion but unlikely for this first project). The sensitivity analysis shows that the project's levelised cost of

[23] Some details of the financial analysis are not presented in the PAD because they are deemed procurement sensitive at the current stage of the bidding process, and are instead available in a confidential paper in the project file

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energy (LCOE) is very sensitive to technical parameters such as capital expenditure and actual generation, and much less sensitive to operating expenses, which was to be expected for a capital intensive project with no fuel cost. This confirms that decreasing capital costs will be paramount to make CSP competitive, not only in Morocco or in the MENA region, but also globally. This also confirms that CSP projects should be located as much as possible in the best possible locations in terms of solar radiation, like the MENA region. The sensitivities also show that the project's LCOE is sensitive to the average cost of capital (debt + equity), which was also to be expected given the capital intensity of CSP plants.

56. The transformational aspects of the project, its potential contribution to scaling up solar energy in MENA countries and advancing the climate change agenda in the world warrant the support provided by the World Bank despite the low economic rate of return for this project.. The successful deployment of CSP with storage would bring costs down and make the technology economically viable for future projects (and possibly this project if export contracts are entered into within the next four years) to meet the energy needs of the region reliably and securely.

B. Technical

57. Based on a technological review carried out by its technical consultant, MASEN intends to develop the 500 MW Ouarzazate power plant considering all utility size and available solar technologies. It carried out a technologically neutral prequalification process, for a first phase of at least 125 MW (and a target of 250 MW), following Bank procurement procedures, which resulted in the prequalification of four consortia with extensive experience in CSP parabolic trough technology. Based on the results of the technical studies and the prequalification process, MASEN requested the Bank and other financiers' support to initiate the first phase development of the site with the installation of a 160 MW gross solar trough power plant in partnership with a competitively selected private partner from the prequalified potential bidders. In the minimum functional specifications (MFS) for the request of technical proposal, reviewed collectively and cleared by the financiers, MASEN provided prequalified potential bidders with technical, health, safety, security and environmental and social requirements that should be taken into account during the design, construction, operation and maintenance of the power plant.

58. The Front End Engineering and Design (FEED) to meet the above requirements will be carried out by the successful private bidder. The construction and operation of the power plant will be delegated to the SPC to be jointly created by MASEN and the successful private partner.

59. The technical due diligence during project preparation focused on ensuring that preliminary technical studies and MFS are sound and would allow the selected private partner to construct, operate and maintain the proposed solar power generation facility in an efficient, economic, reliable, safe and environmentally-sound manner.

60. This technical assessment is based on several presentations made by MASEN's technical advisor in the monthly donors meetings held during the project identification and preparation phase, the summary technical report and the MFS amended to incorporate the financiers' comments during the preparation of the project. The conclusions of the preliminary technical studies are as follows:

- The selected site for the proposed power plant is situated 10 km E-NE of Ouarzazate on a land of about 2,500 ha. The location is a green field site with no prior industrial use,

easily accessible (well-connected via national paved roads, and ready on-site access along existing unpaved roads), close to the power grid for evacuation of all expected power generation, and close to sufficient water supply if the least cost evaluated bid would require wet cooling. Environmental and social issues related to the site are discussed in Sections E and F below.

- In site Direct Normal Radiance (DNI) measurements have been conducted at the site since February 2010. Available data to date indicate that the site-specific insolation DNI is significantly higher than typical site qualification limits; MASEN's technical advisor has rated the meteorological risk as moderate.
- The technical advisor carried out a thorough technology evaluation and concluded that only three solar power technologies have been employed in utility-scale plants that are in operation with sufficient historical data to demonstrate a suitable level of technological maturity. These technologies are parabolic trough, central tower receiver and flat plate photovoltaic. Based on the results of technical studies and of the prequalification process, MASEN decided to limit the first phase RFP to 125-160 MW CSP modules and the technical advisor confirmed that there are solid companies that are capable to design and construct such modules, even though the technical risk is higher for parabolic trough because of storage. Given the results of the prequalification process and the limitation of the first phase to the CSP parabolic trough technology, the technical risk is still rated as high only because of the molten salt thermal energy storage.
- The technical advisor studied various configurations based on: (a) appropriate sizes of individual module (to optimally use the site for the development of 500 MW), (b) technologies that can meet the restrictions of the site while capitalizing on its advantages, and (c) supporting components that will optimize the plant production and water consumption rates of each configuration.
- To meet the requirements defined by MASEN and ONE, the technical advisor proposed a thermal storage system utilizing hot and cool salt tanks to generate steam during peak hours. An auxiliary electric heat source would be used to keep the salt in a molten state during protracted maintenance outages and bidders have also been given the options to use propane and/or low sulfur diesel to ensure the safe and reliable operation of the power plant.

61. The approach developed by the technical advisor and the decisions made by MASEN to date are sound. The technical advisor assisted MASEN in preparing the minimum functional specifications which have been amended to incorporate the comments made by all financiers during the pre-appraisal mission to ensure that the site is used optimally (to the extent possible) and the power plant is designed, constructed and operated safely and reliably.

C. Financial Management

62. MASEN financial management system was appraised to determine if it complies with the requirements of the Bank in respect to OP/BP 10.02. The financial management evaluation of MASEN covered the areas of accounting and financial management, as well as the reporting and auditing process of the project. A financial management system is being developed by MASEN and will be finalized by effectiveness. The FM system will reflect the operations and financial condition of MASEN including the operations, resources and expenditures related to the project.

63. The Solar Power Company (SPC) will build, finance, operate and own the plant. A private consortium will own 75% of the SPC. MASEN will also invest in the SPC and own 25% of its equity (through its wholly owned subsidiary MASEN Capital). In accordance with its contractual arrangements, the SPC will maintain a financial management system acceptable to the Bank, preparing annual financial statements, and periodic expenditure reports by component, category and source of funding. The SPC will be audited annually by and an independent external audit acceptable to the Bank. A review of SPC's draft PPA was done as part of the assessment of the project on SPC's contractual obligations with respect to accounting, financial reporting and auditing. As an effectiveness condition, the final contractual documents (PPA, Shareholder agreement and loan agreement between MASEN and SPC) will be reviewed to ensure that SPC will meet the above requirements.

64. MASEN accounting system is based on the rules applicable to commercial law of the Kingdom of Morocco and its financial statements are submitted annually to an independent external audit. Interim unaudited financial report, which will cover all the activities and sources of funds of the project, will be prepared twice a year by MASEN and transmitted to the World Bank 45 days after the end of each period. The external annual audit report of the project accounts and the management letter covering recommendations to improve the internal controls and the accounting system will be transmitted by MASEN to the Bank no later than six months after the end of each exercise. Moreover, the annual audit report of the project accounts will be carried out in accordance with the Bank guidelines by an acceptable auditor and according to acceptable terms of references to the Bank.

65. The main financial management risks for the project at this time relate to whether the SPC and MASEN have sound financial management systems and suitable human resources. The SPC had yet to be established at the time of this assessment. Financial management risk in MASEN is likely to be lower than in the SPC as MASEN will act as the GoM's fund-channeling agency.

66. The financial management risks will be mitigated by specific obligations for the SPC in the contractual documentation of the PPP including the loan agreement between MASEN and the SPC and for this reason the Bank will need to approve the final documentation and find it acceptable before declaring effectiveness.

D. Procurement

67. The procurement is for the selection, through an open competitive bidding process acceptable to the Bank preceded by pre-qualification, of private Project Sponsor(s) (or Independent Power Producer (s)) who, through a partnership with MASEN, will constitute the SPC. In accordance with the Bank's policies, since the Project Sponsor is being selected under open competitive bidding procedures determined acceptable to the Bank, it will then be free, alone or as a shareholder in the SPC, to procure the goods, works, and services required for the facility from eligible sources, using its own procedures. The procurement plan is limited to one contract for Ouarzazate I.

68. MASEN's law states that the agency is responsible for putting in place RE programs to contribute to (i) local applied research and technological innovation and (ii) the creation of entities for training, university level education and research. MASEN is to use each bidding process for the plants under the Morocco Solar Plan to promote local manufacturing to the

highest level possible. MASEN is targeting a level of local content of 30% of the plant capital cost—a level consistent with the findings of an ESMAP study on the CSP local manufacturing potential in the MENA region[24]. To comply with its mandate, MASEN has requested from the bidders proposals for an action plan on how they could assist MASEN in achieving its mandate. MASEN is suggesting that participants in the RFP can opt for three solutions to meet that requirement: (1) indirect measures (the consortium bidding to develop Ouarzazate I commits to invest, alone or through a partnership, in a RE equipment manufacturing facility, an RE O&M activity or an engineering or R&D facility), (2) direct measures (local procurement of some of the goods and services for developing and constructing Ouarzazate I) or (3) a combination of the two solutions. More details can be found in Annex 3. The content of the action plans is left to the discretion of the bidders and their commitment to local content is on a voluntary basis. The process is therefore compliant with WB Procurement Guidelines.

69. The MASEN team is being trained in Bank procurement procedures. Moreover, MASEN hired a senior procurement specialist well experienced in the Bank's procedures. More details are provided in Annex 3.

E. Social

70. MASEN has conducted a Framework Environment and Social Impact Assessment (FESIA) which incorporates comments from the Bank team. The FESIA describes the process through which, for the purpose of the project, MASEN concluded the acquisition of 2,500 ha of collective land owned by the Aït Oukrour Toundout community (out of a total area of 64,000 ha). This acquisition was carried out following Moroccan standard procedures for similar types of voluntary land transactions between a local community and a public agency. These procedures have included the following steps: a) setting of purchase price by a Commission of Experts; b) granting of required authorization; c) signing of notarized decision regarding land sale; and d) transfer of property right.

71. Although the land acquisition process was a voluntary process, it has been determined that this operation triggers the Involuntary Resettlement Policy (OP 4.12), in order to prepare a Land Acquisition Plan (LAP) to describe the land acquisition process and monitor use of the proceeds to the benefit of the local population. The detailed procedure used for land acquisition in this case is presented in Annex 3. The LAP includes, in particular, the following documents: a) copy of the land price committee determination of the price of the land, b) copy of the written agreement by the community of the Ait Oukrour Toundout on the sale and conditions of the transfer of the land, c) copy of the authorization of the Supervisory Board about the transaction and d) ONE/MASEN/Community tripartite agreement on land acquisition. The land acquisition was completed as per the process described in the LAP.

72. In addition, on a voluntary basis and in order to establish itself as a "good corporate citizen", MASEN shall contribute to a Social Development Plan (SDP) which is being developed through which benefits will accrue to local communities in the area of the project through the use of the proceeds of the compensation paid for the land acquisition under the LAP, and other

[24] ESMAP-Assessment of the Local Manufacturing Potential for Concentrated Solar Power (CSP) Projects. January 2011- Report by Ernst & Young and the Fraunhofer Institute. Study available at http://arabworld.worldbank.org/content/awi/en/home/research/kcb1.html.

voluntary actions planned to be implemented by MASEN and/or any other stakeholders, including local government. The final SDP will be shared with the Bank which will be provided an opportunity to give its feedback, comments and recommendations.

73. *Gender aspects*: The project is going to be implemented in a rural area with small villages along an intermittent water stream, which explains why most of the activity is agricultural. However, most of these villages (about 90%) benefit from water supply through mostly individual connections and from electricity access (nearly 100%). The project should not impact women in any particular way and in any case the social development study will provide recommendations for improving physical and social infrastructure that will benefit women living conditions.

F. Environment

74. The project triggers the World Bank Environmental Assessment Policy OP 4.01 and is classified as Category A. MASEN has prepared a FESIA in order to inform the process of integration of environmental and social concerns in the design and preparation of the project.

75. **Potential impacts**: The FESIA presents how environmental considerations played a role in site selection and includes a discussion of the key potential adverse environmental impacts of the project, that are expected to be:

- Water consumption could be substantial, depending on the technology selected (up to 6 million cubic meters per year). The water needed by the facility will be transferred from the Mansour Eddahhabi dam located near Ouarzazate;
- Construction impacts such as waste, noise, to be managed in the same way as similar impacts for large construction projects (waste disposal, etc);
- Use of transfer fluids in the CSP plant, and associated potential leakage or anti-freeze or rust inhibitors. Safety measures against such releases are achieved through relevant components being leak-proof, regularly maintained, cleaned and periodically replaced by appropriately trained staff;
- Thermal and/or chemical pollution of local water ways from cooling water and other waste water. Appropriate mitigation measures would include wastewater management practices and monitoring of discharge water; and
- Fire risk from solar converters at high temperatures, including risk of out-gassing from panel components. Responses would include measures against overheating (coolants) and relevant warning / monitoring systems.

76. **Mitigation measures**: The site has been selected taking into account operational considerations and, in particular, availability of water in case of wet cooling. Accessibility of the site and proximity to the power grid also played an important role in the selection of the site. The FESIA specifies appropriate mitigation measures, environmental monitoring plan, institutional arrangements and training requirements, together with cost estimates for implementation of the mitigation measures. Major mitigation measures include limitation of water consumption, reduction of risks of pollution, treatment of effluent, protection of biodiversity. Several positive impacts are also foreseen, including avoided greenhouse gases emissions of 240,000 tons of CO_2 equivalent per year.

77. **Public Consultation and Feedback**: Several meetings took place and have been attended by representatives of the local population, local authorities, local representatives of the

various Ministries, utility companies and other affected organizations to discuss the proposed project (a draft FESIA had already been prepared by the client before the World Bank was involved in the project). A formal public consultation meeting on the draft FESIA has been organized on November 3rd, 2010 in Ouarzazate and confirmed that the proposed operation is widely supported by local officials and community representatives. The proceedings of this meeting are included in the FESIA report. The main comments made during the meeting are related to natural risks (wind, seism), water use, access road, economic and social impacts. Additional consultations will be organized during the preparation of the Environmental and Social Impact Assessments (ESIA) for the power plant and the associated facilities. At that stage, more detailed information will be available (including but not limited to conclusion of the impact assessment and a discussion of recommended project specific mitigating activities and plans) to ensure more meaningful consultations.

78. Also consultations were carried out in December 2010 and a participative process implemented as part of a social development study financed by the French Development Agency (AFD) that included several meetings and workshops that will extend into the fall of 2011 with a final presentation to stakeholders of the study's recommendations.

79. **Associated Facilities**: Concerning the associated facilities (water line, transmission lines and other infrastructures such as access roads) which will be built by other agencies (ONEP, ONE and local Government), it was agreed that: (i) an ESIA and Environmental and Social Management Plan (ESMP) will be prepared as appropriate for each associated facility, and (ii) no land acquisition would be needed, however, in case such land would be needed, MASEN shall ensure that no works on such facilities would start until such a time when the land acquisition process will be defined to the satisfaction of the World Bank, using among others, the principles, processes and rules used for the purpose of the LAP.

80. **Information Disclosure**: A draft FESIA and a draft LAP were reviewed during January 2011 and sent to the Infoshop on January 13, 2011. The FESIA was disclosed in-country on January 8, 2011 and the LAP on January 12, 2011. The FESIA and LAP were subsequently amended and disclosed at Infoshop on July 22, 2011. Specific ESIAs that will be conducted by the SPC and national agencies in charge of water and electricity will also be subject to disclosure (in country and at the Infoshop).

Annex 1: Results Framework and Monitoring

Morocco: Ouarzazate I Concentrated Solar Power Plant Project

Results Framework

Project Development Objective (PDO): The development objective of the Project is to support the Borrower in the development of the 500 Megawatt Ouarzazate solar power plant by financing the first phase (160 Megawatt gross) through a public private partnership (PPP), to increase power generation from solar power and mitigate greenhouse gas emissions and local environment impact.

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PDO Level Results Indicators	Core	Unit of Measure	Baseline (2010)	Cumulative Target Values					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (indicator definition etc.)
				2011	2012	2013	2014[25]	2015				
Indicator One: Installed capacity of CSP power generation	☐	MW	20	20	20	20	180	180	Once, after end c project	MASEN report	MASEN	
Indicator Two: Electricity production	☐	GWh	0	0	0	0	185	370	Annual after plar commissioning	MASEN report	MASEN report	Annual generation by Ouarzazate I
Indicator Three: Avoided local air pollution	☐	Tons of NO_x, SO_x annually	0	0	0	0	500 2,000	1,000 4,000	Annual after plar commissioning	MASEN report	MASEN report	Estimate of avoided NOx, SO_x based on various fuel used (oil, coal, gas)
Indicator Four: Avoided global		Tons of CO_2 eq./year	0	0	0	0	120,000	240,000	Annual after plant	MASEN report	MASEN report	Estimate of avoided CO2,

[25] Avoided local air pollution and avoided global GHG pollution indicators based on commissioning of the plant on July 1st 2014.

GHG pollution	☐								commissioning			based on various fuel used (oil, coal, gas)
INTERMEDIATE RESULTS												
Intermediate Results (IR):												
IR indicator One: PPP acceptable to the World Bank and co-financiers	☐	Yes/No	0	Yes	-	-	-	-	Single event	World Bank an co-financiers issues non-objection	World Bank	
IR indicator Two: Transaction financial close	☐	Yes/No	0	-	Yes	-	-	-	Single event	MASEN report	MASEN	Transaction financial close occurs when all loan agreements are signed
IR indicator Three: Beginning construction of the plant	☐	Yes/No	0	-	Yes	-	-	-	Single event	MASEN report	MASEN	
IR indicator Four: Commissioning of the plant	☐	Yes/No	0	-	-	-	Yes	-	Single event	MASEN report	MASEN	MASEN sends commissioning documentation to World Bank

Emissions Calculation

Avoided emissions (tones/year)	=	***Electricity generated (MWh/year)[(a)]***	***x***	***Weighted net emission factor (kg/MWh)[(b)]***	÷	***1000***

Notes:

(a) ***Total electricity generated*** *is calculated as follows:*

Electricity generated (MWh/year)	=	*Installed Capacity (MW)*	*x*	*Capacity Factor (%)*	*x*	*Hours per year (8,760 hours/year)*

Where:

- ***Installed capacity*** *is the capacity of the Ouarzazate I CSP solar plant (1st phase) expected to be* ***160 MW*** *(gross) once commissioned.*
- *The* ***capacity factor*** *for CSP solar plant with storage is estimated at* ***26%*** *(370 GWh generated annually).*

(b) ***Net emission factors*** The net emission factors that are utilized in calculating the emissions from the project are as follows:

Emission rates of power plants in Morocco (source: ONE)

kg per MWh	CO_2	SO_2	NO_x	Displaced power generation (MWh/yr)	Avoided CO_2 (t/yr)	Avoided SO_2 (t/yr)	Avoided NO_x (t/yr)
Coal plant	987	6.6	6.7	67.8	66,900	450	450
Combined Cycle	406	0.0	0.0	53.9	21,900	0	0
Oil plant	592	14.0	2.4	248.7	147,300	3,480	600
Total				370.4	236,100	3,930	1,050
Weighted average*	637	10.6	2.8				

* In kg per MWh: Avoided tons per year divided by Displaced power generation.

Annex 2: Detailed Project Description

General concept

1. The project consists of:
   Component 1: Financing the Initial Investment: (A) Development of the Plant through the formation of a PPP between the Borrower and a competitively selected partner and (B) Construction of the Associated Facilities.
   Component 2: Operational Support: Supporting the acquisition of kilowatt-hours produced by the Project Implementing Entity to partially cover the difference in the price at which the Borrower would buy the electricity generated by the Plant and the price at which the Borrower would sell such electricity to ONE.

2. Component 1-A is for the construction of the Ouarzazate I power plant at a site 10 km E-NE of Ouarzazate. The site and technology are described in this Annex, as are the PPP arrangements.

3. Component 1-B relates to the Associated Facilities (or Common Infrastructures) required for the functioning of the CSP plant; they are within the scope of the project but are not financed by the Bank[26]. The Associated Facilities include but are not limited to the infrastructures operated for the purposes of: (i) providing water for the operation of the CSP plant, (ii) transporting power to and from the CSP plant through transmission lines, and (iii) road access to the site. MASEN will finance and manage the Associated Facilities, while ONE and ONEP will be in charge of the construction of the transmission and the water supply infrastructures respectively. MASEN is currently elaborating a plan for the development of the Associated Facilities, the construction of which are planned to start before the end of 2011.

4. The second component ("Solar Incremental Cost Support or SICS Component"), financed through an IBRD loan, covers part of the difference in the prices at which MASEN buys from SPC and sells to ONE the kilowatt-hours produced by Ouarzazate I.

5. The approach relies on: (a) available donor support for climate change friendly technologies, such as CTF and the European Neighborhood Investment Facility (NIF); and (b) guaranteed availability of funds to purchase electricity generated by the plant during the first years of operation. The approach combines capital and output financing. The former reduces the amount of financing that the government is committed to by law, and the latter postpones budget payments to later years, giving time to MASEN to: (a) design and implement arrangements for export of green electricity from subsequent projects to higher value European markets, in order to improve its financial position; and (b) develop a strategy to lower cost and improve the competitiveness of the technology.

Component 1: Financing the Initial Investment of the Plant and the Associated Facilities

6. MASEN hired a technical advisor to carry out a preliminary technical study (assessment of the site and technological options, storage requirements, modeling of plant configurations,

[26] MASEN intends to finance the associated facilities, through a grant from the GoM (probably from the FDE)

etc.) and a financial advisor to carry out market soundings and assist in developing a business model and a legal advisor to prepare legal arrangements necessary to complete the transaction. These market soundings and technical studies allowed MASEN to narrow the technological (CSP trough) and size (140 to 160 MW gross) options for the first phase of the development.

Site

7. The site, a 2,500 ha green field area situated 10 km E-NE of Ouarzazate, is well suited for solar projects, especially for the development of CSP, because of:

- **Excellent solar resources.** There is a full 1-year in-site weather file that includes solar insolation data. A second in site measurement station was added in September 2010. Data collected since February 2010 indicate that the site DNI is significantly higher than typical site qualification limits and used in the preliminary modelling. This conclusion is based on: (a) comparisons of the Ouarzazate 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, USA; and (b) an analysis of 30 years of satellite data. **Availability of water in case wet cooling is required.** Although the area around Ouarzazate is desertic, a reservoir with a capacity of 480 million m^3 is located approximately 10 km south of the city. Therefore, the option envisaged by MASEN for the first phase is based on wet cooling but as specified in the RFP, entirely or primarily dry-cooled systems would be accepted by MASEN if they are proposed by bidders.
- **Accessibility.** The site is accessible via unpaved tracks originating from the paved N10 road that runs from the port city of Agadir, approximately 350 km from the Site, through Ouarzazate. The Agadir port **is located at a relatively short distance and could be** used to import and transport heavy equipment from abroad to avoid the Atlas Mountains. Use of the Casablanca port would require crossing the Atlas Mountains.
- **Proximity to the power grid.** The existing grid and planned reinforcements by ONE will allow evacuation of the full capacity of the power plant at peak output conditions. Furthermore, CSP can be fitted with thermal energy storage capabilities allowing the optimization of peak output to meet the network carrying capacity within reasonable limits.

Figure 2 - Location of the Proposed Ouarzazate Solar Power Plant

Technology assessment

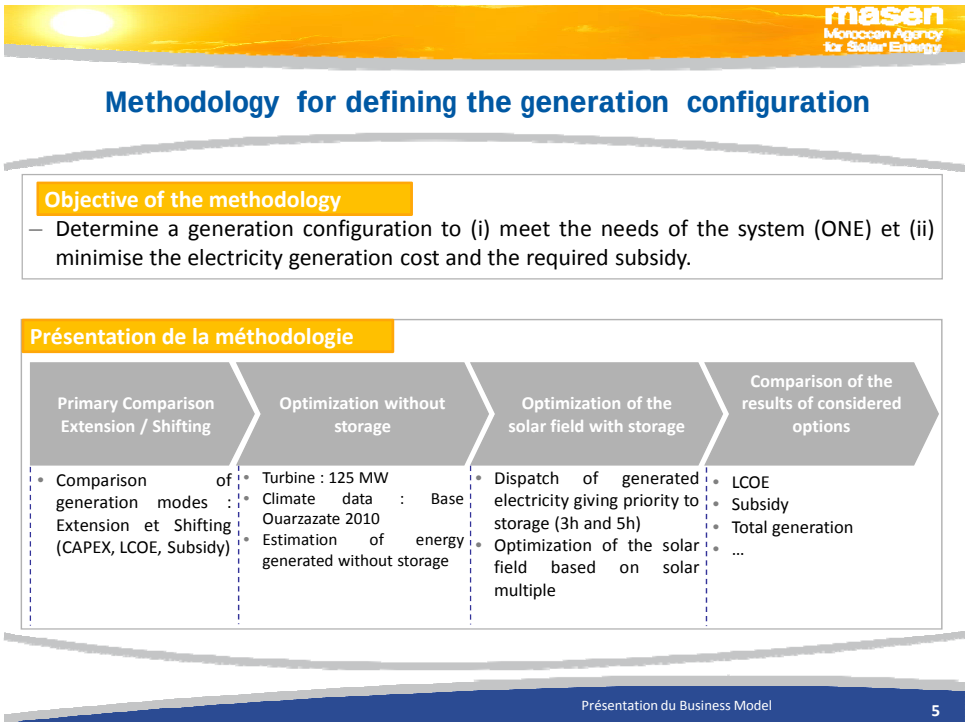
8. MASEN's technical advisor assessed the merits and technical maturity of the most promising solar technologies, including those which emerged only recently from the research and development phase. However, based on installed capacity and operating performance, only three technologies, CSP (parabolic through and central tower receiver) and photovoltaic, were selected for full assessment. Technologies that are still in conceptual design were reviewed but not fully assessed. The results of the evaluation are provided in the table below.

9. Based on the evaluation, MASEN decided to focus in the first phase of the project on 125-160 MW modules of CSP technologies (parabolic troughs and central tower receiver) with 3-hour storage to ensure full displacement of fuel oil- or diesel-based generation during peak hours, (conclusion confirmed by ONE simulations). However, based on the results of the prequalification process, the request for technical bids was limited to a solar trough 125 to 160 MW plant. MASEN's technical specifications called for a wet cooling system but allowed potential bidders to propose a dry cooling system.

Configuration of the first phase

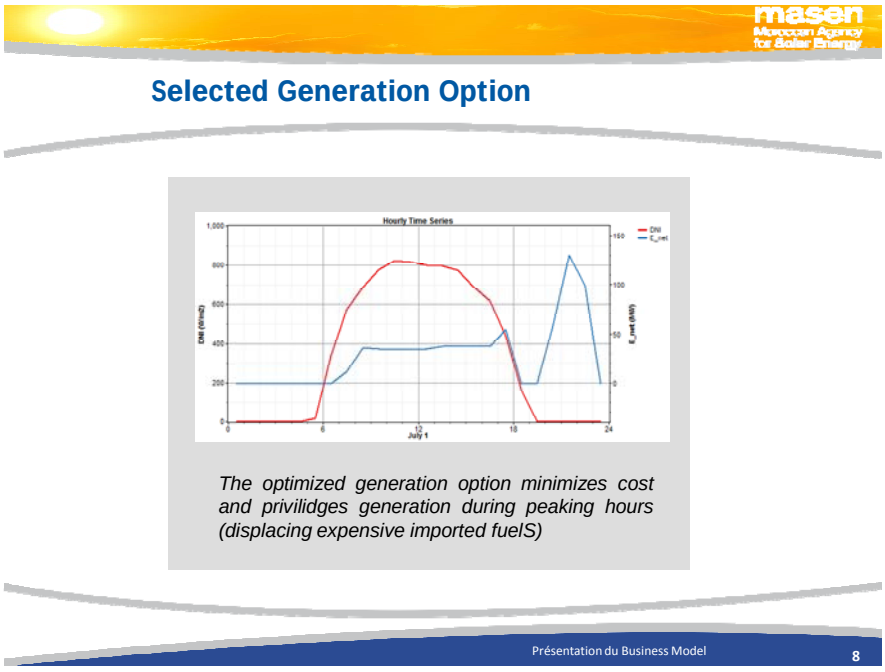
10. The first phase of development of Ouarzazate will consist of a 160 MW gross parabolic trough CSP plant with three hour storage. The configuration was determined by MASEN with the assistance of their technical advisor following the methodology described below.

Figure 3 – Methodology for defining the generation configuration



11. The selected optimum solution meets the system need by displacing expensive imported fuel, especially during peak hours, and considering CSP for meeting future electricity needs and even gradually replacing coal as a base generation capacity.

Figure 4 – Selected Generation Option



12. The plant will be developed with the winner of the on-going two stage bidding process. The first phase will be developed on 450 ha of the site according to a final layout to be finalized after selection of the partner. Two of the layouts considered during the preliminary technical assessment are presented in Figures 3 and 4.

Performance of the plant

13. Table 2, extracted from the Technical Report, compares the different characteristics of the three technologies included in the feasibility study. The 30 year satellite data analyses and on-site measurements to date (on-site measurements started in February 2010) indicate that the performance results of the modelling of the different configurations could be considered as satisfactory. The meteorological risk is considered as moderate by MASEN's technical advisor but the final assessment will be the responsibility of the selected partners.

Table 2 - Solar Technology Comparison: Parabolic Trough, Central Tower Receiver, Flat Plate Photovoltaic (Source: Technical Summary Report)

TECHNOLOGY	Concentrating Solar Power (CSP)		Photovoltaic (PV)
	Parabolic Trough	Central Tower Receiver	Flat Plate PV
Technology Status	Commercial	Mature Demonstration	Commercial
Fuel Sources	Solar (DNI only)	Solar (DNI only)	Solar (Global Irradiation)
Technology Maturity 1 = test to 5 = commercial	4	1	Monocrystalline – 5 Polycrystalline – 4 Thin Film – 3.5
Individual Plant Size (advised)	100 MW	50 MW	N/A
	150 MW	50 MW	50 MW
Overview	• Line-focus receiver in evacuation tube • Heat transfer oil flows through receiver tube • 370ºC max. temp	• Receiver on tower • Molten salt = working fluid • 565ºC max. temp	• Modular technology • Installation: fixed or tracking system • Multiple suppliers
Concentration Ratio	• LS2 ~ 70 suns • LS3 ~ 80 suns • Typically ~ 30 to 100 suns	300 to 1,500 suns	N/A
Storage Option & Type	Indirect Molten Salt TES with auxiliary heat source considering electricity, propane and low sulphur diesel.	Direct Molten Salt TES with auxiliary heat source	Battery
Co-Firing Option	Yes	Yes	N/A
Land Requirements (Ha) (based on 125 MW plant)	~ 250 to 400 ha Dependant on TES vol.	~ 400 to 500 ha	Crystalline (fixed) ~ 250 to 350 ha Thin Film (fixed) ~ 300 to 400 ha
Efficiency % Solar to Electric	10% to 18%	10% to 18%	6% to 25%
Estimated Annual Capacity Factor w/o Storage (TES)	20% to 25%	20% to 25%	25% to 28%

Figure 5 - Option 1: 500 MW SPP Configuration - Four 125 MW Parabolic Trough Plants
(Source: Technical Summary Report)

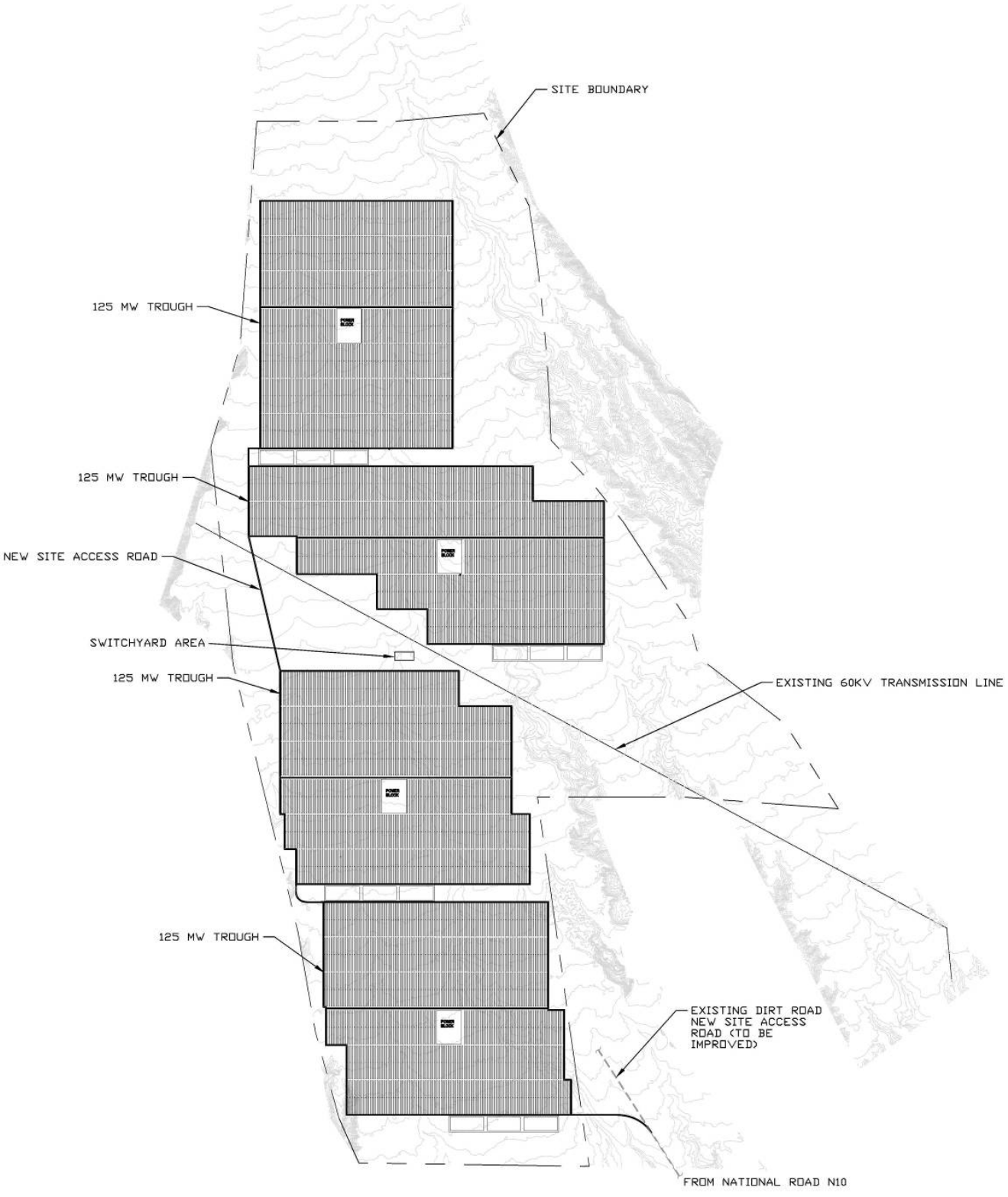
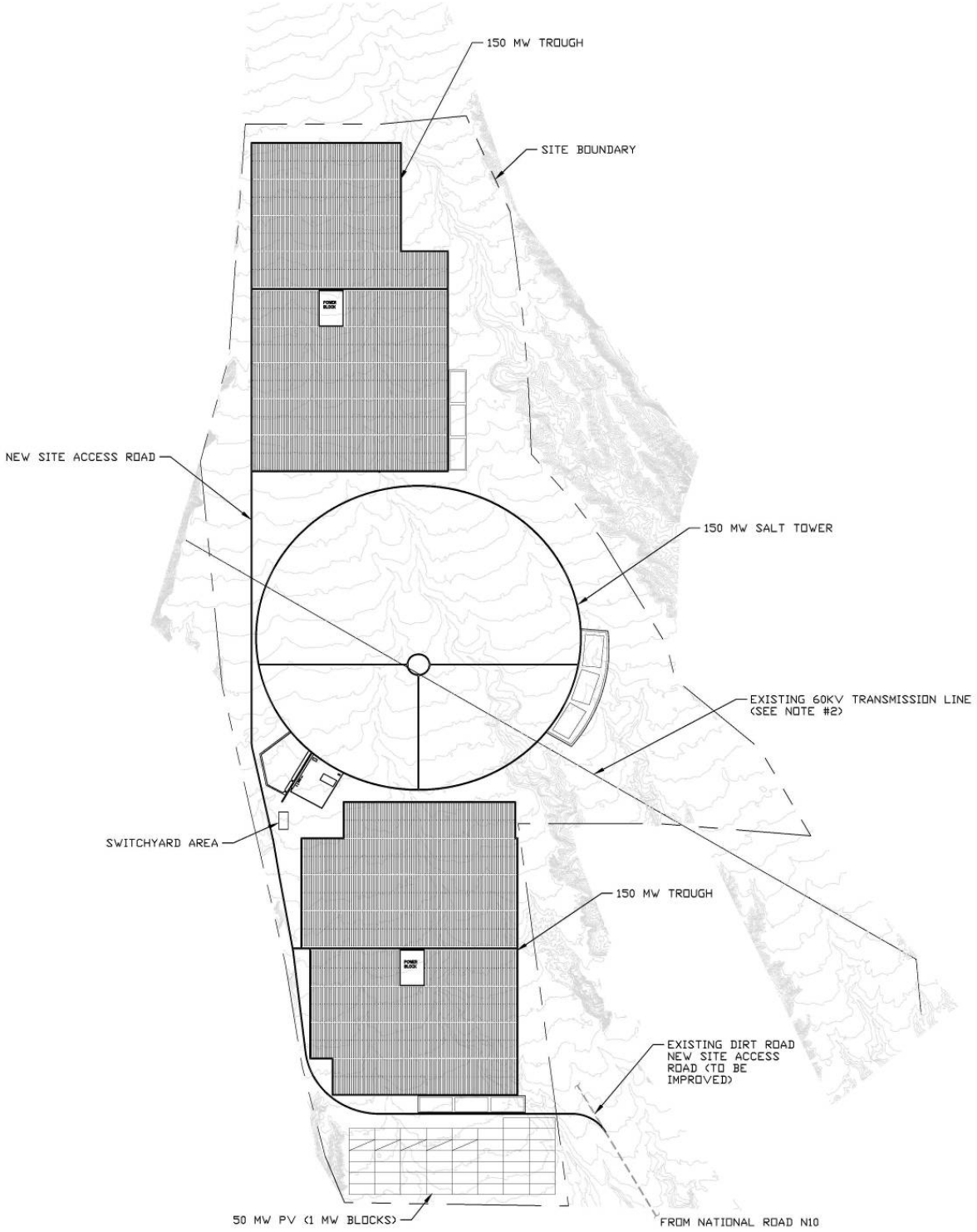


Figure 6 - Option 2: 500 MW SPP Configuration - Two 150 MW Parabolic Trough Plants, One 150 MW Central Tower Receiver Plant, One 50 MW Flat Plate Photovoltaic Field
(Source: Preliminary Technical report)



PPP Arrangements

The PPP Structure

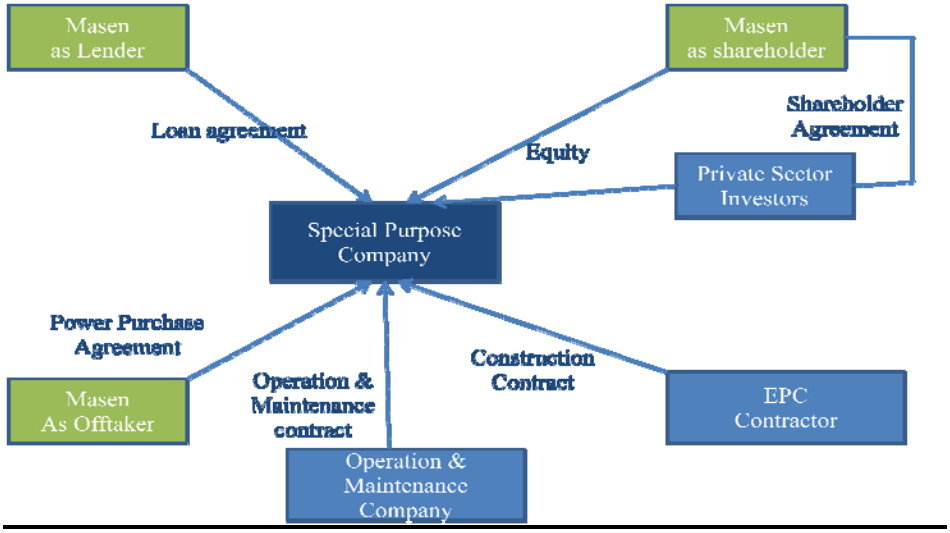
14. MASEN will implement Component 1-A of the Ouarzazate project using a PPP between MASEN and private developers. This is motivated by a desire to introduce private sector participation in a gradual manner in the CSP market, important preconditions to ensure that the long term plan for capacity addition relies as much as possible on privately mobilized capital. The PPP will also facilitate the implementation of contractual mechanisms ensuring that the private sector is incentivized, to the extent possible, to construct the power station with no cost overruns, no time delay and to operate and maintain the power station adequately.

15. Under the PPP structure, a consortium (made up of several private sector developers) is being competitively selected to enter into a set of long term contractual commitments to ensure the construction, financing and operation of the plant, as well as the sale of electricity at a competitively tendered price. The consortium, once such agreements have been finalized, will create a special purpose company, the Solar Power Company (SPC) to carry out the construction and operation and to sell the generated electricity to MASEN, and therefore act as the Project Implementing Entity for Component 1-A. MASEN will be obliged to purchase the electricity only if the plant has been constructed and is operating in accordance with MASEN's requirements. The SPC will enter into a number of contracts (construction contracts, operation and maintenance contract, power purchase agreements, financing contracts etc.) to fulfill the obligations it undertakes under the PPP. This contractual structure is similar to the other PPPs and IPPs that the World Bank and other MDBs have supported in the past (including in the MENA region).

16. The SPC/project will be financed with 30% equity and 70% debt. The equity will be contributed by MASEN (up to 25%, through MASEN Capital), by some IFIs and by the consortium and other potential non-operational investors (up to 75%). The IFIs will provide all the funds required to finance 100% of the debt of the SPC and part of its equity (through MASEN and MASEN Capital), in tenors ranging from 20 to 40 years. MASEN intends to on-lend IFIs funds to the SPC with a tenor reflecting a blend of the terms and conditions of the different IFI loans. However, MASEN will pass on the terms and conditions of the CTF loan to the SPC to ensure that the full CTF subsidy is available to the SPC.

17. The SPC will enter into a number of contracts with MASEN and with private sector entities to fulfill the obligations it undertakes under the PPP. This is presented in Figure 7.

Figure 7 - Contractual Arrangements under the PPP[27]



Tendering process and conclusion of the PPP

18. The selection of the partner will be made in a two-stage bidding process to allow discussion of the technical bids and ensure the soundness of the proposals and their compliance with the technical specifications indicated in the RFP. As is typical in relation to this type of structuring, the PPP is being developed in steps as follows:

i. Prequalification of consortia (December 2010);
ii. Preparation of Request for Proposal (RFP), including draft contracts to be included in the RFP. It is normally best practice to include all draft contracts required to be signed as part of the PPP. In this PPP, the RFP was issued in May 2011 including only draft shareholder agreement and draft PPA between SPC and MASEN which was already reviewed by the WB. It did not include the draft loan from MASEN to the SPC;
iii. Publication of RFP and Q&A from potential bidders on the terms of the RFP, with eventually publication of amendments / clarification to the RFP (completed in July 2011);
iv. Submission of technical proposals by bidders (August 19, 2011);
v. Publication of a final RFP, including sufficiently developed documents to be initialed by the bidders, incl. the draft MASEN-SPC loan agreement (planned for November 2011);
vi. Submission of final proposals by bidders (planned for early January 2012) ;
vii. Selection of a preferred bidder;
viii. Negotiation with the preferred bidder of the contractual documentation; in parallel the preferred bidder will start negotiations with its suppliers in relation to construction and operation and maintenance (as well as if relevant any additional requirement for financing);
ix. Once the contractual documentation has been finalized between the preferred bidder and MASEN, signature of all PPP related contracts (commercial and financial close);
x. Construction of the power plant;
xi. Once the plant is constructed, sale of electricity and operation and maintenance of the plant.

[27] The Special Purpose Company is the same as the Solar Power Company (SPC)

19. Four consortia were selected as part of step (i)[28]:

1) **"Abeinsa Consortium"[29]** made up of Abengoa Solar SA (Seville, Spain), Mitsui & Co. Ltd. (Tokyo, Japan), Abeinsa ICI SA (Seville, Spain) and Abu Dhabi National Energy Company PJSC TAQA (Abu Dhabi, U.A.E.): Abengoa Solar is a subsidiary of Abengoa, a Spanish multinational corporation, which includes companies in the domains of energy, telecommunications, transportation, and the environment. Abenisa is Abengoa's Industrial engineering and industrial construction business group. The Abu Dhabi National Energy Company TAQA is a government controlled energy holding company. Mitsui & Co., Ltd. is one of the world's most diversified comprehensive trading, investment, and service companies,
2) **"Orascom Consortium"[30]** made up of Solar Millennium AG (Erlangen, Germany), Orascom CI (Cairo, Egypt) and Steag (Essen, Germany): Solar Millennium is a German globally active company in the renewable energy sector founded in 1998 in Erlangen, Germany, which is specialized in the designing and implementation of solar thermal power plants. Orascom Construction Industries or Orascom Construction Industries SAE (OCI) is a leading Egyptian EPC (engineering, procurement and construction) contractor, based in Cairo, Egypt and active in more than 25 countries. STEAG (formerly Evonik Steag GmbH) is the energy business subsidiary of Evonik, which is the fifth largest power company in Germany.
3) **"Enel Consortium"[31]** made up Enel SpA (Rome, Italy) and ACS SCE: Enel is Italy's largest power company, and Europe's second listed utility by installed capacity. It is an integrated player which produces, distributes and sells electricity and gas. ACS, or Actividades de Construccion y Servicios S.A., has a RE portfolio totaling about 1,757 megawatts, comprised of 1,056 megawatts of wind power in Spain, 352 megawatts of wind power installed outside Spain and 349 megawatts of concentrated solar power in southern Spain.,
4) **"Acwa Consortium"[32]** made up International Company for Water and Power or Acwa Power (Riyadhh, Saudi Arabia), Aries IS and TSK EE: International Company for Water and Power (or ACWA Power) is a lead developer, owner and operator of independent water and power projects structured on a concession or utility outsourcing contract model. ACWA Power is incorporated in Saudi Arabia. Aries Ingenieria Y Sistemas, S.A. (Aries) is an engineering company actively engaged in developing high technology solutions for various industries. Based in Spain, TSK Electronica y Electricidad S.A. provides solutions for development and infrastructure creation. The company covers project development needs, including basic engineering, detailed engineering, software programming for automation and control, procurement, supplies and manufacture, installation and assembly, commissioning, integral maintenance, training, and quality activation, inspection, and control.

[28] The name of the Lead Member of each consortium is the name given to the consortium
[29] Further information can be obtained on the websites of the consortium members: www.abengoasolar.com, www.abeinsa.e, www.mitsui.com and www.taqa.ae
[30] Further information can be obtained on the websites of the consortium members: www.solarmillennium.de, www.orascom.com and www.steag.com
[31] Further information can be obtained on the websites of the consortium members:` www.enel.com and www.grupoacs.com
[32] Further information can be obtained on the websites of the consortium members: www.acwapower.com, www.aries.com.es and www.tsk.es.

20. MASEN has completed only steps (i)-(iv) at the time of presentation of the project to the WB Board. The identity of the private sector consortium will be known in step (vii), which is scheduled to take place early 2012, and the details of the contractual structure that form the PPP will be known at step (ix), which is expected around mid-2012.

Component 2: Operational Support- Solar Incremental Cost Support (SICS)

21. The purpose of this component is to support the acquisition of kilowatt-hours produced by the SPC to partially cover the difference in the price at which MASEN would buy the electricity generated by the Plant and the price at which the Borrower would sell such electricity to ONE. Financing the purchase of kilowatt-hours, rather than funding only the upfront investment through a PPP, will create an integrated scheme which will be easily replicable to other projects. It will be a way to ease the cash burden on the Moroccan budget during the first years of operation (at least three years and up to about seven yeras, depending on the GoM's contribution to the gap).. A stable financial situation for MASEN will mostly result from developing the next CSP projects, while making sure that these projects will export a significant part of their production to Europe at a premium. Depending on how many MWs are built, on what share of the output is exported and at what price, MASEN will eventually be able to reach financial breakeven and ultimately to generate profits.

22. The component will finance the difference in the prices at which MASEN buys from SPC and sells to ONE the kilowatt-hours produced by Ouarzazate I. The selling price by SPC to MASEN reflects the levelised cost of energy (LCOE) for CSP, once the grants—NIF and grant element of the CTF and other loans—are factored in to reduce the investment cost through a capital subsidy. The resulting LCOE is approximately 25% lower than if all the financing was at commercial rates instead of low IFIs rates. The selling price by MASEN to ONE reflects the wholesale price of electricity in Morocco which is essentially driven by the levelised cost of coal generation. It is important to note that most of the substantial difference in the LCOEs of CSP and of coal is due to the high capital cost of CSP (given that CSP operations and maintenance costs are low compared to those of fossil fuel-based generation, as CSP plants do not have to buy fuel). Thus, the SICS Component of the project is essentially financing part of the amortization of capital in the CSP price during operations (and is therefore performance-based), while the upfront capital subsidy from the PPP Component of the project effectively reduces that CSP price from the outset before operations commence.

23. GoM has in principle committed, through the MASEN law and the MASEN-GoM convention to ensure the financial equilibrium of MASEN for each project of the Morocco Solar Plan. The forthcoming Ouarzazate I specific convention is likely to specify the modalities of the GoM support to cover the gap between the prices SPC-MASEN and MASEN-[33]. At the request of MASEN, WB is offering a loan to cover the additional generation cost of CSP when the GoM and MASEN decide to resort to this financing, instead of state financing, when economic and fiscal conditions warrant it. This solution will provide temporary comfort to private investors that funds will be available to MASEN to pay the high CSP price agreed in the PPA even when GoM faces budgetary pressures.

[33] If some of the production was exported, the gap could be null.

24. This gapfill mechanism can be seen as a prototype feed-in tariff fund (to help pay the incremental costs of CSP and other renewable energies) which could be extended and replicated in Morocco and elsewhere in the world. If replicated, this mechanism would have the advantage of significantly reducing the transactions costs and risks to the private sector associated with making climate financing or development aid available to multiple RE projects.

25. The SICS Component of the project will be a valuable tool for MASEN to fill a temporary cash deficit, until cash generation from the next CSP plants becomes sufficient to cover all costs (thanks to high priced exports).

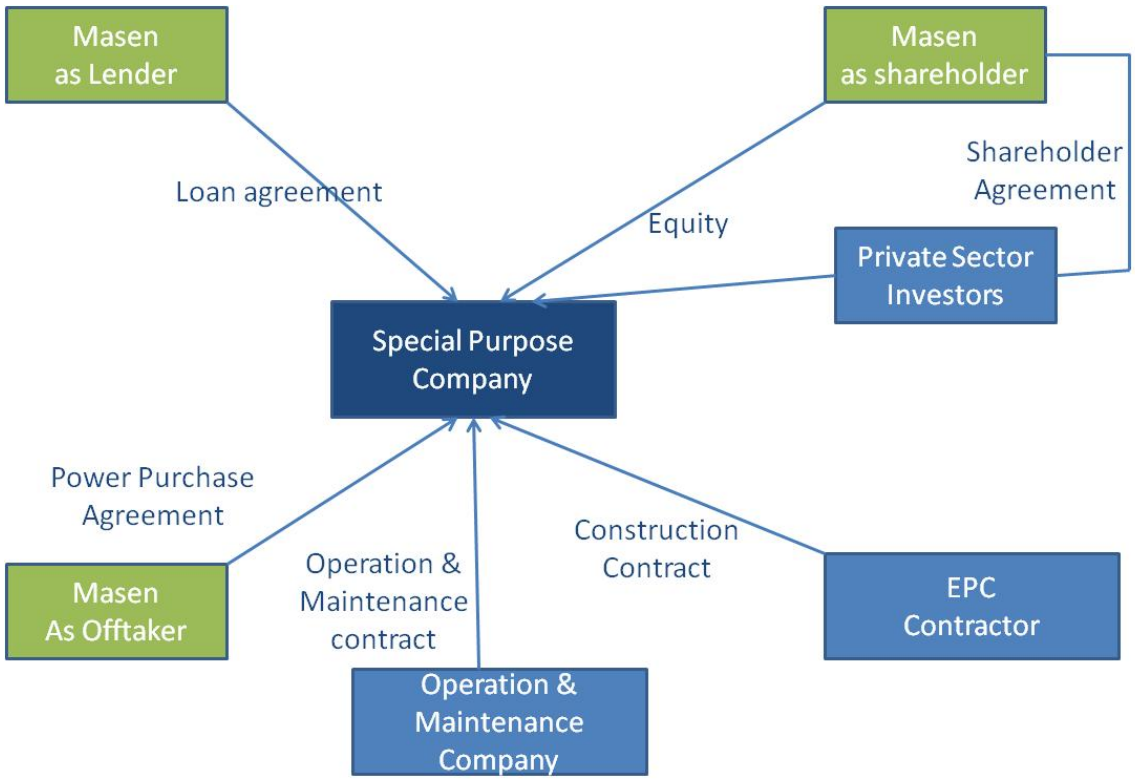
Annex 3: Implementation Arrangements

I. Project institutional and implementation arrangements

1. The project institutional and implementation arrangements for Component 1-A are articulated around the project specifics, namely (i) the PPP and (ii) MASEN as the agency in charge of implementing the Morocco Solar Plan, including the first project, the Ouarzazate CSP. Component 1-B is under the responsibility of MASEN, as implementing agency for the Morocco Solar Plan. Component 2 will also be implemented by MASEN, in close coordination with GoM, to agree when the price gap would be covered from State resources or from the IBRD loan proceeds.

1. Public Private Partnership arrangements

2. The SPC[34] will enter into a number of contracts with MASEN as well as with private sector entities as illustrated below:



3. The principal contracts[35] that MASEN will enter into as part of the PPP will be:

[34] The Special Purpose Company is the Solar Power Company (SPC) formed as a result of the PPP arrangement between MASEN and a competitively selected partner.
[35] In addition, there will be a Transmission Connection Agreement and a Grid Access Agreement

- Power Purchase Agreement (PPA) between SPC and MASEN: It specifies the terms and conditions under which the sale/purchase of power will be governed. It includes obligations from the SPC to build the plant and deliver all electricity to MASEN for the period of the PPA (25 years). During this period, MASEN undertakes to buy and pay for all electricity produced by the plant for a fixed price (subject to a set indexation formula). Some of the terms of the current draft contract are fairly typical for this type of PPA including provisions relating to the requirement for the SPC to build and commission the power plant within a certain period of time, and to pay penalties for delay or for failure to provide power at the full contracted capacity, as well as relating to termination and the consequences of such termination. It also includes the modalities of MASEN's obligations in relation to the Associated Facilities and supply of the utilities. Some other provisions are atypical such as, but not limited to: (i) lump sum penalties instead of percentages calculated over the price of the contract; (ii) final acceptance tests of 365 days over a 3 year period, which is much longer than market practice; (iii) minimum performance level of 90% which is below market practice; (iv) emission credits being owned by the off-taker instead of the renewable power generator; (v) termination for performance at 90%, which is above market threshold and without buy-down option; and (vi) isolation of MASEN as shareholder from construction risk via a call option. The WB, and other IFIs financing the project, will approve the final PPA.

- Shareholder Agreement: MASEN, through its wholly owned subsidiary MASEN Capital, intends to take an equity stake in the project alongside the private investors. A Shareholder Agreement will govern the relationship of the shareholders in the SPC. The draft agreement delivered with the RFP contains some standard provisions as well as some atypical provisions such as: (i) quorum and majority requiring the presence of a representative of a minority shareholder (MASEN); and (ii) put option by MASEN as shareholder in case that MASEN as off-taker terminates the PPA. Amendments may result from discussion with the PPP partner and the final version will be submitted to the WB and other IFIs for approval.

- Loan Agreement between the SPC and MASEN: The debt portion of the financing for the SPC will be provided by MASEN in the form of on-lent funds borrowed by MASEN from IFIs. The loan from MASEN to the SPC is likely to represent 70% of the funding of the capital cost of the SPC. MASEN will pass on the terms and conditions of the IFIs loans to the SPC, especially in relation to the CTF loan. The MASEN-SPC loan agreement(s) will be included in the RFP so that they can be initialed by bidders as part of their bid. They will also be submitted for approval by WB and other IFIs.

4. Whereas it is usual for a single entity to be involved as Shareholder, Sole Electricity Purchaser, Landlord and Infrastructure Supplier, the fact that MAEN is Sole Lender is less usual. This needs to be fully evaluated from a risk allocation perspective, as such roles are likely to result in situations of conflict of interest, which may affect the interest of the SPC and the other IFIs, and therefore can potentially be a source of concern to discourage private sector participants. The different roles of MASEN and how they are contractually laid out will be evaluated as part of the RFP review for non-objection to ensure, amongst others, (i) that the purpose of the PPP is maintained, (ii) that the SPC is a viable entity, (iii) that the set of contracts that MASEN will enter into does not create undue risks at MASEN level, and (iv) that the IFI's interest are duly recognized and protected. MASEN will manage risks where possible by

ensuring that they are covered on a "back to back" basis, and that the risks not covered via back to back mechanism will be directly or indirectly covered as specified in the *Convention Générale.*

5. The SPC will also enter into a number of other contracts with private and public sector entities. Such contracts are not developed at this stage and will be only once the bidder is selected and the contractual structure is finalized. These contracts are likely to be:

- "EPC" (Engineering, Procurement, Construction) contract: the SPC might enter into a fixed price contract to construct the power plant. This is typical for the type of project financing. MASEN has indicated their willingness to contemplate a contractual structure with several prime contractors (so called "multi-prime"). The risks associated with interfacing and completion in a multi-prime structure must be assessed carefully by MASEN and the IFIs;
- Operation and Maintenance contract: the SPC is expected to enter into a long term operation and maintenance services agreement for the power station which should include standard provisions for this type of contract.

6. The commercial structure of the PPP, and how the different contracts inter-relate is central to the feasibility of the CSP plant and of the SPC and MASEN sustainability. The assessments of the contracts will be conducted in full before the stage 2 RFP is released to bidders so that appropriate feedback can be provided to MASEN, in order to ensure that the contracts are acceptable to the World Bank. The acceptability of the final contractual documentation is a condition of effectiveness for the loans.

2. MASEN project administration mechanisms

7. MASEN is a limited liability company (LLC) with the Moroccan State, ONE, Fonds Hassan II and the Société d'Investissements Energétique (SIE) as equal shareholders, created in March 2010 to develop at least 2,000 MW of solar power capacity by 2020. While MASEN is responsible for the implementation of the Moroccao Solar Plan, the SPC will be created by the PPP partners to implement the Ouarzazate I project. MASEN is governed by a Board of Directors ("Directoire") and a Supervisory Council ("Conseil de Surveillance"). Their functions and responsibilities (see table 3) are defined in MASEN's Statutes as required by the LLC Law.

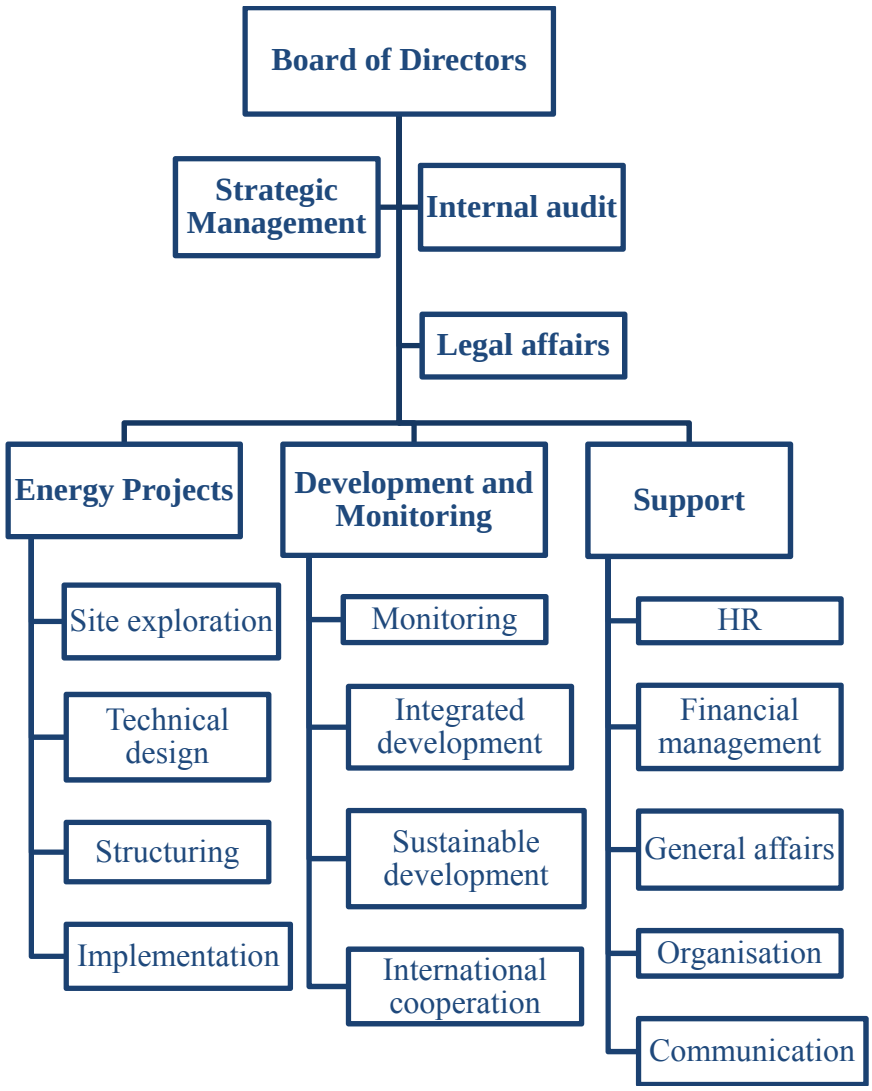
Table 3 - MASEN's governance structure

MASEN body	Composition	Responsibility
Board of Directors (BoD)	2-5 directors appointed by Supervisory Council , including the Board's president, for a 6-year renewable term	Provides direction to achieve company's goals. Upon authorization of the Supervisory Council (SC), the BoD adopts the: annual budget, company's organization chart, multi-annual action plan, and procurement rules. Reports every three months to the SC on the company's activities
Supervisory Council (SC)	3-12 members appointed by the General Shareholder's Meeting for a 6-	Ensures management control of the company. Calls for General Shareholders Meeting at least

	year renewable term among the company's shareholders	once a year
General Shareholder's Meeting (GSM)	Company's shareholders, chaired by the President of the Supervisory Council.	Appoints company's auditors, approves annual accounts, decides on dividend distribution, and resolves potential differences between Board of Directors and Supervisory Council

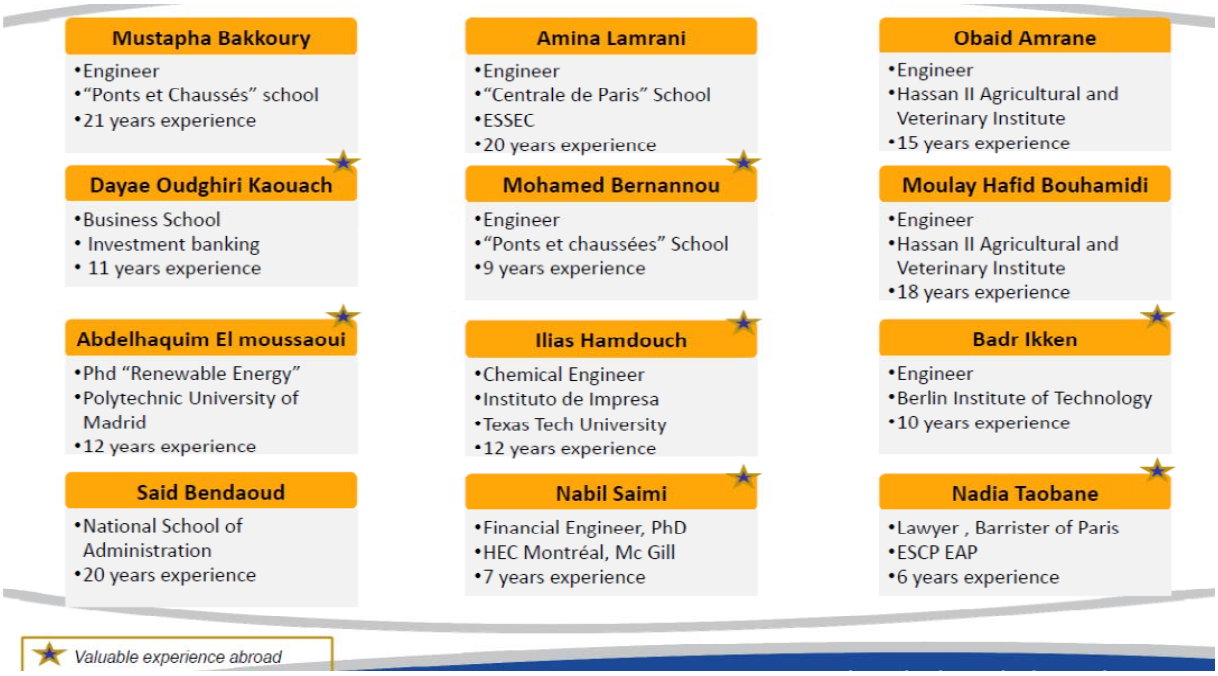
8. MASEN's organization, presented in Figure 8, mirrors the main responsibilities entrusted to the agency by law. The focus is not only on developing solar projects but also to support research and development, technology transfer and integrated development (local development and industrial integration).

Figure 8 – MASEN's organization chart



9. MASEN staff consists of 26 carefully selected experienced technical and managerial experts (see example in Table 4). The number of staff is expected to grow to 48 when MASEN reaches its full size.

Table 4 – MASEN's staff



10. MASEN is developing the Ouarzazate I project with the assistance of reputable advisors:
- Financial – Citibank (and IFC Advisory during the prequalification phase of the PPP partners selection),
- Technical – Worley Parsons,
- Legal – Norten Rose (and Linklaters and Gide Loyrette Nouel during the first phase),
- Fiscal – Deloitte,
- Project Managemet Office – Valyans.

11. MASEN, with the assistance of Valyans consulting, set up a Project Management Office (PMO) to plan, manage and monitor the implementation of the solar program and the Ouarzazate I project. The PMO aims to manage appropriately the timing for implementation through, e.g. monitoring of construction work and risk management, and to ensure the adequate mobilization of resources and ownership for the program by managing the communications and training.

3. Financial Management, Disbursements and Procurement

3.1 Financial Management

Public Financial Management (PFM) System

12. The Bank's experience in Morocco and the main conclusions of the 2009 PEFA indicate that the Moroccan public finance system is governed by an elaborate legal and regulatory framework. It also contains strong reliability and transparency safeguards. The financial management risk of the Moroccan public finance system is considered low. Moreover, the particular PFM challenges, with respect to the timeliness of Government's financial statements raised by the PEFA, do not affect the project since MASEN operates as an autonomous entity from the Government public finance system.

Assessment of MASEN Financial Management System

13. An assessment of the financial management system in place at MASEN was carried out to determine if it complies with the Bank requirements for the project management in respect to the OP/BP 10.02.

14. MASEN will be responsible for managing the project funds and all related financial transactions. MASEN is a new company created by the Government of Morocco as a state owned commercial and industrial enterprise with financial and administrative autonomy (Etablissement public à caractère industriel et commercial). Accordingly, it operates as a private sector entity and the systems in place are based on the principles and procedures of the commercial law of the Kingdom of Morocco.

15. As a new company, MASEN hired a group of advisors including a consulting firm for document preparation, filing, preparation of reports and administrative support.

Staffing

16. MASEN hired qualified and experienced experts capable of managing the project including in financial management matters. MASEN outsources its accounting to an International Accounting and Auditing firm (KPMG) which follows the international standards. This firm has qualified and experienced staff and a deep industry knowledge. In addition MASEN uses Valyans services, a sound international group, to advise and assist on preparing MASEN's Manual of procedures. This manual will be updated to include the Financial Management and Disbursement Manual that is required as effectiveness condition. The outsourcing of the accounting and advisory allows a balanced segregation of duties for the FM staff in MASEN. Therefore, for now, MASEN has one staff that is in charge of the financial management to coordinate FM matters with KPMG and Valyans services, and prepare FM organization to take over accounting. The FM team will be reinforced and acceptable FM arrangements (including staffing) will be in place before effectiveness .

17. MASEN will ensure that appropriate staffing arrangements are maintained throughout the life of the project.

Accounting

18. MASEN is currently developing financial accounting consistent with the Code of General Accounting Standards (CGNC). The accrual accounting applied by MASEN is governed by the rules applicable to the autonomous public entities (decree of November 10, 1989). To ensure taking over responsibility of accounting, MASEN is preparing the Term of references in order to select the best offer for accounting software. MASEN will establish a coherent accounting and financial management system supported by appropriate software before the project's effectiveness. IBRD will ensure that MASEN has an adequate computerized accounting system is in place before project's effectiveness. The general principles adopted for the project accounting are:

- Project accounting will cover all sources and all uses of funds for all donors,
- Project transactions and activities will be distinguished from other activities carried out by MASEN,
- All the accounting principles will be spelled out in MASEN financial management and disbursement manual acceptable by the WB and other IFIs.

19. Moroccan CGAC do not require MASEN to apply consolidation rules. However to ensure that assets, liabilities and contingent liabilities of MASEN, SPC or any other subsidiary will be fully accounted for by MASEN and SPC, MASEN and SPC will apply Moroccan consolidation rules applied to public companies.

Reporting

20. The financial reports will be designed to provide quality and timely information to the MASEN management, donors, and various stakeholders monitoring the project's performance.

21. The Interim Unaudited Financial Statements (IFS) for MASEN must include data on the financial situation. These reports must include by donor: (i) a statement of sources and uses of funds for that period and in aggregate value, (ii) a statement of the use of funds by component and expenditure category, and (iii) a budget statement indicating forecasts and deviations from implementation. MASEN will submit to the Bank these semi-annual Interim unaudited financial report 45 days after the end of each period. These reports will be established in accordance with Bank guidelines. The formats have been defined and agreed during negotiations.

22. The Financial Statements of MASEN should be prepared in accordance with the Code of General Accounting Standards (CGNC) which is deemed acceptable. They must include: (a) a cash flow statement, (b) a financial closing, (c) a statement of on-going commitments, and (d) an analysis of payments.

Internal control system

23. The project's internal controls (including processes for recording and safe guarding fixed assets) will be documented in a Financial Management and Disbursement (FMD) Manual under preparation. The FMD manual should be a living document that can be updated to strengthen the internal control system when the need arises. The FMD manual will be agreed by all donors and describe the accounting system including: the major transaction cycles of the project; funds flow processes; the accounting records, chart of accounts; authorization procedures for transactions; the financial reporting process used to prepare the financial statements and interim financial reports procedures; procurement and contract management.

24. MASEN is subject to financial control by the State financial controller in accordance with the Law 69-00 on financial controls of public entities. Actually the Financial Controller appointed by the Government (i) will take part of the deliberating bodies of MASEN, and (ii) can at any time control supporting documents at MASEN and its subsidiary companies and participations including the SPC.

Internal audit

25. MASEN is also establishing an internal audit unit under the authority of its Board of Directors (Directoire). MASEN is in the process of recruiting for this position. The Internal Audit arrangements for MASEN will be documented in the Manual of procedures that will include the Financial Management and disbursement Manual that will be approved by IBRD.

External control system

26. The Supreme Audit Institution, Court of Accounts performs the external audit for management and use of public funds. The Court of Accounts activity report presents to Parliament the results of its management audits and the use of public funds. In addition to the audit performed by the Court of Accounts, MASEN is subject to statutory annual audit performed by an independent private auditor. Because of the delays of the Court of Accounts' report, IBRD will rely on the statutory annual audit conducted by an external independent auditor and applying ISA standards. The statutory audit report for MASEN must be approved by MASEN's Board of Directors and must include financial audit report and a management letter. It must be submitted to IBRD within six months after the end of each financial year. The arrangements for the statutory audit of the financial statements of MASEN should be communicated to IBRD through agreed terms of reference. Appropriate terms of reference for the external auditor must also be developed and agreed within six months of Loan Effectiveness. Audit reports of MASEN and SPC will be published in MASEN website. If MASEN demonstrates that those audited financial statements contain proprietary or commercially sensitive information, MASEN will request an authorization from Regional FM manager to disclose an abridged version in accordance with ISA 810 standards.

Financial management obligations of SPC

27. The SPC is yet to be created. Therefore the assessment of SPC's financial management obligations was based on the draft bidding documents which included main FM requirements. As an effectiveness condition, SPC should have financial management arrangements acceptable to the Bank. All documents required to finance, construct and operate the plant will include the following provisions:

- Adequate internal control procedures,
- Accurately recording all transactions and balances relating to the project,
- Ensuring the preparation of regular, timely and reliable semi-annual financial reports and financial statements that will be sent to MASEN for submission to the Bank,
- Bank's right to review SPC's accounts,
  Annual audit reports by an auditor acceptable to the Bank to be sent to MASEN and submitted to the IBRD no later than 6 months after the end of SPC's fiscal year

Reporting (SPC)

28. The SPC will prepare financial statements in accordance with consistently applied accounting standards acceptable to the World Bank, a manner adequate to reflect the operations and financial conditions of the SPC, including the operations, resources and expenditures related to the project.

External audit (SPC)

29. The SPC will be audited annually in accordance with international standards. The audit will be conducted by an independent external auditor under the terms of reference acceptable to the Bank. The auditor will express a professional opinion on the annual financial statements of the SPC and submit the report to MASEN which will submit it to the Bank within two months after the end of each fiscal year. The audit report must also be made publicly available in a timely fashion and in a manner acceptable to the World Bank. The IFIs will be allowed to: (i) inspect the site and any documents needed, and (ii) appoint an auditor if needed as described in the bidding documents. In addition, during project's implementation, MASEN will also submit its audited annual financial statements, conducted by an external independent auditor, acceptable to the World Bank.

Flow of funds (MASEN and SPC)

30. The project has a "PPP Component" aimed at co-financing the initial investment into the power plant, and an "SICS Component" aimed at financing purchases of kilowatt-hours by MASEN. The project is co-financed by the World Bank and other donors (AFD, AfDB, CTF, EIB, EU/NIF, KfW) as follows: AFD, AfDB, CTF, EIB, EU/NIF, and KfW will finance the PPP Component and IBRD will finance the SI CSC. The flow of funds mechanisms will be agreed by all donors and included in the FM and disbursement Manual which will constitute an effectiveness condition. MASEN will first use the CTF funds mobilized by the World Bank and the AfDB to maximize the benefits of the CTF loan terms. Once the CTF/WB and the CTF/AfDB loans will be fully disbursed, other IFIs will contribute to the financing of the PPP component of the project as agreed with other donors. The Bank's percentage of financing would be 49.2% and the remaining 50.8% would be financed by the AfDB.

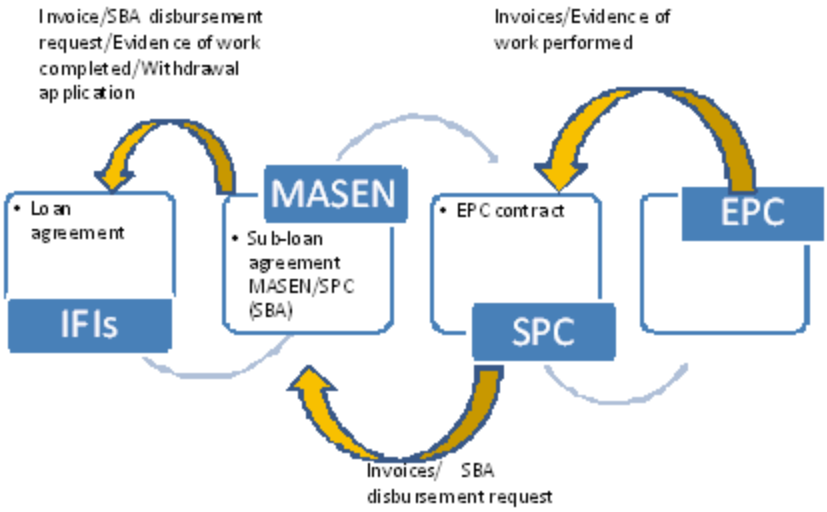
Flow of fund mechanisms of CTF loan

31. The Solar Power Company (SPC) will build, finance, operate and own the plant. It is the intention that the private consortium will own 75% of the SPC. MASEN plans also to invest, through MASEN Capital, in the SPC and own 25% of its equity. The SPC should be financed under a 70/30 debt/equity leverage. In addition to its equity share, MASEN intends to provide 100% of the debt, in the form of funds borrowed from IFIs including CTF and on-lent to the SPC.

32. The financing from CTF Loan proceeds and other Donors' resources will be made according to procedures outlined in the Financial and Disbursement Manual. Disbursement must be completed within four months after the Project Closing Date for eligible expenditures incurred prior to the Closing Date.

33. The flow of funds will be as described in this paragraph as well as in Figure 9. Withdrawals from the Loan Account covering the time period agreed with the Bank and made on the basis of interim unaudited financial report including the technical audit report to be prepared by the independent verification expert to be focused in particular on: (i) the achievement of the milestones set forth in the EPC contract; and (ii) compliance with pricing provisions set forth in the EPC contract.

Figure 9 - Flow of funds of CTF loan



34. **Designated Account:** To ensure that funds are readily available for project implementation, MASEN would open, maintain and operate a Pooled Designated Account (DA) at Bank Al-Maghrib in Moroccan Dirham. Deposits and payments from the Pooled DA will be

made in accordance with the provisions stated in the Loan Agreement. Withdrawals from the Loan Account covering the time period agreed with the Bank and made on the basis of interim unaudited financial report including the technical audit report to be prepared by the independent verification expert. Withdrawal Applications (WAs) will be prepared by MASEN and signed by authorized signatories, as designated by the representative of the Borrower. The name of each of the authorized signatories and their corresponding specimen of signature will be submitted to the Bank before the first disbursement is claimed.

35. **The Authorized Ceiling of DA**: Initial Advance to the Pooled DA will be based on cash forecast not to exceed the equivalent of U.S. Dollars 40 million.

36. **Management of Pooled Designated Account**

- **Advance (Initial Deposit):** On behalf of each Donor, MASEN will request an Advance from each Donor on the basis of their disbursement procedures. The Bank's Initial Deposit to the DA will be based on cash forecast not to exceed the equivalent of U.S. Dollars 40 million.
- **Replenishment of the Pooled Designated Account:** Replenishment procedures will be similar to those for the Initial Deposit. MASEN will send to each Donor a replenishment request along with an interim unaudited financial report including the technical audit report to be prepared by the independent verification expert to be focused in particular on: (i) the achievement of the milestones set forth in the EPC contract; and (ii) compliance with pricing provisions set forth in the EPC contract. Replenishment of the Pooled Designated Account will be based on the Bank's percentage share of 49.2% and the AfDB's share of 50.8%.

Flow of fund mechanisms of IBRD loan

37. The SPC will sell its electricity production to MASEN who will resell it to ONE, as per the price in the PPA ONE-MASEN. The World Bank will provide US$ 200 million to finance the incremental cost of solar generated kilowatt-hours purchased by MASEN during the first 3-7 years of operation, in case insufficient funds are allocated from the government's budget to cover the gap between the buying and selling prices. The amount of MASEN's cash shortfall will be determined based on the difference between the two PPAs. In case this shortfall is not fully covered by the government's contribution, funds will be drawn from the IBRD loan.

38. Based on these principles, the flow of funds' mechanism will be the following:

- Establish the appropriate level of maximal disbursement per kilowatt-hour: Component 2 of the project will finance up to 100% of this maximal level, as requested by the Borrower (during the first years of project implementation, the government may already cofinance part of this difference; based on the maximal yearly disbursement, the available funds would cover between 3 and 4 years of cash shortfall; it is expected that the funds will actually be disbursed in 4 to 7 years, depending on the government's fiscal situation),
- The triggering factors will be: (i) the actual generation and delivery of kilowatt-hours by the plant and the purchase of such kilowatt-hours by MASEN at the same delivery point (on bi-annual basis), and (ii) the amount of funds contributed by the government to cover MASEN's cash shortfall (on the same time basis),

- The disbursement will be based on the reimbursement method. Withdrawals from the Loan Account covering the time period agreed with the Bank and made on the basis of Interim Unaudited Financial Report (IFR) including a report prepared by an independent verification expert certifying that the amount of the relevant solar Incremental Cost is correct as per the provisions of the Power Purchase Agreement, the Power Sale Agreement, the Conventions and any other relevant documents.

39. The amount to be disbursed, namely the SICS, will be equal to: (A – B) – C, where: "A" shall be equal to the amount paid for a specific quantity of electricity bought by the Borrower from the Project Implementing Entity pursuant to the provisions of the Power Purchase Agreement; "B" shall be equal to the amount received by the Borrower from ONE for the same quantity of electricity pursuant to the provisions of the Power Sale Agreement; and "C" shall be equal to the amount of the contribution, if any, received by the Borrower from the Kingdom of Morocco pursuant to the provisions of the Project Specific Convention to compensate for the price difference between "A" and "B".

Flow of fund diagrams

40. The financial flows of the project are as follows during construction and during operation:

Figure 10 – Financial flows during construction (CTF contribution)

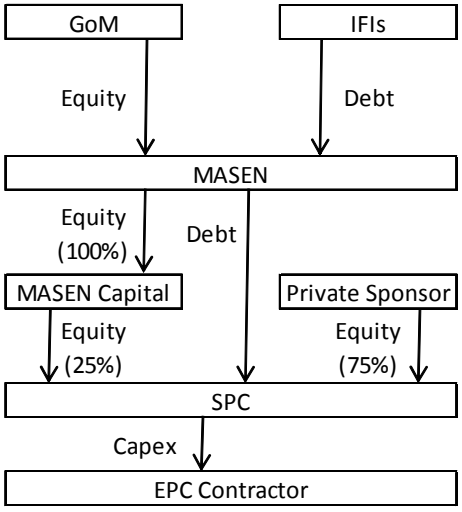
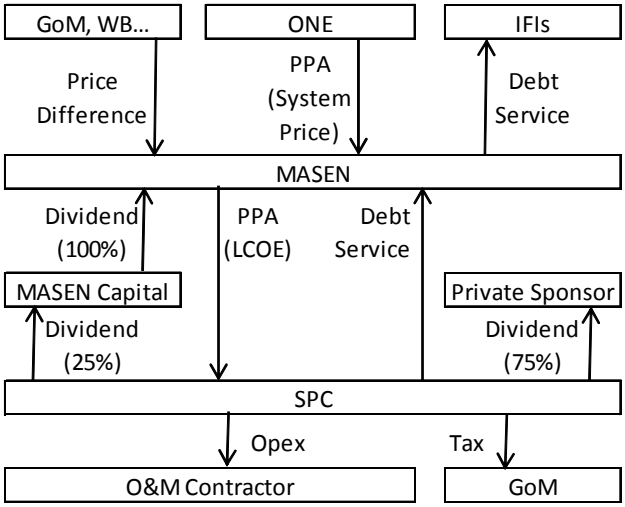


Figure 11 – Financial flows during operation (World Bank contribution)



Project's risk assessment

41. The risk is assessed as high as this project is the first of its kind in Morocco, and it will be implemented through a PPP set up between MASEN and the SPC. The overall financial management risk is assessed as high before mitigation and substantial after mitigation measures which are: (i) carefully select the SPC based on its experience, reputation and capacity of completing the project, (ii) ensure that MASEN has the capacity to finance and supervise the SPC, and (iii) train the staff on Bank procedures.

Planning of Supervision

42. A FM supervision mission will be conducted at least twice every year, and more frequently in the early years of implementation, given on the risk assessment of the project. The mission's objectives will include: (i) that of ensuring that strong financial management systems are maintained for the project throughout its life, and (ii) semi-annual review of IFRs, review of annual audited financial statements and management letters. To the extent possible, Bank supervision missions will be done jointly with other donors and include site visits of MASEN, SPC and the power plant in Ouarzazate to review financial management practices.

3.2 Disbursement Arrangements

43. All disbursements will be subject to the conditions of the Loan Agreements (CTF for the investment component and IBRD for the kWh purchase support component) and the procedures defined in the Disbursement Letters.

3.3 Fraud and Corruption

44. As specified in Annex 5, MASEN will design and implement a governance risk management framework to support good governance and business ethics, enhance disclosure and transparency and reduce the risk of collusion, fraud and corruption.

3.4 Procurement

3.4.1 General

45. Procurement for the proposed project would be carried out in accordance with the "World Bank's Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits & Grants By World Bank Borrowers" dated January 2011, and the provisions stipulated in the legal agreements between the Bank, as lender, and MASEN, as borrower. The various items under different expenditure categories are described in general below. The proposed project will partly finance PPPs arrangement for a Design, Build, Own, Operate and Transfer (DBOOT) contract to be granted to the SPC to implement the Ouarzazate I Plant. The anticipated procurement is the selection through an open competitive bidding process acceptable to the Bank, preceded by pre-qualification, of a private Project Sponsor who, through a partnership with MASEN, will constitute the Solar Power Company. Estimated costs, prior review requirements, and time frame agreed between the Borrower and the Bank would be as indicated in this PAD and as indicated in revised versions of the procurement plan thereafter.

46. Procurement of Works, Goods and Services: Works, Goods and Services procured under this project would include the whole supply, construction, erection, and commissioning of the complete power plant and the purchase of electricity produced by Ouarzazate I. The procurement will follow the stipulations of paragraph 3.14 (a) of the Bank procurement guidelines. The guidelines establish that the concessionaire or entrepreneur under the BOO/BOT/ BOOT or similar type of contract shall be selected under open competitive bidding procedures determined acceptable by the Bank. The said entrepreneur selected in this manner shall then be free to procure the goods, works, and services required for the facility from eligible sources, using its own procedures. The Loan Agreement shall specify the type of expenditures incurred by the said entrepreneur towards which Bank financing will apply. In this project, the CTF loan to MASEN would be used for on-lending from MASEN to SPC, and the IBRD loan for financing partially and temporarily the additional cost due to high capital cost of CSP.

47. Advanced Procurement: Due to tight Moroccan agenda to reach the overall objective of 500 MW solar power by 2015, the procurement process has been advanced as much as possible during project preparation to speed-up project implementation. The Bank gave its No Objection on the prequalification process.

48. Selection of Consultants: No Consulting services will be financed by the proposed project.

49. The procurement procedures and Bidding Documents to be used for the project are presented in Section 3.4.4 (Details of the Procurement Arrangements) below.

3.4.2 Assessment of the agency's capacity to implement procurement

50. Procurement activities will be carried out by Morocco Agency for Solar Energy (MASEN). MASEN is a new company created by the Government of Morocco as an Anonymous Company, regulated, managed and controlled as a private company. MASEN will be in charge of the selection of private Project Sponsor (s) (or Independent Power Producer (s))

to form and fund the SPC to implement the Solar Power Plant becoming the Concessionaire (s) for the design, construction, ownership, maintenance and operation of the plant, selling the generated power to MASEN under a Power Purchase agreement (PPA). Such SPC (s), or Concessionaire company (ies), will be a partnership between MASEN and the selected private Project Sponsor (s).

51. As MASEN is a newly created company, the Government has hired a group of Advisors to help MASEN in the development and implementation of the project. The Advisors are: (a) International Finance Corporation (IFC) for providing, during the prequalification phase, general advice on design of the operation; (b) Citibank for helping MASEN in the selection of partners and negotiation of the agreement with the private sponsors; (c) Worley Parsons for providing advice on all technical and engineering aspects; (d) Gide & Partners Lawyers for providing legal advice and helping MASEN in the preparation of bidding documents and all contracts and agreements; and (e) Valyans Consulting for providing support for project management including providing all support for document preparation, filing, preparation of reports and administrative support to MASEN. For the purpose of the preparation of the bidding document, MASEN hired a senior procurement specialist well acquainted with Bank procurement procedures.

52. MASEN will be responsible for procurement actions to be taken for the selection of private Project Sponsor who, through a partnership with MASEN, will constitute the Solar Power Company. MASEN has hired a procurement officer acting as procurement focal point and coordinating the procurement actions, consulting with the Bank and submitting reports on procurement matters. This procurement officer will be supported by the four consulting firms and the senior procurement specialist indicated in the previous paragraph. Consequently, Citibank will provide general support for the procurement actions and Valyans will provide the administrative, managerial and reporting support. The technical and legal support for procurement documentation preparation and for evaluating proposals will be given by the technical (Worley Parsons) and legal (Linklaters and Gide) advisors. The senior procurement specialist will help to ensure the compliance with Bank's procedures.

53. An assessment of MASEN's capacity to implement procurement actions for the project has been conducted using P-RAMS. As the agency will have strong support from its advisors for procurement actions, the capacity assessment includes an assessment of the procurement capacity of the teams allocated by those advisors to this project.

54. MASEN has only one staff in charge of procurement, lacking strong experience in procurement ("Le Responsable des Moyens Généraux et du Suivi des Marchés"), who was recently hired. However, due to the role of MASEN in this and future projects, there would be no benefit for the government in creating a strong procurement group in MASEN since it will not carry out project implementation with its own staff but joining forces with private investors for the creation of special purpose companies. Consequently, the procurement actions for selecting the concessionaire who will become the BOO contractor will be carried out with strong support from MASEN's advisors. These advisors have indicated to have good procurement capacity in their fields of expertise (especially the technical and legal advisors). However, the assessment carried out has already identified the need for the technical advisor to include a full time procurement specialist as a member of the project team. MASEN's staff in charge of

procurement should be trained immediately in order to be able to coordinate efficiently advisors activities and to report properly to the Bank on procurement matters. MASEN should maintain the level of capacity of the senior procurement specialist who is advising right now at least until the hiring of the Project Sponsor and the creation of the SPC.

55. The overall project risk for procurement is **High**.

3.4.3 Frequency of Procurement Supervision

56. The capacity assessment of MASEN has recommended prior review supervision of the bidding process and contract for the selection of the developer to ensure its acceptability by the Bank.

3.4.4 Details of the Procurement Arrangements

57. For this project, procurement actions for the first unit have been advanced. The prequalification was completed. The Borrower has advertised and issued open invitation to potential bidders to prequalify to this contract. The Bank has reviewed the prequalification documents and issued a no objection. Nineteen (19) applicants have submitted applications. This shows the interest in this contract and the competitiveness of the process used. The evaluation was submitted to the Bank for review and no objection. Four consortia were pre-qualified. The procurement process to be followed and the bidding document to be used to invite prequalified bidders to submit bids are as follows:

a) Procurement process to be followed

58. The project will support MASEN to establish a PPP with competitively selected private partners to develop the first phase of the Ouarzazate Solar Power Plant- 160 MW parabolic trough. The prequalification process was completed and the selection of the partner will be done through a two-stage procurement process. During the first stage, the prequalified bidders will be allowed to propose technical proposals (without prices) based on the minimum specification requirements (performance specifications) without limiting the potential technological choices. The discussions between MASEN and each bidder on the technical bids will ensure the soundness of the proposed technology and technical proposals before requesting financial proposals (second stage). Bidders will be asked to submit final technical proposals and priced bids in the second stage. However the financial criteria used for the final evaluation should be clearly defined in the bidding document during the first stage.

b) Bidding documents

59. The bidding document drafted by MASEN to invite prequalified bidders to submit bids was sent to the Bank's "No Objection". The Instruction to Bidders of the World Bank's Standard Bidding Document for Design, Supply and Installation (two-stage bidding) has been used with minor changes. Pre-qualified bidders will have the opportunity to comment on a draft of the conditions of contract during the first stage. Based on the first stage evaluation and clarification process, MASEN may need to issue an amendment to the Bidding Document to clarify the requirements and improve competition without compromising essential project objectives.

60. The Morocco Solar Plan is not limited to developing solar power generation capacity but calls also for the development of local manufacturing, R&D activities and training/education, so as to boost economic growth and contribute to job creation. MASEN's law states that the agency is responsible for putting in place RE programs to (i) contribute to local applied research and promote technological innovation and (ii) contribute to the creation of entities for training, university level education and research. In addition MASEN is to use the implementation of the five plants of the Solar Program to promote local manufacturing to the highest level possible and to propose to GoM measures to promote local manufacturing for each power plant in the Moroccan Solar Plan. To comply with its mandate, MASEN is targeting a level of local content of 30% of the plant capital cost—a level consistent with the findings of an ESMAP study on the CSP local manufacturing potential in the MENA region[36]. MASEN has requested from the bidders proposals for an action plan to assist MASEN in achieving this objective. MASEN is suggesting that participants in the RFP can opt for three solutions to meet that requirement:

- Indirect measures: the consortium bidding to develop Ouarzazate I commits to invest, alone or through a partnership, in either (i) a RE equipment manufacturing facility, (ii) an RE O&M activity or (iii) an engineering or R&D facility (the latter activity being given a multiplying factor of two). The developer will sign an agreement with GoM to invest 30% of the capital cost of Ouarzazate within 2 years of the date of effectiveness of the PPA between MASEN and SPC.
- Direct measures: instead the developer can procure locally some of the goods and services for developing and constructing Ouarzazate I. The local content must be proven through invoices and eligible expenditures are those that take place before the date of preliminary commissioning of the Ouarzazate plant, as specified in the PPA between MASEN and SPC.
- A combination of the two previous solutions. If the developer's investment in direct measures is not sufficient to reach the 30% level, this can be complemented by indirect measures.

61. Contribution to the local economy is a priority for a technology as expensive as CSP, for which MENA is essentially lending its climate advantages for global benefit, to accelerate deployment of the technology, the primary local benefit will be employment creation in industry and services. The commitment from the bidders is on a voluntary basis, therefore fully compliant with WB procurement guidelines.

3.4.5 Risk mitigation measures

62. The main risks are the lack of knowledge of Bank procurement procedures at the advisors level and within MASEN. The technical advisor should have, as a part of its team dedicated to this activity, a well experienced procurement specialist. MASEN's staff who is responsible for procurement coordination should be trained. MASEN has hired a senior procurement specialist well experienced in Bank procedures and PPPs.

[36] ESMAP-Assessment of the Local Manufacturing Potential for Concentrated Solar Power (CSP) Projects. January 2011- Report by Ernst & Young and the Fraunhofer Institute.

3.4.6 Procurement Plan

63. This project includes the partial financing of a PPP arrangement for a Design, Build Own, Operate and Transfer (DBOOT) contract (s) to be granted to the SPC to implement the Solar Power Plant. The anticipated procurement is for the selection of a private Project Sponsor (s) who, through a partnership with MASEN, will constitute the SPC (s) (or Concessionaire Company(ies)). Consequently the procurement plan is limited to one contract. The agreements with the Borrower include the use of (i) prequalification of potential bidders; and (ii) a two stage bidding process for selecting the Project Sponsor.

4. Environmental and Social (including safeguards)

4.1 Environmental

64. For the purpose of the project, MASEN has commissioned a Framework Environmental and Social Impact Assessment (FESIA) completed in April 2010, further discussed and revised with stakeholders including potential lenders and disclosed both in country and at the Infoshop on January 13, 2011. The final version of the FESIA has been disclosed on July 22, 2011.

65. The FESIA scope covers the Ouarzazate Solar Power plant site and the different technologies (CSP parabolic trough, CSP Power Tower, photovoltaic, standard – with and without tracker – and / or concentration) under consideration by MASEN. The FESIA was prepared in a participatory manner including all stakeholders' consultation and disclosure. It includes a description of: (i) the legal and regulatory framework applicable to the project, (ii) alternative options considered, (iii) a state of the environment in the project 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 is FESMP includes institutional settings, general mitigations measures and monitoring plan for the potential impacts expected from project activities during construction and operation stages.

66. The FESIA is to guide the preparation, adoption and monitoring of an Environmental and Social Impact Assessment (ESIA) to be carried out by the SPC once established for Component 1-A of the project (the Solar Power Plant) once its initial design is achieved. The ESIA shall include a detailed Environmental and Social Management Plan in accordance with the provision of the FESIA including the processes, rules and standards defined in the FESIA and will be subject to World Bank review and concurrence before its final approval and implementation by the Borrower. The bidding documents to select the operator of the Solar Power Plant shall include clauses to mandate the SPC to prepare the ESIA before finalizing the detailed design of the Solar Power Plant.

67. Accordingly, the SPC will be responsible for preparing the ESIA that will include a detailed Environmental and Social Management Plan (ESMP) for the Solar Power Plant. After the ESIA is approved, the SPC shall contract an environmental and social safeguards coordinator that will have direct responsibility for implementation of the Environment, Health and Safety measures for the Solar Power Plant during construction and operation. An adequate budget, staff and material support will be provided to the SPC's environmental and social safeguards

coordinator to assist him/her to implement its mandate. The SPC Safeguards Coordinator will, inter alia, prepare a monthly Health, Safety and Environment report during the construction and operation phases of the project.

68. ESIAs for associated facilities (including but not limited to transmission lines and water conveyor) will be carried out by various entities including but not limited to ONE and ONEP which will be in charge of preparing environmental and social assessments for their respective associated facility and implementing the related environmental and social management plans (ESMP). Both environmental and social assessments and environmental and social management plans shall be forwarded to the World Bank for review and concurrence by MASEN. They will further be publicly disclosed.

69. MASEN will hire an environmental and social safeguard coordinator for the purpose of ensuring that all environment and social impact mitigation measures including occupation, health and safety guidelines are mainstreamed into the project design; monitored and supervised in accordance with the provisions of the FESIA.

4.2 Social

70. The land which had to be purchased for this project consists of 2500 ha of community land owned by a local community (‘Aït Oukrour Toundout’), a village (douar in Moroccan) consisting of 55 families is located right outside the boundary of the projected facility (However, many of the family members are not permanent residents there but instead work elsewhere in Morocco). Land purchase from this community was carried out in accordance with Moroccan law and in line with established land ownership (collective ownership). The Community of Aït Oukrour Toundout gave its explicit agreement via its community representatives in a friendly settlement at a price of 10,000 MAD/ha established by an expert commission on the basis of similar transactions in the region. The Land Acquisition Plan describing the process will detail the steps and legal background for this acquisition.

71. As is the case in the sale of community territory, and in accordance with the relevant laws, the sales price of 25 million MAD is being put into a fund with the Ministry of the Interior, to be used in a social development plan for the benefit of the local community.

72. As regards transmission infrastructure, the project necessitates one transmission line (225 kV) and one transformer (60 kV). The transmission line will pass through uninhabited desert terrain with no use value. No land purchases will be necessary for this.

73. The project has the potential to generate positive side-benefits for the local population both in terms of local jobs creation in clerical, transport and O&M functions, as well as by contributing to powering the future development of Ouarzazate through clean energy.

74. The project required the acquisition of 2,500 ha of collective land owned by the Aït Oukrour Toundout community (out of a total area of 64,000 ha), which was carried out following Moroccan standard procedures for similar types of voluntary land transactions between a local community and a public agency. These procedures have consisted in the following steps:

a) Setting of purchase price by a Commission of Experts: The purchase price is determined, according to article 6 of the Dahir dated April 27 1919, by a Commission of Experts comprising (i) the Pacha or Caid, president, (ii) a representative from the ministry of Finance, (iii) two representatives of the ministry of agriculture, trade and forests, and (iv) a representatives from ministry of public works. The Supervisory Board ("*comité de tutelle*" defined in the Dahir mentioned above) chaired by the ministry of interior and comprising representatives from the ministry of agriculture and forests, the directors of political affairs and administrative affairs of the ministry of interior and two members designated by the ministry of interior, is in charge of making a decision on the use of the proceeds from the sale of the land, to the benefit of the Aït Oukrour Toundout community.

b) Granting of required authorization

- Agreement in writing by the community of the Aït Oukrour Toundout on the sale and conditions of the transfer of the land , and
- Authorization of the Supervisory Board of the collective land from tm which the area needed for the project is being extracted following (i0 an analysis of the risks and losses of all types as well as of the benefits resulting from the sale to the benefit of the community affected and (ii) verification that the community affected will keep enough land so that its development is not affected after the sale of the area considered

c) Signing of notarized decision regarding land sale: MASEN being a limited company (société anonyme) cannot directly purchase the collective land, consequently the purchase is done in two phases and involves the intervention of a public notary:

- Acquisition of the land by the public utility (*Office National de l'Electricité* "ONE"), which is a public entity, from the community of the Aït Oukrour Toundout, on the basis of the "élire command" procedure; and
- Declaration of transfer ("élire command") between ONE and the Moroccan Agency for Solar Energy (MASEN) established on the same day as the acquisition of the above mentioned land, recognizing that ONE has duly acquired the land on behalf of MASEN and that the latter has paid the price and all related fees to the notary in charge of the transaction.

This transfer process ("élire command" procedure) complies with the Moroccan tax code and allows to avoid to pay twice the registration and sale fees.

d) Transfer of property rights

Due to its limited company status (*société anonyme*), MASEN is obliged to justify by Moroccan law that the land is not an agricultural land prior to initiating the land's registration process. Once the fact that the land is not agricultural land has been established, the registration can proceed after the land is properly delimited and mapped by the land registration administration of Ouarzazate.

The community of Aït Oukrour Toundout and supervisory board gave their approval, respectively on 14 January and 20 May 2010, on the sale of land to MASEN in

accordance with the terms of transfer outlined above and a price set by the Committee of Experts.

All authorizations and pre-requisites above have been obtained. The acquisition of land was finalized October 18, 2010 as part of a sale by private treaty ("gré à gré"), with the right to transfer on the basis of the "élire command" procedure, between the community of Aït Oukrour Toundout as the seller and ONE as the buyer. This transaction was followed by the transfer of property rights, based on the "élire command" procedure mentioned above, between ONE and MASEN.

The certificate establishing that the land is non-agricultural has been obtained as of 22/10/2010 from the competent territorial authority empowered to issue such certification allowing the registration to proceed after the land is properly delimited and mapped by the land registration administration of Ouarzazate.

75. This process was found satisfactory by the World Bank and conforms to the requirements of OP 4.12. In addition and beyond its obligations under the applicable safeguard polices, MASEN agreed, on a voluntary basis, to prepare and implement a social development plan (SDP) that will be financed through voluntary contributions of MASEN and other stakeholders. The SDP shall also be an instrument to plan for the use of the compensation paid to local communities for their lands sold to MASEN for the purpose of the project. The SDP is being developed and MASEN agreed to forward it to the Bank for review, comments and recommendations before its final adoption and implementation.

5. Monitoring & Evaluation

76. The monitoring and evaluation of the project will be ensured by the following: a) MASEN will submit an annual report to the Bank Group, covering, *inter alia*, progress on physical implementation, procurement, financial commitments and other elements of project progress; b) MASEN will every 6 months submit a report to the Bank Group, covering implementation of the framework environmental management plan. Each fund withdrawal application will include the report from the independent verification expert, certifying that the amount of the relevant SICS is correct as per the provisions of the PPA, the PSA, the *Conventions* and any other relevant document.

77. The Bank Group, in co-ordination with the other lenders (see "Role of Partners" below), will hold regular meetings (bi-annually during construction *and annu*ally thereafter) to address implementation issues, and in particular to review the implementation progress of the environmental management plan.

II. Role of Partners

78. The project has raised strong interest and support from international financial institutions, industry players and other stakeholders. The prequalification process that was launched in July 2010 resulted in 19 proposals from strong and diverse consortia.

79. Component 1-A of the project will be co-financed by the World Bank Group, African Development Bank, CTF, AFD, KfW, EIB and NIF. Together they initially raised around US$ 1.9 billion (EUR 1.4 billion), for the first phase initially set at 250 MW but subsequently reduced to 160 MW (gross) as recommended by the technical advisor based on the result of the prequalification. At least US$ 1.1 billion is expected to be made available from IFIs for the financing of Ouarzazate I.

80. A steering group representing the project's co-financiers has been meeting monthly since April 2010. Missions were held jointly in September 2010, January 2011 and May 2011. The World Bank team was invited to attend some of the meetings of a mission of the European donors in July 2011. The AFD loan has already been approved by its Board. The other approvals are expected as follows: EIB in October 2011, KfW in November 2011 and AfDB in December 2011.

81. The steering group will continue to meet regularly during implementation. To strengthen their coordination, all co-financiers have agreed to: (i) develop a common list of effectiveness conditions for disbursing their loans, (ii) recruit a common consortium of legal and technical advisors to review the project's contractual documents, if MASEN agrees, and (iii) harmonize their procedures and their interaction with MASEN. The WB Loan Agreements include cross-effectiveness clauses. All co-financiers have agreed to adopt joint effectiveness conditions, in particular as regards co-financing. Donors have agreed to disburse CTF funds first and adopt joint disbursement principles for Component 1-A. The preparation of a FM and Disbursement Manual, approved by the IFIs, is an effectiveness condition.

Annex 4: Operational Risk Assessment Framework (ORAF)

MOROCCO

OUARZAZATE I CONCENTRATED SOLAR POWER PLANT PROJECT

Project Development Objective(s)

The development objective of the Project is to support the Borrower in the development of the 500 Megawatt Ouarzazate solar power plant by financing the first phase (160 Megawatt gross) through a public private partnership (PPP), to increase power generation from solar power and mitigate greenhouse gas emissions and local environment impact.

PDO Level Results Indicators:	CSP power generation capacity installed (MW)
	Electricity production (GWh)
	Avoided local air pollution (in tonnes of NO_x, SO_x)
	Avoided GHG emissions (in tonnes of CO_2)

Risk Category	Risk Rating	Risk Description	Proposed Mitigation Measures	Timing for Mitigation: Prep/Imp	
1. Project Stakeholder Risks					
1.1 Stakeholders	L	Government commitment and very strong support for CSP and renewable energy (RE) scale-up by Government of Morocco (GoM) and NGOs. MASEN is a newly created agency fully committed to its mandate to develop and	Consultation and discussion with all stakeholders during project preparation confirmed the support of all stakeholders to the proposed project.	X	

		implement the country's solar program. The single buyer and off-taker of the generated electricity is fully on board and a minority shareholder of MASEN. The local authorities and population are supportive of the project because it creates opportunities of employment and could play a catalyst role in developing this semi desert region. Finally, the private partner will be selected competitively through a clear and transparent process			
2. Implementing Agency Risks (including FM & PR Risks)*					
2.1 Capacity	H	The potential risk in working with a newly created agency is its inexperience, which can sometimes take long time to become operational. MASEN will undertake multiple roles in the PPP transaction, which are likely to be partially conflicting with each other. Such multitude of roles is unusual. MASEN will need to analyze and commercially structure these roles in a way that is both fair and attractive to the private sector and that represent an adequate degree of protection for IFIs (IFIs financing will be on-lent from MASEN via a loan agreement yet to be conceptualized). MASEN chose to rely on limited but highly competent staff with good understanding of its mission and objectives and reliance on highly reputable consultants and advisors to carry out activities related to the selection of a private partner to develop the project	On-going support to MASEN by Bank staff, TA through CTF and other trust funds. Training of MASEN staff to acquaint them with Bank procedures Hiring by MASEN of a consultant well acquainted with Bank procurement procedures. Significant degree of supervision between loan signature and loan effectiveness. Thorough list of condition precedents to loan effectiveness. Should the PPP not be conclusive, the IBRD and CTF loans would not become effective.	X	X
2.2 Governance	L	No significant risk identified	As a condition of effectiveness of the loans, MASEN will be required to design a good	X	

			governance mechanism –the details of which are described in Annex 5- to enhance business ethics, transparency and reduce the risk of collusion, fraud and corruption. Prior to effectiveness, the Bank will ensure that the design is robust and includes all relevant local laws and regulations. During implementation of the project, the Bank will monitor the effective implementation of the good governance mechanism by MASEN's Supervisory Council, as well as the operation of the Supervisory Council.		
3. Project Risks					
3.1 Design	H	The selected partner does not have the capacity to design and implement the project. Board is taking place before the PPP structure has been fully developed, before feedback on the preliminary structure has been received from bidders and before either the identity of the winner or the cost of the project are known. Also the contractual structure that will be used to channel IFIs loans into the SPC is not known at this stage. There are risks of (i) bid failure and delay leading to the risks that the loans committed are not drawn down, or are drawn down at a much later stage than currently anticipated; (ii) uncertainty of project costs, leading to smaller or larger than committed financing needs from IFIs and (iii) risk allocation in the loan agreement between SPC and MASEN not adequately reflect the needs of the IFIs, including for the IBRD and CTF loans Because of the timing of presentation to the Board, key project risks cannot fully assessed, both in nature and consequences, at time of	High caliber advisor to MASEN during selection process Finalization of key documents subject to the Bank's No Objection. Execution and effectiveness of the documents, as cleared by the Bank, will be conditions to effectiveness for CTF/IBRD funding in the legal agreements between the Bank and MASEN.	X	

		Board presentation and this will remain so until full development of the project, conclusion of the competitive bidding process and negotiations of key project documents.			
3.2 Social & Environmental	M-I	No compliance with Bank rules and procedures could hinder project implementation	Compliance with Bank social and environmental rules will be included in the PPP RFP and contractually mandated	X	X
3.3 Program & Donor	H	Concessional funding (CTF) exhausted with first tranche and RE financing/support mechanisms not operational. CSP cost reduction likely to be insufficient after first phase to make CSP competitive for Phase II of Ouarzazate and the rest of the Moroccan Solar Program.	Bank continued support to Morocco to secure additional concessional funding (more CTF or Green Climate Fund) Ensure success of Ouarzazate and disseminate results to replicate the Moroccan approach in MENA and extend the size of the market to lower CSP cost. Close coordination with industry bodies such as DII will help in both cases Assist Morocco in finalizing agreement on physical export of green electricity and/or green certificate trading. Contribute to designing and implementing RE support mechanisms and post-Copenhagen financing schemes	X	X
3.4 Delivery Quality	M-I	No delivery of project by PPP partners	Capacity of the private partner evaluated and quality of delivery contractually mandated. Penalties applied in case of delays or performance shortfall	X	
3.5 Co-financiers coordination during evaluation and processing of the project	M-I	Financiers/donors have different procedures and rules. Risk of burdening or confusing MASEN during the preparation of the project	Co-financiers will align on WB procedures Monthly financier meetings and joint missions during preparation Clarification of working procedures and joint appraisal Memorandum of Understanding to clarify coordination and specify common procedures.	X	

		Inappropriate use of funds and/or double dipping	A financial management and Disbursement Manual will be prepared agreed by co-financiers Disbursements will be based on independent verification (IBRD) and technical audit (CTF)		
3.6 Affordability	H	CSP generation cost substantially higher than for fossil fuel technologies. Government committed to cover gap after mobilization of concessional financing and grant. However, the impact on the budget could be too high given the difficulties facing the subsidy mechanisms for energy and other commodities, or priorities for use of state budget could change in order for instance to finance social or poverty reduction programs.	Morocco cooperating with EU countries to export green electricity and contribute to meeting EU's RE 2020 target. MASEN mobilizing with Bank assistance concessional funding and grants to address affordability issue. Moreover, analyses by ONE show that CSP will displace highly subsidized diesel. Therefore some of the incremental cost will be compensated.	X	
3.7 Technical risk	H	Plants of similar size are operating satisfactorily for parabolic trough over the world and Morocco has constructed and is operating a smaller size plant satisfactorily. The risk is assessed as low.	MASEN secured the assistance of a technical advisor well versed in the considered technology and with extended experience worldwide for the design and technical assessment of bids MASEN and all involved financiers agreed on prequalification and two-stage bidding, which would allow MASEN to review, assess and discuss one on one the technical and technological choices proposed and ensure that they are sound.	X	X

*The SPC will be created to construct the power plant after the selection of private partner(s) through a competitive process during which the technical, financial and project management and implementation capacity of the bidders will be evaluated with the assistance of transaction advisor(s) and the due diligence/supervision of the Bank and other donors. At this stage, only risks related to MASEN are identified and addressed under Implementing Agency.

Annex 5: Implementation Support Plan

MOROCCO: Ouarzazate I Concentrated Solar Power Plant Project

Strategy and Approach for Implementation Support

1. The implementation support plan has been conceived based on the design and the risk profile of the project. It aims at providing sufficient technical support to the Moroccan Solar Agency (MASEN) and the Solar Power Company (SPC), to ensure fiduciary compliance with World Bank guidelines and to adequately carry out the mitigation measures defined in the ORAF. More precisely, the strategic approach for implementation support includes the following:

A. **Financial Management:** Supervision of project financial management will be performed applying a risk-based approach. The supervision will review the project's financial management system, including but not limited to accounting, reporting and internal controls.

B. **Procurement:** The Project Sponsor contracts anticipated in this project are subject to prior review. Implementation support will include: (a) reviewing procurement documents and providing timely feedback to MASEN; and (b) providing detailed guidance on Bank Procurement Guidelines to MASEN; and (c) monitoring procurement progress against the detailed Procurement Plan.

C. **Environmental and Social Safeguards:** The World Bank team will supervise the implementation of the agreed Environmental Management Plan and Land Acquisition Plan (LAP) for the project; and ensure compliance with World Bank safeguards policies.

D. **PPP Management:** Supervision of the PPP will be conducted during the PPP preparation, execution (e.g. construction of the plant) and operation. The nature of the supervision will vary depending on the phase of the project: during the PPP preparation (e.g. up until financial close) the supervision will focus on assessing all the elements of the project that could have an impact on the success of the PPP structure, including evaluation of the contractual documentation being prepared for the PPP, evaluation of the economic and financial viability, assessment of the strength of the contractual structure, and evaluation of the risk allocation all with view to ensuring the sustainability and replicability of the project.. This will be done in close coordination with MASEN. During the execution and operation phase of the PPP, supervision will focus on ensuring that the contracts are being properly implemented, and to determine whether any additional risks are arising from the project implementation either at the SPC's or at MASEN's level.

E. **Donor coordination:** The World Bank team will ensure coordination of procurement procedures with other co financiers: African Development Bank, Agence Française de Développement, Kreditanstalt für Wiederaufbau, and European Investment Bank to facilitate implementation and avoid overburdening MASEN.

F. **Governance mechanism:** MASEN will design and implement a governance risk management framework which will support good governance and business ethics,

enhance disclosure and transparency and reduce the risk of collusion, fraud and corruption. The risk management framework would cover the relationship between directors, officers, shareholders, employees, suppliers and the SPC (following the provisions of section I.2 and Annex 13 included in the RFP) and will be developed on the basis of four essential elements, namely: (1) risk assessment, (2) control activities, (3) information and communication; and (4) monitoring. This framework will include a code of conduct which would be aimed at ensuring the independence of MASEN's employees and reducing potential for conflicts of interest. The principal elements to be covered and essential risk mitigating measures would be as follows:

- Human Resource on-boarding procedures that will guide employee behaviors and which would introduce new employees to the organizational culture and ethical workplace values;
- Processes which allow for continuous dissemination and education of employees, on good ethical business practices and for obtaining internal feedback;
- Internal disclosure and authorization: due diligence mechanisms to require employees to disclose assets, outside and proprietary interests (at the time of hiring, and periodically during the term of an employee's tenure);
- Mechanisms to prevent conflicts of interest (segregation of duties, strong internal controls, polices on family members and relatives, gift policy);
- Complaint handling mechanisms for third parties to report allegations, e.g. ethics helpline;
- Accessibility of declaration and reports for internal and external review;
- Mechanisms to prevent, investigate, refer or sanction employee wrongdoing;
- Feedback mechanisms that would provide for periodic updates to the risk assessment and mitigating measures;
- Introducing fraud and corruption mitigation measures in standard bidding documents.

Implementation Support Plan

2. To successfully supervise implementation of the Ouarzazate CSP plant project, the WB team consists of experts in power engineering, procurement, environment, as well as in other relevant areas such as PPP structuring. The task team is based in Rabat, Washington DC and other locations worldwide. Formal supervision and field visits will be carried out at least once each year, and more frequently during the construction period (first 3 years of project implementation). Detailed inputs from the World Bank team are outlined below:

A. Financial Management: The FM team will remain closely involved in the operation to provide implementation support until MASEN FM arrangements become fully operational. Given the complexity of the project, Bank supervision missions will be perform jointly with TTL, PC, other donors and include site visits of MASEN, SPC and the power plant in Ouarzazate to review (i) continuing adequacy of MASEN and SPC control framework, and (ii) individual transactions.

B. Procurement: The Bank's procurement team (procurement specialists in Washington and Rabat and the PPP focal point in the RPM office) will supervise closely the bidding process and contract for the selection of the developer to ensure its acceptability by the Bank.

C. Environmental and Social Safeguards: The experienced environmental and social specialists on the task team will monitor and evaluate the implementation effectiveness of the agreed LAP and the Environmental Management Plan. Formal supervision will be carried out at least annually, and continuous support is available as required by the client.

D. **PPP management:** The PPP team will supervise closely the contractual development process and the bidding process and the contract implementation through annual or more frequent supervision missions.

E. Donor coordination: A steering group representing all co-financiers of these institutions has been meeting monthly to review the status of project preparation and will continue to meet regularly during implementation. To strengthen their coordination, all co-financiers have agreed to: (i) develop a common list of effectiveness and disbursement conditions (ii) recruit a common consortium of legal and technical consultants to review the project's contractual documents and (iii) harmonize their procedures and their interaction with MASEN. All co-financiers have agreed to adopt joint effectiveness conditions, in particular as regards co-financing. Donors have agreed to disburse CTF funds first and adopt joint disbursement principles for Component 1-A. The preparation of a FM and Disbursement Manual, approved by the IFIs, is an effectiveness condition.

F. Good Governance mechanism: The governance risk management framework would be implemented by MASEN's Supervisory Council (see Annex 3.2). Prior to effectiveness, the Bank will ensure that the design of the mechanisms is robust and includes all relevant local laws and regulations. During implementation of the project, the Bank will monitor the effective implementation of the good governance mechanism as well as the operation of the Supervisory Council.

G. Operations: The Task Team Leader, based in Rabat initially, will provide day-to-day supervision support, and will be assisted by an Energy/Operations specialist. They will liaise closely with the client and coordinate efforts within the task team.

Table 5 –– Skills Mix and Resources Required

Skills Needed	Number of Staff Weeks (SWs)	Number of Trips	Comments
Task Team Leader	8 SWs annually	Field visits as required	Country office based
Energy Specialist/ Operations Officer	6 SWs annually	2 trips annually, field visits as required	
Power Engineer/Solar energy specialist	6 SWs annually	2 trips annually, field visits as required	
Institutional and PPP Specialists	10 SWs annually	Between 2 to 6[37] trips annually	
Social Safeguards Specialist	3 SWs annually	Field visits as required	Country office based
Environmental Specialist	6 SWs annually during the first two	2 trips annually, field visits as	

[37] Until financial close a high level of supervision will be required (6 trips per year). This will be reduced to 3-4 trips annually during construction and 2 annual trips during operation.

	years then 3 SWs annually	required	
Procurement Specialist	6 SWs first year, then 2 SWs annually in following years	2 supervision missions annually Field visits as required	Country office support available
Financial Management Specialist	3 SWs annually		Country office based
Governance Specialist	2 SW annually first year, then 1 SW	1 trip annually as required	Function may be covered by FM specialist
Operational Support	4 SWs annually	Field visits as required	

Annex 6: Team composition

Name	*Title*	*Unit*
Silvia Pariente-David	TTL, Sr. Energy Specialist	MNSEG
Ahmedou Ould Hamed	Lead Procurement Specialist	MNAPR
Patricia Baquero	Sr. Procurement Specialist (PPP expert)	MNAPR
Abdoulaye Keita	Sr. Procurement Specialist	MNAPR
Salim Benouniche	Lead Procurement Specialist	MNAPR
Anas Abou-El Mikias	Sr. Financial Management Specialist	MNAFM
Soukeyna Kane	Sr. Financial Management Specialist	MNAFM
Chandrasekar Govindarajalu	Sr. Energy Specialist	MNSEG
Andrea Liverani	Sr. Social Development Specialist	MNSSO
Gael Gregoire	Sr. Environmental Specialist	MNSEN
Georg Caspary	Energy Economist	MNSEG
Bassem Abou Nehme	Jr. Professional Officer	MNSEG
Roger Coma Cunill	Jr. Professional Officer	MNSEG
Manaf Touati	Consultant	MNSEG
Noureddine Berrah	Consultant, Power Planning Expert	MNSEG
Armando Araujo	Consultant, Power Engineer	MNSEG
Sameh Mobarek	Counsel-Energy, PPP expert	LEGPS
Hassine Hedda	Finance Officer	CTRFC
Philippe Roos	Consultant, Financial Analyst	MNSEG
Pierre Audinet	Sr. Energy Economist	MNSEG
Eavan O'Halloran	Sr. Country Officer	MNC01
Jean-Charles de Daruvar	Sr. Counsel	LEGEM
Mohammed Bekhechi	Lead Counsel	LEGEN
Raymond Bourdeaux	Lead Infrastructure Specialist, PPP expert	MNSSD
Clara Alvarez	Senior Infrastructure Finance Specialist	FEUFS
Stefano Paternostro	Lead Economist	MNSED
Khalid El Massnaoui	Senior Economist	MNSED
Angeline Mani	Language Program Assistant	MNSEG
Khadija Sebbata	Program Assistant	MNCMA
Suman Babbar	Peer Reviewer	EASNS
Nataliya Kulichenko	Peer Reviewer	SEGEN

Annex 7: Global, Regional, Country, Sectoral and Institutional Context

Global and Regional Context

1. On December 2 2009, the Clean Technology Fund Trust Fund Committee (CTF TFC) endorsed the Investment Plan for Concentrated Solar Power (CSP) in the Middle East and North Africa Region, which aims at mobilizing US$ 5.6 billion (including US$ 750 million from the CTF) to accelerate deployment of CSP through the CSP expansion programs of Algeria, Egypt, Jordan, Morocco and Tunisia. Specifically, the Investment Plan (IP) will enable MENA to contribute the benefit of its unique geography to global climate change mitigation and support the deployment of about 1 GW of CSP generation capacity (amounting to about 15% of the projected CSP global pipeline and therefore doubling the worldwide CSP installed capacity).

2. A confluence of three global and regional factors provides a unique opportunity for the Clean Technology Fund (CTF) to finance transformational actions in the MENA region, with global reach. These investments would constitute a dominant part of the countries' ambitious strategies for deployment of low carbon technologies, have the scale to shape the course of global CSP market development, and deliver benefits that transcend climate mitigation by providing broader environmental and economic co-benefits. The three enabling factors are:

a) CSP is a technology that is of particular interest to utilities, but with unexploited manufacturing scale economies: CSP is a large-scale proven solar technology easy to integrate into conventional electricity systems with centralized dispatch of power plants. CSP is a relatively simple technology with few high-cost materials or proprietary components. If the demand for CSP is scaled up, then equipment costs can fall very substantially, since it has yet to benefit from cost savings that often come from manufacturing scale. Cost reductions would also be dependent upon : scale effects (larger projects would result in economies of scale), learning curve effects (history has shown that CSP costs fall by 15% or so for doubling of deployed capacity as a result of experience effects), plant convoy effects (executing multiple identical projects in the same area can drive a 5-15% reduction in capital costs), and improvements in technology (advancement in this area is expected to result in a reduction of up to 20% in capital costs across various technologies). However subsidies are needed as the technology scales up in order to realize those cost reductions in the medium term. Moreover the CSP technology offers the possibility of storage more cost-effectively than storage modes associated with other renewable energy technologies, increasing the availability of CSP plants to meet the load throughout the day and the year.

b) *The MENA region has physical attributes that makes it particularly promising for CSP scale-up:* The region has amongst the world's best production conditions for solar power: abundant sunshine, low precipitation, and plenty of unused flat land close to road networks and transmission grids. The economies of scale needed for global deployment of CSP can be achieved at the lowest cost of any region.

c) Market dynamics in the MENA region can provide a strong enabling environment for large-scale investments: The consumption of electricity in MENA is one of the fastest growing in the world and countries are increasingly looking to scale-up RE to meet growing demand, while diversifying the fuel mix away from hydrocarbons and enhancing

energy security. The region's industrial base, its need for industrial diversification, and the business environment make it favorable for the local manufacturing of CSP equipment. As this industry is at an early stage of development globally, MENA would also have a "first-mover" advantage in industry scale-up. In the Mediterranean Basin and Gulf Region as a whole, opportunities to trade "green" electricity are opening up, stimulated by the "decarbonisation" of Europe and developing incentives in MENA markets. The revenue from exports to European markets would enable the development of CSP electricity supply in MENA markets.

3. Besides the CTF, other sources of financing, especially climate change financing, are being mobilized for the MENA CSP program. In principle, resources from the Neighbourhood Investment Facility (NIF) will be available for the projects in the IP, and have already been secured for projects in Jordan, Tunisia and Morocco. The countries of the IP, with the support of the World Bank (WB) and other International Financial Institutions (IFI), are seeking to mobilize funding from the EU "fast start" scheme which has pledged to mobilize EUR 7.2 billion over 2010-2012, of which 37% for mitigation in developing countries, as well as other climate change financing sources which are under development.

4. Addressing climate change requires "a paradigm shift towards building a low-carbon society that offers substantial opportunities and ensures continued high growth and sustainable development". This conclusion from the December 2010 Cancun conference acknowledges that all countries should cooperate in peaking GHG emissions as soon as possible. The parties also recognized that the time frame for peaking will be longer in developing countries and that social and economic development and poverty eradication are the first and overriding priorities. The establishment of the Green Climate Fund signals a commitment to scaling up funding to help developing countries cope with adverse effects of climate change and embark on a low-emissions development path. The establishment of the Green Climate Fund strengthens the international commitment made in Copenhagen to work toward a goal of jointly mobilizing US$ 100 billion a year by 2020. The basic principles of those new climate change financing schemes are that:

- Developing countries may, on a voluntary basis, propose projects for financing, including estimates of incremental costs and consequent benefits
- Developed countries should provide financing, including for technology transfer, to developing countries for agreed projects.

5. Success of the MENA CSP program depends on the evolving policy and regulatory framework for RE on both sides of the Mediterranean. The proximity to Europe, where there is a huge appetite for "green" electricity, is a feature that makes MENA a favorable location for large-scale CSP development. On December 17, 2008, the EU adopted a Directive that sets an overall target of 20% for the share of RE in gross final energy consumption by 2020, compared to 8.5% today. To reach this target, the legislation allocates differentiated sub-targets to each of the 27 EU countries taking into consideration the 2005 RE share and their GDP per capita. The national sub-targets will lead to intra-EU trade because some countries will be able to export their excess supply, while others need to import. Spain, for example, is expected to meet its obligations from national renewable resources, whereas Italy and Luxembourg are likely to import RE from other EU countries or from non-EU countries. The EU legislation opens the door to imports from MENA countries through its Article 9. Under certain conditions, this clause

recognizes that electricity physically imported from MENA countries and consumed in the EU can count towards the targets of EU Member States.

6. However, implementation of the Directive, especially Article 9, will take time, as it requires (i) transposition into national laws of the Directive and (ii) the conclusion of bilateral and multilateral agreements to implement the technical, financial and legal mechanisms necessary for green electricity exchanges. A French-Moroccan working group has been created for the practical implementation of Article 9; it should lead to the first experimental electricity exchange between the South and the North in late 2011. AFD launched a study in March 2011 to clarify the legal and institutional framework to implement Article 9 and to analyze the practical conditions necessary to export in practice green electricity from Morocco to France (or other participating European countries). During the visit of French Ministry of Energy and Industry to Morocco in July 2011, there was an announcement that a bilateral agreement between France and Morocco would be signed before the end of 2011, setting the stage for electricity exports from Morocco to countries of the Northern shore. During the G8 Deauville summit in June 2011, several countries committed to the creation of a EU-Mediterranean green electricity market, which would support the exports of electricity from Morocco to the EU.

7. The European Council reconfirmed in February 2011 the EU objective of reducing GHG emissions by 80%-95% by 2050 compared to 1990. Under the framework of the 2020 flagship initiative for a resource efficient Europe, the European Commission issued a roadmap to transform the EU into a competitive low carbon economy by 2050[38], which indicates that the GHG reduction objective can only be achieved through a fully decarbonized power sector. This report shows that a decarbonized European power sector is not only technically feasible but, crucially, economically compelling. Europe can meet its decarbonization objectives more efficiently by tapping resources in neighboring countries, in particular the Southern Mediterranean countries. The EU intends to strengthen its cooperation with its international partners to support efforts of developing countries to implement low carbon strategies and ensure that climate financing contributes to development objectives.

8. The MENA CSP scale-up initiative also aims at generating much needed employment in MENA countries—for which pressure is increasing to seek solutions since the Arab Spring--through increased local manufacturing opportunities. The World Bank ought to demonstrate local development impact whenever it deploys climate finance – this demonstration is a major element of the geopolitics of climate financing and the concern of key stakeholders that climate financing should not crowd out development assistance. For a technology as expensive as CSP, for which MENA is essentially lending its climate advantages for global benefit-- to accelerate deployment of the technology-- the primary local benefit will be employment creation in industry and services.

9. The proposed MENA CSP program has strong synergy with other initiatives that seek to develop the renewable potential of the Mediterranean Basin, while creating the conditions for a regional market linking the North and the South of the Basin to optimize resource use—namely the Mediterranean Solar Plan (MSP), the DESERTEC Industrial Initiative (DII), Medgrid and the World Bank's Arab World Initiative (AWI). The main objective of the MSP is to develop 20 GW of renewable power generating capacity on the South Shore of the Mediterranean, as well as

[38] COM (2011) 112/4- A Roadmap for moving to a competitive low carbon economy in 2050.

the necessary infrastructures for the electricity interconnection with Europe, in particular through the establishment of a regulatory framework to promote the scale-up of renewable energies and to facilitate the exchange of electricity. The DII was formed by a consortium of 12 large companies of the energy, technology and finance sectors with the mission to roll-out the Desertec concept - linking North Africa and Europe to tap the vast solar and wind resources of North Africa to bring clean energy to Africa and Europe. The long-term goal of DII is to satisfy both a substantial part of the energy needs of the MENA countries and to meet about 15% of Europe's electricity demand by 2050. Medgrid aims at developing interconnections around the Mediterranean to deliver to Europe solar energy produced in the Sahara; the Medgrid consortium is planning to develop a technical network capable of exporting about 5 GW to Europe by 2020. The WB AWI is a platform for a regional approach to addressing policy and infrastructure bottlenecks that hold back long term sustainable growth, in particular the development of renewable power[39]. The CTF MENA CSP program builds a strong foundation for visionary and ambitious initiatives such as the MSP, DESERTEC and the AWI by offering a concrete solution to move forward and implement projects in the immediate future.

10. All these initiatives support the creation of a Mediterranean electricity market connected to Europe. There is clear potential for building an EU-Mediterranean partnership in the production and management of renewables, in particular solar energy, and in having a joint approach to ensuring energy security. Joint renewable energy investments in the Southern Mediterranean in line with the EU's 2050 decarbonisation scenario could offer the possibility of a new partnership provided that the right market perspective is created for electricity imports. It is desirable to open a credible perspective for the integration of the Southern Mediterranean in the EU internal energy market based on a differentiated and gradual approach. In the mid to long term, this would mean establishing a form of 'EU-Southern Mediterranean Energy Community' starting with the Maghreb countries and possibly expanding progressively to the Mashreq. Extending the Energy Community Treaty with the Union's Eastern and South-Eastern neighbors, or building on its experience, this community should cover relevant parts of the EU's energy legislation with a view to promoting a real and reliable convergence of South Mediterranean partners' energy policies with EU policy.

11. A regionally integrated electricity market would facilitate the take off of CSP, and cooperation in large scale development of CSP could be an enabler to the creation of a regional energy market, in particular a Maghreb electricity market. Regional market integration, which results in larger and more diversified power generation capacity than in isolated national markets, promotes the development of renewable energy, a common objective of all MENA countries as a way to enhance energy security and to mitigate climate change. Regional integration permits sharing of back-up reserves, which are necessary to guarantee reliability of supply in the presence of intermittent sources of supply (as is the case from renewables), and the

[39] Scaling-up of solar energy is attractive within the Arab context due to several key reasons: (a) it is a vehicle to promotes economic integration in the region as it could foster increased trade and knowledge exchange (b) new opportunities in this area would be helpful in achieving industrial modernization and diversification objectives and also enhance job creation; (c) increased use of solar energy would free-up valuable oil and gas resources that could then be utilized for higher value added purposes such as in industrial processes; (d) in countries with limited energy resources, energy supply diversification through renewable energy increases energy security; and finally (e) as the global solar industry is at the beginning of a market take-off, entry at an early stage will offer Arab countries a firm first mover advantage.

creation of a market of sufficient size to justify the development of a local industry at scale to serve those markets.

Country Context

12. Morocco is one of the countries of the MENA CSP CTF Investment Plan, the country with the largest proposed capacity and the first one to launch the development of a concrete project, which furthermore will be one of the world's largest solar CSP plants. Morocco has decided at the highest level to play a leadership role in the development of CSP and move forward with a 500MW plant in Ouarzazate. By proposing this ambitious project for private investment and concessional financing, Morocco's intention is to test the reality of the Copenhagen and UfM commitments. The other countries in the region are now watching closely to see if Morocco succeeds before deciding to follow suit.

13. Morocco is experiencing relatively high real GDP growth. However, in the short term, economic growth is projected to remain moderate, impacted by the economic slowdown of the world economy and by the higher risk-averse perception of investors due to the on-going Arab Spring. The budget deficit is expected to increase to between 5.5 and 6 percent of GDP this year instead of the budgeted 3.6 percent of GDP. The deficit may worsen further in case of higher world prices of fuels and food and the inability of the government to curtail other non-priority recurrent budgetary spending. While Morocco's indebtedness remains under control (the central government debt is projected to rise to around 52 percent of GDP in 2011 from 50.3 percent in 2010), the current universal subsidy system threatens the medium term fiscal sustainability. Although Morocco has up to now easy access to financing with favorable conditions –both domestically and in international financial markets– if public finance does not regain its strength quickly, public debt may reach unsustainable levels putting in jeopardy the stability of the macroeconomic stance prevailing so far.

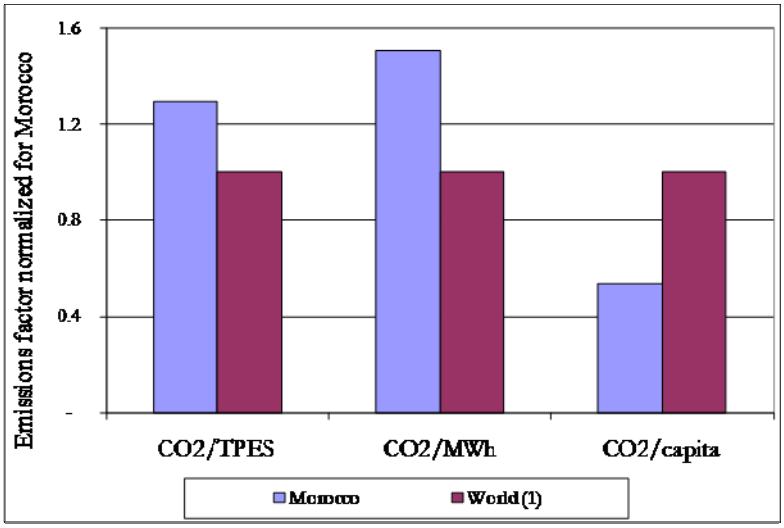
14. Sustained GDP growth in the long-term raises challenges of long-run energy security and management of the country's (increasing) GHG emissions, given both that Morocco imports nearly all its energy needs (97%, excluding non-commercial forms of energy) and that its energy mix is dominated by oil (61% of primary energy demand) and coal (28%). Power generation is dominated by coal (between 50% and 70% of power generation over the last five years depending on hydro availability), which makes Morocco a CO_2 intensive country, with CO_2 emissions per kWh generated 50% higher than the world average, despite a low CO_2 per capita.

15. Given the high level of import dependency and strong reliance on oil, Morocco is highly exposed to international oil price fluctuations, which have a destabilizing effect on its balance of payments and a negative effect on the trade balance. Energy import expenditures have again skyrocketed in the first seven months of 2011, increasing to MAD 51.8 billion (+39% compared to same period in 2010) under the combined effect of increased volume of oil products imports (+19%) and a 27% increase in the average price of imported energy because of higher world oil prices . This is cutting into Morocco's trade balance, with the cost of energy imports having offset export growth so far, leading to a 21% widening of Morocco's trade deficit to MAD 106.5 billion (US$ 13.2 billion) from MAD 88 billion in the same period of 2010..

16. Improving energy security and climate change mitigation are two key objectives of the country's energy policy, while ensuring energy access for all citizens and businesses at the

lowest cost possible. The commitment of Morocco to a low carbon growth was evidenced by its high level participation in Copenhagen and Cancun, with an explicit commitment to climate change mitigation, and was reaffirmed during the "Assises de l'Energie" in June 2011 on the theme "Green energy: a momentum for Morocco. In preparation for the COP-15 and COP-16 meetings, the GoM released a National Action Plan against Global Warming, which lists adaptation and mitigation measures either already implemented or under consideration across a range of sectors.

Figure 12 – CO_2 Emission Intensity: Morocco vs. Rest of the World



17. To address the challenges of energy security, sustainable development and competitiveness, the GoM formulated a new energy strategy in 2009. The objectives are: energy security, availability of energy to all Moroccan households and businesses at competitive prices, energy demand management, promotion of national expertise and development of technological know-how and environmental protection and climate change mitigation. To achieve these objectives, the key elements of the strategy are: (a) diversify and optimize the energy mix around reliable and competitive energy technologies, in order to reduce the share of oil to 40% by 2030, (b) develop the national renewable energy potential (increasing the contribution of renewables to 10% by 2012), (c) make energy efficiency improvements a national priority (induce energy savings of 15% by 2020 and 25% by 2030), (d) develop indigenous energy resources by intensifying hydrocarbon exploration activities and developing conventional and non-conventional oil sources and (e) integrate into the regional energy market, through enhanced cooperation and trade with both other Maghreb countries and the EU.

18. The Morocco Solar Plan, launched in November 2009, is the cornerstone of the country's climate change mitigation strategy. The US$ 9 billion Solar Plan calls for the commissioning of five solar power generation plants between 2015 and 2020, for a total capacity of 2,000 MW, thus helping Morocco achieve higher growth and employment while ensuring sustainability. With this plan, 4,500 GWh annually will be produced from solar energy alone, notably CSP. This implies a major transformation of not only the energy sector but the entire economy, as this 'green stimulus plan' will gear industrial development as well as the research community (e.g. through publically financed RE-dedicated research centers) towards RE. In addition to fostering low-carbon development of the energy sector and enhancing energy security, it will stimulate

large investments, enhance Morocco's competitiveness and position the country as an 'early mover' on a promising green technology by encouraging the development of domestic manufacturing capacity. Additionally, both construction and operation of the projects are likely to provide major employment opportunities.

19. Morocco aspires to become a green energy platform between Europe and Africa is taking a calculated risk with the Morocco Solar Plan in order to achieve its ambitions. The commitment of Morocco is evidenced by the support from the state budget to cover the additional cost of solar generated electricity compared to conventional generation. Morocco is also accessing substantial amounts of concessional financing to get the Plan kick started. However, longer term, Morocco will be able to afford this expensive technology only if the costs come down sufficiently and if it can access high paying markets. A flurry of political and diplomatic activity took place during the early part of 2011 to establish the grounds for energy trade at least on a bilateral basis until the EU legislation allows for a harmonized EU green electricity market. A pilot study is under way, led by France, to test the export of Moroccan green electricity to Europe. The Desertec Industry Initiative is setting up a reference project exclusively for export, linked to an off take contract from major European player(s).

20. The "Office National de l'Electricité" (ONE) is already operating an Integrated Solar Combined Cycle (ISCC) plant with a 20 MW solar-assisted CCGT at Ain Beni Mathar (northeastern Morocco), which is financed by the AfDB and supported by a World Bank/Global Environment Facility (GEF) grant. Lessons learned about CSP during the project preparation and construction increased the operators' confidence in the technology and led, after thorough studies, to the announcement of the ambitious Moroccan Solar Plan and the phased development of the Ouarzazate project.

Sectoral and Institutional Context

21. Morocco is ideally positioned to serve European markets and to use this positioning to take a technology and market lead. Morocco's chance of success is enhanced by the country's commitment to undertaking electricity sector restructuring and creating enabling policy and regulatory conditions for greater integration of renewables into the energy system, notably by: (1) gradually removing subsidies on fossil fuels and electricity to provide price signals to consumers to encourage energy efficiency on the demand side and creating a level playing field on the generation side to make renewable energy technologies competitive; (2) limiting electricity demand growth through demand side management (DSM) and other energy efficiency measures (strong demand growth is partly due to inefficient use of electricity and, given that CSP and other renewable technologies have high capital costs, capacity additions are to be undertaken only when necessary, i.e. only after implementing energy conservation measures) and (3) creating a transitional incentive scheme until cost reduction in CSP is achieved and fossil fuel subsidies are removed, or at least substantially reduced.

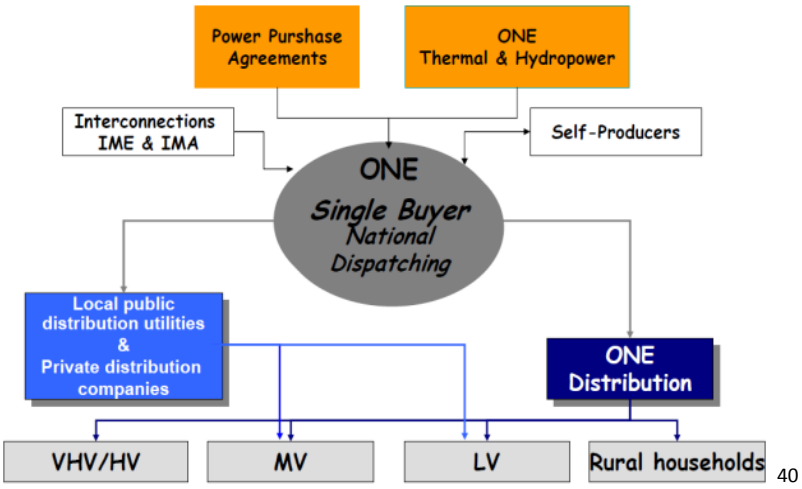
22. Morocco's power sector experienced transformational changes during the last 25 years and is currently characterized by strong involvement of the private sector in power generation and electricity distribution. ONE, the incumbent public utility, is still the major operator in the system. It is entrusted by the GoM with the development of power generation, transmission and distribution of electricity mostly outside the distribution concessions and rural areas. It owns and

operates about 50% of the generation capacity, has the monopoly over power transmission and supplies about 50% of the customers, including the 90 largest consumers.

23. Private producers account for 50% of power generating capacity and 75% of the electricity generated in the country, which is sold to ONE under power purchase agreements (PPAs). Moreover, 55% of electricity distribution is performed by private operators and municipal utilities. While subsidized prices and lack of clarity in energy market reform, especially in the electricity sector, could be a deterrent to private investment, the proximity with European markets and dynamism of the economy have attracted interest of foreign investors. Their interest in the Moroccan market is strong in the development of the vast untapped potential in wind and solar energy.

24. The sector is regulated by different ministerial departments: Ministry of Energy, Mines, Environment and Water, Ministry of Interior, Ministry of Finance and Ministry of Economic and General Affairs. The sector is organized under a single-buyer model where the state-owned company ONE purchases all of the power generated on Moroccan territory through PPAs as well as all the imports from Spain and Algeria. Since 1994 (Law 2-94-502), ONE has been allowed to sign contracts with private generators. The new RE Law (see relevant section below) allows, under certain conditions, direct sales of electricity generated from renewable energy to some large customers or to exports without necessarily transiting through ONE. The figure below provides an illustration of the organization of the Moroccan electricity sector.

Figure 13 – Electricity Sector Organization



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25. The next phase of reform calls for the effective merger of ONE with ONEP, the national water utility, for which legislation passed the first stage of approval in the Fall of 2011. Other restructuring decisions depend on the results of a study underway on sector organization and regulation. Third party access (TPA) to the transmission system is granted by law for electricity generated from renewable energy.

[40] IME: Interconnection Morocco Europe, IMA: Interconnection Morocco- Algeria.

26. The implementation success of the Moroccan energy strategy is supported by a new institutional, financial and legal framework:

a. Morocco has created a new legal and institutional framework for promotion of renewable energy. The RE Law (Dahir 1-10-16 dated February 11, 2010) and the Moroccan Agency for Solar Energy (MASEN) Law (Dahir 1-10-18, dated February 11, 2010) are intended to scale up the development of renewable energy with special focus on solar technologies. Moreover, a national plan of priority actions (NPPA) is under implementation. It includes measures to address the deficit between energy demand and supply (particularly in the electricity sector). An energy efficiency law was approved by Parliament in 2011.

b. In terms of implementation capacity, several institutions have been created:
   i. MASEN is entrusted by the GoM to develop at least 2000 MW of grid connected solar power by 2020, including conducting technical, economic and financial studies, supporting relevant research and fund-raising, seeking involvement of local industry for each solar project and establishing associated infrastructure. While the generated electricity must be sold in priority to ONE for the domestic market, the Law allows MASEN, under conditions specified in the convention signed with the government, to sell electricity to other public or private operators on national or export markets.
   ii. The *Agence Nationale pour le Développement des Energies Renouvelables et de l'Efficacité Energétique* (ADEREE) has become the central institution promoting energy efficiency and renewables, developing relevant strategies and incentive programs, and implementing them.

c. Morocco also has reinforced its financial support: the *Fonds de Développement Energétique* (FDE) contributes to subsidies and concessional loans for renewable energy and energy efficiency investments and the *Société d'Investissement Energétique* (SIE) provides equity to financially viable energy projects.

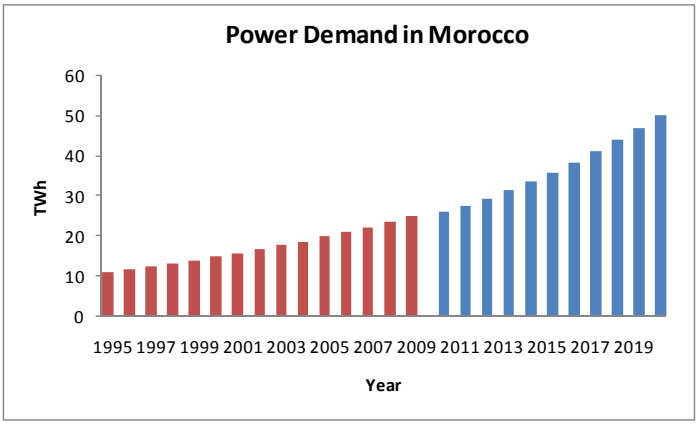
27. A reform of the price compensation mechanism is underway. Both petroleum products and electricity are sold to consumers below cost of supply, through a compensation system administered by the State in the case of petroleum products or through State support to ONE in the case of electricity. The largest subsidies are on Liquefied Petroleum Gas (LPG). With the globally rising food and energy prices, the budgetary envelope for the subsidies had grown from MAD 5 billion in 2003 (or around 1% of GDP) to MAD 31.5 billion in 2008. Lower oil prices in 2009 resulted in a decline to around MAD 13 bn (or 1.7% of GDP). The higher oil prices in 2010, and increasing imports, resulted in a strong increase in the total subsidy level, and the annual budget of MAD 14 billion was exhausted by mid-year. For the full year 2010, the level of subsidies was 27.2 billion (3.5% of GDP). For 2011, subsidies are estimated at around MAD 45 billion (5.6% of GDP), a record level..

28. Thus, a reform of the energy price system is becoming an imperative to lessen the burden on state finances, especially at a time when the GoM is committed to financing solar energy, and the process was initiated in 2009-10. Work is under way to identify efficiency improvements in the petroleum distribution sector to reduce the level of subsidies. Similarly, an electricity tariff study was launched in order to the assess the cost of serving different categories of customers and a full reform of the electricity pricing system will be undertaken when the tariff study is completed. These tariff reform measures will be combined with targeted social assistance

programs promoting the insertion of poor and vulnerable groups in the economy, which are also currently being developed. At the same time, there is no price incentive scheme for renewable generated electricity, but the GoM has committed to finance the Moroccan Solar Plan in part directly from State budget.

29. Many of these reforms and policy measures are in part driven by the need to reduce growth in electricity demand, requiring a doubling in power generation capacity by 2020. Electricity demand has been growing at an average of 6% annual growth rate since the mid-1990s increasing more than twofold from 11 TWh in 1995 to 25 TWh in 2009. Part of the reason for this strong growth is that the country's policy of universal access to electricity is compounding the effects of population and economic growth and improving standards of living. Morocco has had to rely increasingly on imports from Spain to meet national demand as the commissioning of capacity additions has not kept up with the pace of growth in demand. Although growth slowed down to 4.2% in 2009 because of lower electricity use for irrigation, electricity demand is expected to continue growing at around 7% per annum, with demand thus being multiplied by a factor of four to six between now and 2030. The addition of 700-800 MW of power generating capacity per year (and increased interconnections to 2,100 MW with Spain and 1,400 MW with Algeria) are required to meet demand and avoid increasing reliance on electricity imports.

Figure 14 – Electricity Demand: History and Forecast to 2010



30. The installed capacity was about 6,400 MW at the end of 2010. The main characteristics of the Moroccan power generation capacity are as follows:

- A strong dependence on coal for base load generation (43% of electricity production in 2009),
- A strong dependence on imports from Spain (18%),
- A significant share of hydro power (10%), which is high for a region characterized by water scarcity,
- The lowest share of natural gas in the region, partly because the introduction of natural gas in the Moroccan electricity system is very recent (2005 with Tahaddart combined cycle power station) but also because of constrained supply.

Figure 15- Installed power generation capacity in 2009

	Power (MW)	Share of total installed capacity
Gas Turbines	914	15%
Steam Turbine (Oil Fired)	600	10%
Steam Turbine (Coal Fired)	1785	29%
Hydro	1265	21%
Pumped Storage	465	8%
Combined Cycle	680	11%
Wind	250	4%
Diesel	175	3%
Total	6134	100%

Figure 16- Electricity supply by fuel and source in 2009

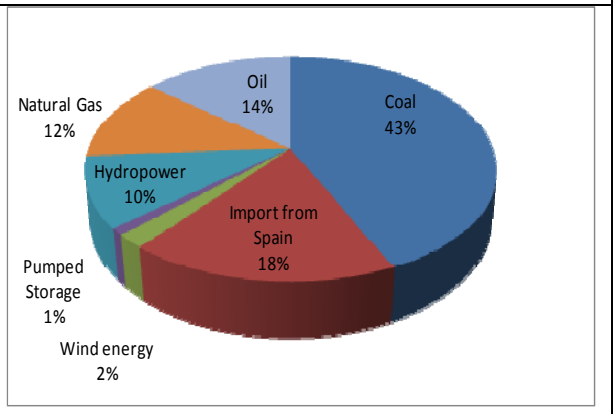
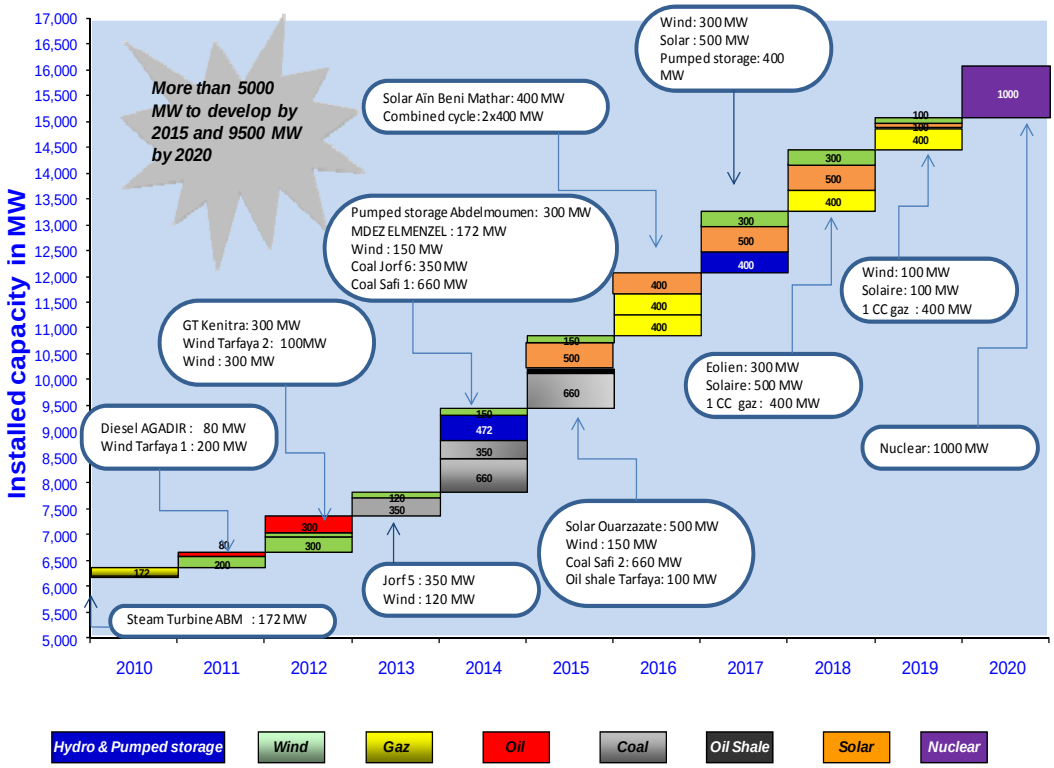


Figure 17 - Capacity expansion plan and the role of solar energy 2010-2020



31. To support its energy system optimization efforts (taking into account both the supply and demand side) and develop appropriate tools to ensure optimum integration of renewable into the grid, Morocco is participating as a pilot country in the "Low Carbon Growth" joint WB/ESMAP program, to implement new planning methods and tools during 2011.

Annex 8: Economic and Financial Analysis

I. Project economic analysis

Cost Effectiveness

1. The "Office National de l'Electricité" (ONE) carried out a least-cost expansion study using the "Wien Automatic System Planning" (WASP) model covering the period 2010-2030 (study period) with a focus on 2010-2020 (planning period). WASP is an optimization model that determines the optimal capacity and generation mix to meet the demand with the minimum cost (net present value of investment, operating and environmental costs), given predetermined reliability criteria. The study considered all potential candidates including coal and gas fired units, as well as solar and nuclear.

2. The costs and technical assumptions considered in the study are provided in Table 6, which presents the WASP input table for existing and new generic power plants, including fixed and variable costs, fuel type, efficiency (or heat rate), capacity and availability data.

Table 6 - WASP Assumptions

FIXED SYSTEM
SUMMARY DESCRIPTION OF THERMAL PLANTS IN YEAR 2010

NO.	NAME	NO. OF SETS	MIN. LOAD MW	CAPA CITY MW	HEAT RATES KCAL/KWH BASE LOAD	HEAT RATES KCAL/KWH AVGE INCR	FUEL COSTS CENTS/ MILLION DMSTC	FUEL COSTS CENTS/ KCAL FORGN	FUEL TYPE	FAST SPIN RES %	FOR %	DAYS SCHL MAIN	MAIN CLAS MW	O&M (FIX) $/KWM	O&M (VAR) $/MWH
3	JERA	3	26.	48.	3120.	3120.	271.0	2583.0	2	0	9.5	40	60.	3.00	3.00
4	EOLS	4	50.	50.	860.	860.	0.0	0.0	4	0	75.0	0	1.	1.00	1.00
5	KENI	4	35.	71.	2702.	2702.	52.0	4688.0	1	0	5.0	30	60.	1.25	1.50
6	MF12	2	47.	140.	2429.	2429.	0.0	4688.0	1	0	7.0	30	150.	0.80	1.50
7	MC34	2	65.	139.	2454.	2454.	222.0	2517.0	2	0	10.0	45	150.	1.20	2.00
8	TG33	15	0.	29.	3216.	3216.	391.0	4688.0	0	0	10.0	15	20.	0.46	1.00
9	JL12	2	141.	320.	2064.	2064.	90.0	2500.0	2	0	8.0	25	300.	1.50	2.00
10	JL34	2	141.	320.	2064.	2064.	90.0	2500.0	2	0	8.0	25	300.	1.50	2.00
11	IMP	7	0.	97.	2880.	2880.	54.0	3059.0	5	0	10.0	15	0.	0.00	0.00
12	TAHA	1	192.	384.	1561.	1561.	150.0	3953.0	3	0	3.0	21	400.	1.60	1.50
13	TAGF	3	0.	97.	2880.	2880.	377.0	4688.0	1	0	8.0	15	100.	0.60	1.00
14	ABM	1	231.	450.	1652.	1652.	103.0	3953.0	3	0	3.0	15	150.	1.70	1.60
15	BHAR	0	367.	620.	1998.	1998.	90.0	2500.0	2	0	8.0	20	300.	2.00	2.50
16	GD	0	0.	113.	1728.	1728.	352.0	4688.0	1	0	8.0	15	100.	0.60	1.00
17	SOLR	0	0.	200.	860.	860.	0.0	0.0	6	0	85.0	0	1.	2.00	0.00
18	TAGK	0	0.	102.	2880.	2880.	429.0	4688.0	1	0	8.0	15	100.	0.60	1.00

VARIABLE SYSTEM
SUMMARY DESCRIPTION OF THERMAL PLANTS

NO.	NAME	NO. OF SETS	MIN. LOAD MW	CAPA CITY MW	HEAT RATES KCAL/KWH BASE LOAD	HEAT RATES KCAL/KWH AVGE INCR	FUEL COSTS CENTS/ MILLION DMSTC	FUEL COSTS CENTS/ KCAL FORGN	FUEL TYPE	FAST SPIN RES %	FOR %	DAYS SCHL MAIN	MAIN CLAS MW	O&M (FIX) $/KWM	O&M (VAR) $/MWH
1	C660	0	367.	620.	1998.	1998.	90.0	2500.0	2	0	8.0	20	300.	2.00	2.50
2	CCLW	0	192.	384.	1561.	1561.	150.0	3953.0	8	0	3.0	21	200.	1.60	1.50
3	TAGF	0	0.	97.	2880.	2880.	377.0	4688.0	3	0	4.0	15	100.	0.60	1.00
4	NUCL	0	450.	950.	2606.	2153.	0.0	308.0	7	0	2.5	30	200.	5.83	0.00
5	GD	0	0.	116.	1728.	1728.	352.0	4688.0	0	0	8.0	15	100.	0.60	1.00
6	JL56	0	141.	320.	2136.	2136.	90.0	2500.0	2	0	8.0	25	300.	1.50	2.00
7	CCGZ	0	231.	450.	1561.	1561.	150.0	3953.0	8	0	3.0	21	225.	1.60	1.50

3. The fossil fuel prices selected by ONE for the study are based on IEA assumptions and are as follows:

- Coal: US$ 150 per ton at plant gate;
- Fuel oil: US$ 450 per ton at plant gate;
- Natural gas: US$ 10 per million BTU at plant gate.

4. Prices were assumed to increase 5 percent per year in real term. The investment price assumed for solar is around US$ 6 000/kW. These analyses showed that CSP plants are not part of the least cost generation mix. CSP candidates are incorporated in the generation in 2017 only if the capital cost is reduced by 30 percent. At the request of MASEN and the World Bank, ONE revised the optimization study with a Capex assumption including higher physical and price contingencies and fuel cost assumptions based on IEA forecast.

5. ***Optimization at 10 percent discount rate***. With these assumptions and a discount rate of 10 percent, the study showed that CSP power plants are not part of the optimal generation mix. However, if the solar Capex is 30 percent lower than considered in the base case and fuel prices increase by 5 percent in real terms, CSP power plants would be part of the optimal generation solution beginning in 2021. The study also showed that if prevailing economic conditions (base assumptions) do not change and solar is imposed in 2015, the Morocco Solar Program (2,000 MW in 2020) would entail an incremental cost of about US$ 2.3 billion, an increase of about 6.2 percent over the least cost solution. If the solar Capex is 30 percent lower than in the base case and fuel prices increase by 5 percent in real terms, the incremental cost of the program would be reduced to about 628 million, an increase of about 1.7 percent over the least cost solution.

6. ***Optimization at 5 percent discount rate.*** With the above assumptions and a discount rate of 5 percent, the study still showed that the CSP power plants are part of the optimal generation mix beginning. However, if the solar CAPEX is 30 percent lower than considered in the base case and fuel prices increase by 5 percent in real terms, CSP power plants would be part of the optimal generation solution beginning in 2017. The study showed that if prevailing economic conditions (base assumptions) do not change, the Moroccan solar program would still entail an incremental cost of about US$ 723 million (an increase of about 1.3 percent over the least cost solution), even at a discount rate of 5 percent. If the solar Capex is 30 percent lower than in the base case and fuel prices increase by 5 percent in real terms, the incremental cost of the program would be reduced to about US$ 327 million, an increase of about 6 percent over the least cost solution.

Table 7- Objective Functions at 5% and 10% Discount Rates

Cases studied	Objective Functions @10% DR (kUS$)	Objective Functions @5% DR (kUS$)
Base Case	**36,880,488**	**57,246,628**
Solar Capex Reduced by 30%	**36,837,616**	**55,663,836**
Base case Assumptions and Solar Program imposed beginning 2015	**39,166,612**	**57,969,784**
Solar Capex Reduced by 30% and Solar Program Imposed in 2015	**37,465,288**	**55,990,880**

7. The analyses indicate that CSP power plants are closer to cost effectiveness when the discount rate is lower. However, the proposed first phase of Ouarzazate is not part of the optimal

generation mix under the prevailing economic conditions whether the discount rate is 10 or 5 percent.

Cost/Benefit Analysis and EIRR Calculations

8. Utilizing traditional cost-benefit tools is very challenging for a transformational flagship project within a global program. Decision makers in Morocco emphasize that the proposed project (Ouarzazate I) is not being undertaken on the basis of its self-standing economic value, using standard cost-benefit analysis. This project is the linchpin of the Moroccan transformational solar program. The program will benefit Morocco by increasing its energy security, gradually developing R&D and green energy industries, developing interior regions of the country and creating urgently needed jobs. But, it will also benefit the development of a clean zero carbon electricity generation technology. It is also expected that solar technology will contribute to better integration of regional markets and substantial increase of green electricity trade.

9. However, below is set out a cost-benefit analysis for Ouarzazate on a stand-alone basis, including sensitivity analysis, and which shows that the proposed CSP project is economically viable in all cases when the discount rate is zero, in some cases when the discount rate is 5 percent, and in no cases when the discount rate is 10 percent. Many economists advocate lower discount rates in environmental and climate change projects and the appropriate discount rate is still a matter of debate. Several countries, mostly developed ones, adopted discount rates lower than 5 percent for climate change projects. However, it should be emphasized that the sensitivity analysis shown below assumes various scenarios which are unlikely, and hence it must be concluded that the project on a stand alone basis is not economically viable and should be considered as part of a larger transformational program.

10. Table 8 below sets out the costs and benefits that should be considered when conducting a cost/benefit analysis for a CSP project on a stand-alone basis. Recognized benefits such as energy security and hedge against volatility in fuel prices are not considered in the analysis because they are difficult to quantify. The impact of exports was tested in the sensitivity analyses.

Table 8 - Costs and Benefits

Benefits	Costs
✓ Sales of electricity	✓ CAPEX
✓ Avoided fuel subsidies	✓ OPEX
✓ Avoided CO_2 emissions	
✓ Avoided NO_x emissions	
✓ Avoided SO_2 emissions	
✓ Avoided Particulate Matter (PM) emissions	

Assumptions on Project Costs

11. In order to analyze the costs of the CSP project, technical assumptions need to be taken into account. The technical and economic characteristics of the project are derived from a preliminary technical study carried by MASEN with the assistance of their technical advisor

(Worley Parsons). The technical assumptions in the economic study provided in the table below are based on these estimates:

Table 9 - Technical Assumptions

Net capacity (MW)	143
Annual production (GWh)	370
Hours of storage	3
Annual degradation	0.5%
Lifetime (years)	25

12. Costs include capital expenditure (Capex), including storage, and operation and maintenance expenditures (Opex). Capex is estimated around US$ 6 000 per kW, i.e. about US$ 1 billion for a 160 MW (gross) solar plant, including high price and physical contingencies. The cost structure is provided in the table below:

Table 10 - Project Cost Structure

Component	**% of total Capex**
Solar systems (solar field and HTF)	62%
Power block	21%
Storage	13%
Site preparation	4%
Total	100%

13. MASEN estimated that the annual Opex would amount to around 11% of annual revenues. No cost is allocated to the heat transfer fluid's environmental impact and transmission losses.

Assumptions on Project Benefits

14. The economic benefits accrue from: (i) the electricity sold and valued at the average sales price to ONE or alternatively at the long run marginal cost (LRMC) of the system, (ii) the avoided subsidy because of the displacement of the fuel, and (ii) the value of avoided global GHG and local environment emissions.

15. Avoided GHG emissions are valued based on the actual emissions savings derived from the ONE dispatch analysis and a CO_2 price of 30 US$/ton. Avoided NO_x/SO_2/PM emissions are valued based on the actual emission savings derived from the ONE dispatch analyses and unit prices for emissions which were transferred to Morocco from the EC ExternE[41] study.

[41] ENG1-CT2002-00609.

Table 11 - Emission Rates of Power Plants in Morocco

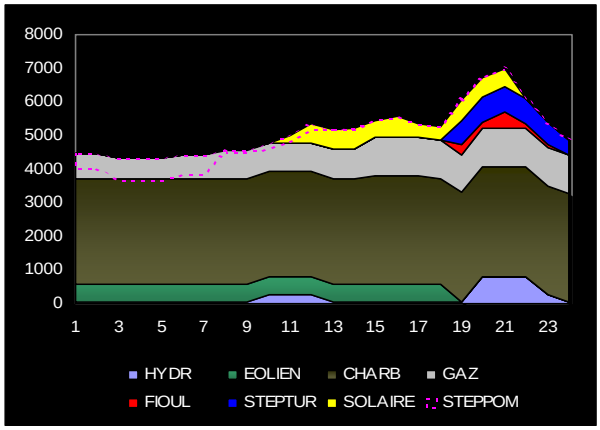
Tons per GWh	CO_2	SO_2	NO_x	PM
Coal plant	987	6.6	6.7	3.7
Combined Cycle	406	0.0	0.0	0.0
Oil plant	592	14.0	2.4	0.0

Table 12 - Externality Values Transposed to Morocco

	ExternE[42]		Morocco
	Price (2000 EUR/ton)	Price (2010 US$/ton)	Price (2010 US$/ton)
SO_2	2,939	5,220	1,380
NO_x	2,908	5,165	1,370
PM	11,723	20,823	3,100
CO_2[43]			30

16. Fuel savings stemming from Ouarzazate I are significant because peaking units in Morocco are high cost fuel based combustion turbines and diesel generators. They were estimated based on dispatch simulations prepared by ONE following commissioning all Ouarzazate tranches in 2017. In Morocco, peak demand occurs between 7pm and 11pm as shown in Figure 18 below, which shows that Ouarzazate I with storage displaces fuel oil-based electricity. Analyses carried out by ONE indicate that Ouarzazate (total capacity) with 3 hours of storage would save about US$ 8 million of fuel cost at market prices and US$ 10 million in fuel subsidy. Benefits considered in the cost benefit analysis are as follows: (a) full amount of fuel displaced in 2017 valued at market price minus the fuel sale price to ONE for 5 years; and (b) half the fuel displaced in 2017 valued in the same way during the following five years (fuel subsidy reduced and/or structural change of the generation mix reduced the fuel savings). After 10 years, it was conservatively assumed that fuel subsidies are phased out and/or the structural change of the generation mix reduced the fuel savings.

Figure 18 - Moroccan Dispatch in September 2017[44], with 3h Storage Solar Generation



[42] Source: http://www.externe.info/expolwp6.pdf, Table 5.
[43] Team's assumption for CO_2.
[44] Eolien = Wind; STEP = Pumped Storage; Charbon = Coal; Fuel = Heavy fuel oil.

17. The ONE dispatch study shows that a 160 MW CSP plant generating around 370 GWh of electricity would displace 68 GWh of coal generated electricity, 54 GWh of natural gas generated electricity and 249 GWh of fuel oil based electricity. The resulting emissions savings and their associated value would be as follows:

Table 13 – Value of Avoided Emissions

	Electricity displaced (GWh/year)[45]	Avoided CO_2 emissions (tons/year)	Value of CO_2 emissions (US$ million/year)	Value of other emissions (US$ million/year)
Coal	68	66,900	2.0	1.3
Natural gas	54	21,900	0.7	0.0
Fuel Oil	249	147,300	4.4	5.6
Total	370	236,100	7.1	6.9

Project Economic Internal Rate of Return (EIRR)

18. Cost benefit analyses were carried out based on the above assumptions and three discount rates, 10, 5 and 0 percent and with two electricity prices referred (average sales price to ONE and LRMC). The results of the base case are provided below.

Table 14 - Cost/Benefit Analysis

	Sales Price to ONE			**LRMC**		
	Discount @0%	Discount @5%	Discount @10%	Discount @0%	Discount @5%	Discount @10%
Value of CO_2 emissions avoided	167	95	62	167	95	62
Total net present value	109	-305	-443	384	-169	-367
EIRR	**0.9%**			**2.9%**		

19. The analysis shows that if electricity is valued at the average sales price to ONE, the Economic Internal Rate of Return (EIRR) is 0.9 percent. If the electricity is valued at the LRMC, the IERR is 2.9 percent. Both are significantly lower than the 10 percent discount rate usually considered in infrastructure projects.

20. Sensitivity analyses was carried out to assess the robustness of the results to the different assumptions considered in the low case. The alternative assumptions considered are as follows:

- High carbon price: US$ 100 per ton in 2015, instead of US$ 30 per ton in the base case,
- Low CAPEX: 30 % and 50% lower than in the base case,
- Combined High Carbon + Low CAPEX,
- Doubling of sales price of electricity produced by the plant (this could result from selling 50% of the production to ONE and 50% to the export market at a price nearly three times higher),

[45] Source: ONE study.

- High rate of increase of the electricity sales price in real terms: double electricity price because of export of part of the electricity generated or 5% in real terms.

21. The results of the sensitivity analysis confirm that the proposed CSP project is economically viable in all cases when the discount rate is zero, in some cases if the discount rate is 5 percent and in no cases if the discount rate is 10 percent.

Table 15 - EIRR and NPV

	EIRR	NPV		
		@0%	@5%	@10%
Sales Price to ONE				
Base Case	0.9%	109	-305	-443
High Carbon Price	3.3%	469	-144	-361
Lower CAPEX • - 30% • - 50%	 3.3% 6.5%	 327 514	 -98 69	 -249 -99
High Carbon + Lower CAPEX (-50%)	10.5%	937	274	15
Double electricity price	6.8%	1,079	161	-186
Sales ONE Price increasing in real term by 5%/year	5.3%	1,024	36	-300
LRMC				
Base case	2.9%	384	-169	-367
High Carbon Price	4.9%	743	-8	-284
Lower CAPEX • - 30% • - 50%	 5.6% 9.3%	 603 789	 38 205	 -172 -22
Double electricity price	9.5%	1,629	432	-33
LRMC increase by 5%/year in real terms	7.3%	1,543	262	-185

Storage Economics

22. Cost-benefit analyses and dispatch simulations were also carried out without storage. They showed that, without storage, the proposed CSP unit would almost not contribute to the peak demand. In all cases, the storage reduces the EIRR, but only marginally. For instance, the base case shows a 1.6% EIRR without storage and a 0.9% EIRR with storage. However, incorporating storage in this first project is strategically essential to ensure that CSP would in the future contribute to meeting the electricity demand reliably and continuously, one of Morocco's major strategic choices and reasons to undertake this costly project. Without storage, CSP would only be another intermittent renewable energy resource and its transformational contribution would be limited.

II. Project Financial Analysis

23. As the bidding for a project developer for Ouarzazate I will be based on the proposed kilowatt-hours price for CSP generated electricity, the financial analysis at solar project company (SPC) level is focused on the Levelized Cost of Electricity (LCOE) for the plant. At MASEN's

level, the analysis is focused on the company's cash generation, i.e. on the level of subsidy/additional financing required to preserve MASEN's financial viability.

24. The simplified financial model that was used for this analysis was developed by the World Bank and discussed with MASEN. Sensitivity analyses were carried out to test the impact of key variables affecting the project. Foreign exchange risk was not taken into account.

Project Company (SPC) - Ouarzazate I

25. ***Assumptions***. The key assumptions that were used for the base case are as follows:

- Construction:
  - Total capital expenditure (Capex): approximately USD 1 billion,
  - Lifetime of the plant/amortization period: 25 years after a 3 year construction period,
- Operations:
  - Operating expenditure (Opex): 11% of revenues, of which 15% is stable over time and 85% is inflated at general inflation rate (2.15% p.a.),
  - Production sold: 370 GWh/year, with a 0.5% annual degradation factor,
  - Sales price to MASEN: LCOE, with an "inflation minus X" factor (inflation @2.15%, X@1%),
  - No revenues from carbon credits (nor from NOx or SOx savings) were assumed at the SPC level,
- Financing:
  - 70% debt, 30% equity:
  - It was assumed that the IFIs (including NIF) would provide around USD 700 of which USD 37 million of grant (NIF).

26. ***Sensitivities***. Two kinds of sensitivities were tested: (i) *ex ante* sensitivities (i.e. before the cost of electricity [LCOE] is set) on CAPEX, OPEX, interest rates, etc., in order to determine how the LCOE would change according to new parameters for the project, and: (ii) *ex post* sensitivities (i.e. after an LCOE is set), to determine how an unexpected level of DNI (and therefore electricity generation) or OPEX would affect the profitability of the project.

27. The following *ex ante* sensitivities were tested:

Table 16 - Ex Ante Sensitivity Analyses Assumptions

		Pessimistic case	Base case	Optimistic case
CAPEX	Assumption	Base + 20%	Base	Base - 20%
OPEX	Assumption	Base + 30%	Base	Base - 30%
Production	Assumption	Base - 20%	Base	Base + 20%
	GWh/year	296	370	444
Non-CTF interest rate	Assumption	Commercial	Base	All CTF
	Non-CTF blended %	7.00%	3.84%	0.25%
	Total blended %	5.06%	2.81%	0.25%
Equity IRR	Assumption	High	Base	Low
	%	18%	12%	8%
CTF	Assumption	No CTF	Base	More CTF
	USD m	0	197	400
	Resulting interest rate %	4.13%	2.52%	2.36%

28. The results of the sensitivity calculations are shown in Table 17, indicating the percentage increase or decrease case of LCOE compared to the Base case. In addition to the six cases described in Table 16, two combined cases were tested: combination of technical sensitivities (CAPEX, OPEX and production), and combination of financial sensitivities (debt interest rate, equity return, amount of CTF money).

Table 17 - Ex Ante Sensitivity Analyses Results

LCOE		Pessimistic case	Optimistic case
CAPEX (a)	Sensitivity/Base	+19%	-18%
OPEX (b)	Sensitivity/Base	+5%	-5%
Production (c)	Sensitivity/Base	+25%	-17%
Combination (a+b+c)	Sensitivity/Base	+55%	-42%
Interest rate (d)	Sensitivity/Base	+6%	-11%
Equity IRR (e)	Sensitivity/Base	+25%	-15%
CTF (f)	Sensitivity/Base	+9%	-6%
Combination (d+e+f)	Sensitivity/Base	+55%	-25%

29. The calculations show that the project's LCOE is very sensitive to technical parameters such as capital expenditure and actual generation (increase/decrease compared to Base case vary from +25% to -18%), and much less sensitive to operating expenses (increase-decrease varies +5% to -5%), which was to be expected for a capital intensive project with no fuel cost. This confirms that decreasing capital costs will be paramount to make CSP competitive, not only in Morocco or in the MENA region, but also globally. This also confirms that CSP projects should be located as much as possible in the best possible locations in terms of insulation, like the MENA region.

30. The sensitivities also show that the project's LCOE is sensitive to the average cost of capital (debt + equity), which was also to be expected given the capital intensity of CSP plants. The direct impact of CTF is limited, due to the current low level of interest rates. However, the calculations also make clear that the strong implication of IFIs in general, and CTF in particular, will be key to the early success of CSP in Morocco and in the MENA region: the IFIs will not only provide loans at very competitive rates, but their involvement in the projects will give private sponsors additional confidence, hence lowering the risk premium such sponsors will ask for their investment (through the equity rate of return).

31. Ex post sensitivities were also tested to determine how an unexpected level of lower DNI or higher Opex would impact the DSCR. Results show that, due to its favorable financial structure, the project is very robust to adverse operating conditions. For example, power generation would need to decrease by at least 35-40% for the minimum DSCR to fall below 1, as is shown in Table 18.

Table 18 - Ex Post Sensitivity Analyses Results

	Production	Opex	Avg. DSCR	Min. DSCR
Base case	Base	Base	2.50	1.93
Production - 10%	-10%	Base	2.20	1.70
Production for DSCR 1.5	-19%	Base	1.93	1.50
Production for Breakeven	-41%	Base	1.26	1.00
OPEX + 30%	Base	+30%	2.35	1.83
Production for DSCR 1.5 @ High OPEX	-14%	+30%	1.91	1.50
Production for Breakeven @ High OPEX	-37%	+30%	1.24	1.00

MASEN - Ouarzazate I

32. For the purpose of this analysis, it is assumed that MASEN has only one project in portfolio (Ouarzazate I). The main assumptions are as follows:

- During the construction period, MASEN provides 100% of the debt required by the SPC (based on the 70/30 leverage) in the form of repackaged IFI loans, as well as 25% of the SPC's equity;
- MASEN buys electricity from the SPC at a price based on the plant's LCOE, and resells it to ONE, based on ONE's high voltage and very high voltage tariffs escalated at the general inflation rate; and
- MASEN's additional revenues include sales of CO2 emissions rights and rent/fees for the use by the SPC of MASEN-owned site infrastructure.

33. The model was used to calculate the amount of additional funds required to preserve MASEN's positive cash position (cash greater or equal to zero, on a yearly basis), regardless of the company's equity level. Two financing options were tested:

- *Case A*: The IFIs provide funds covering most of MASEN's contribution to the SPC.
- *Case B*: In addition to the funds provided to cover MASEN's contribution into the SPC, the World Bank provides USD 200 million to participate in the purchase of kilowatt-hour by MASEN during the first years of operation. WB funds are disbursed on a kilowatt-hour basis in order to cover the difference between MASEN's revenues and expenses. Based on the above assumptions, the proposed USD 200 million would cover approximately four-five years of cash shortfall.

34. Simplified cash flows statements for the first 12 years of operations are as follows:

- *Case A*: MASEN's cash at the end of the construction period would be sufficient to cover 1 year of cash shortfall during operation of the project.
- *Case B*: The additional financing of USD 200 million from the World Bank would cover another 4 years of cash shortfall. From a financial point of view, financing the early shortfall can be seen as a way to ease the cash burden on the Moroccan budget during the early years of operation of Ouarzazate I. Over the life of the project, due to this additional debt and the related debt service, the cumulated value of the cash shortfall would actually be only slightly higher than in Case A.

35. ***Sensitivities***. The following sensitivities were tested, using Case B as the Base case:

Table 19 - Sensitivity Analyses Assumptions at MASEN's Level

		Pessimistic case	Base case	Optimistic case
Capex	Assumption	Base + 20%	Case B	Base - 20%
Equity IRR	Assumption	High	Case B	Low
	%	18%	12%	8%
CTF (initial investment)	Assumption	No CTF	Base	More CTF
	USD m	0	197	400
	Resulting interest rate %	Base+1.5%	Base	Base-0.3%
Additional kWh financing	Assumption	Case A	Case B	More financing
	USD m	0	200	500

36. The results of the sensitivity calculations are presented in the table below. The key parameters are the cumulated value of the shortfall and the number of years the additional kilowatt-hour financing would cover this shortfall (base case: **5 years**). The first two cases confirm what was observed in the SPC analysis, i.e. that the project is very sensitive to capital costs, whether through the cost of equipments or through the cost of invested capital. The third case shows that, while the impact of CTF on the project's LCOE is moderate (see above), it can indirectly "buy" about 2 years of cash shortfall for MASEN, which could be crucial in the transition period before exports take off and investment costs get closer to breakeven with conventional technologies.

Table 20 - Years of Cash Shortfall Covered

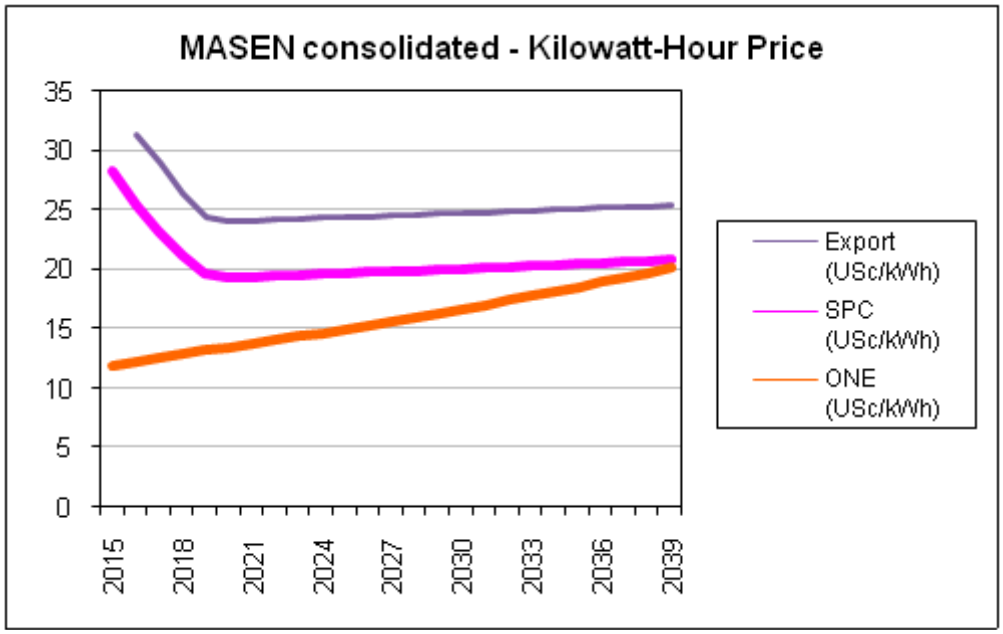
		Pessimistic case	Optimistic case
Capex	Years covered	4	8
Equity IRR	Years covered	3	6
CTF	Years covered	4	8
Additional financing	Years covered	1	9

III. MASEN's Consolidated Financial Assessment

37. Based on the Ouarzazate I financial model and the list of plants to be developed under the Moroccan Solar Plan, a consolidated model was developed for MASEN, as an illustration of how the company could reach financial equilibrium, thanks to increasing volume of exports. The main assumptions were the following:

- Commissioning of Ouarzazate I (160 MW gross) mid-2014, Ouarzazate II (340 MW) at end-2015, Ain Beni Mathar (400 MW) in 2017, Sabkhat Tah (500 MW) in 2018, Foum El Oued (500 MW) in 2019, and Boujdour (100 MW) in 2020,
- 15% yearly decrease in capital cost,
- No debt financing from MASEN to projects other than Ouarzazate I,
- MASEN borrowing for building Ouarzazate I and buying kilowatt-hours from this project, then for its equity contribution to the following projects,
- Increasing level of export, from 0% in 2015 to 7% in 2016 and 46% from 2019 onward,
- 30% export price premium over LCOE.

Figure 19 – Assumptions for MASEN's Financial Assessment



38. The results of the simulation for the period 2015-2030 show that MASEN would be very close to operating breakeven around 2020. The company could start to generate cash (including repayment of the early kilowatt-hour financing funded by the World Bank) as soon as 2019, after only 5 years of operation. Additional financing, either from the government of Morocco or other sources, amounting to approximately USD 365 million would be required between 2015 and 2018. Over the lifetime of the planned 2,000 MW of the Morocco Solar Plan, net cash generated by MASEN would be well over USD 1 billion, leading to an equity rate of return of 6.2% for the company, and much higher for the government of Morocco, when taking into account income tax revenues from both MASEN and the various SPCs.

IV. Derived Economic Effects and Macroeconomic Analysis

Local manufacturing potential and related economic benefits

39. The benefits of the large scale development of solar energy in Morocco through the Morocco Solar Plan are expected to extend beyond climate change mitigation and potential revenues from green electricity exports to creation of high technology industry and highly skilled jobs. To assess potential derived economic benefits from the CSP MENA scale-up initiative, the World Bank and ESMAP commissioned a study to analyze the potential for local manufacturing of CSP components across the five countries of the MENA CSP Investment Plan, namely Algeria, Egypt, Jordan, Morocco and Tunisia, and evaluated the impact of the program on manufacturing output, value added, labor and foreign trade impact[46]. The results for Morocco are:

[46] "MENA Assessment of the Local Manufacturing Potential for Concentrated Solar Power Projects", Ernst & Young, Fraunhofer ISI and Fraunhofer ISE for the World Bank and ESMAP, January 2011.

- ***Average share of local manufacturing in the CSP value chain:*** The potential for local content (in terms of value added) is expected to increase constantly over time. It would reach about 30% in 2015, 50% in 2020 and 60% in 2025;
- ***Impact on GDP:*** Assuming approximately 2,000 MW of installed CSP capacity in Morocco by 2020 (and 5,000 MW in the 5 countries of the MENA CSP Investment Plan), and based on the expected share of local content, the local manufacturing study concludes that US$ 4.6 billion of cumulated additional value added would be created by 2020. It is reasonable to assume that the impact of the first 250 MW in Ouarzazate would be approximately 1/8th of this figure, i.e. about US$ 550 million;
- ***Labor impact:*** The cumulated number of full-time equivalent jobs in construction, manufacturing and O&M of the 2,000 MW CSP program in Morocco would reach 11,000 by 2020. Those jobs include a majority of low skilled positions, especially in construction, but also numerous skilled jobs, like engineers and technicians, in construction and O&M, as well as in manufacturing;
- ***Foreign trade impact:*** Additional impacts for job creation and growth of GDP could come from exporting CSP components. For the MENA region as a whole, the local manufacturing study concluded that the equivalent of 2,000 MW of components could be exported by 2020, which would generate more than US$ 3 billion of cumulated export revenue for the region.

Impact on budget

40. To assess the impact of the 160 MW Ouarzazate solar power complex on the budget, it is assumed that the Government would contribute 7.5 percent to the capital of the project, for a total of US$ 73 million. The other budgetary outlays consist of subsidies and amounts foregone on taxes on saved fuels. Given the fuel composition imported to produce power, the average customs duty rate is estimated at 6.4 percent. The annual taxes foregone amount to US$ 3.4 million, which adds up to US$ 83.3 million over the life span of the Ouarzazate plants. The Budget will benefit from income taxes received from SPC and local manufacturing and will save on subsidies on saved imported fuels. The net total cost to the budget is estimated at US$ 883 million over the life of the plants. The annual budgetary impact of the project is small, around 0.03 percent of GDP on average. The annual impact of the project is presented in Table 21.

Table 21 - Cost to Budget, US$ Million- Illustrative Case

	2012	2013	2014	2015	2016	…	2039	2040	2041	Total
Capital	-16	-19	-38							-73
Subsidies				0	0	…	-58			-1,192
Taxes foregone on saved imported fuel				-2.5	-2.5	…	-2.5			-62
Subsidies saved on saved imported fuels				8.5	8.5	…	0			64
Income tax received from SPC and taxes on revenues from local manufacturing	4	4	8		9	…	19			380
Total cost to the budget	**-12**	**-15**	**-30**	**-6**	**15**	**…**	**-41.5**			**-883**
Impact on budget, in % of GDP	**-0.01**	**-0.02**	**-0.02**	**-0.00**	**0.02**	**…**	**-0.04**			

Impact on the balance of payments

41. Construction of Ouarzazate will translate into US$ 728 million of foreign exchange expenditures. If power produced in Ouarzazate is entirely consumed in Morocco, there would be no electricity exported at this stage. Based on ONE data, the 160 MW Ouarzazate complex will allow savings in fuels imported amounting to US$ 960 million[47]. The net impact of the Ouarzazate solar complex on the balance of payments is positive, estimated at US$ 230 million of receipts..

Table 22 - Impact on the Balance of Payments, US$ Million

	2011	2012	2013	2014	2015	…	2038	2039	2040	Total
Imported capital (70%)	-242.7	-242.7	-242.7		-		-	-	-	**-728.0**
Exports of electricity	-	-	-	-	-	…	-	-	-	-
Savings on fuels	-	-	-	38.5	38.5	…	38.5	-	-	**960.0**
Net impact on the balance of payments	**-242.7**	**-242.7**	**-242.7**	**38.5**	**38.5**	…	**38.5**	**-**	**-**	**232.0**
Net impact in % of GDP	**-0.25**	**-0.25**	**-0.25**	**0.04**	**0.04**	…	**0.04**		**-**	

42. Given the high level of import dependency and strong reliance on oil, Morocco is highly exposed to international oil price fluctuations, which have a destabilizing effect on its balance of payments and a negative effect on the trade balance. According to the IEA, Morocco is the largest energy importer in Northern Africa. Energy import expenditures have again skyrocketed in 2010, increasing to 71.7 billion MAD (up 32.4%) under the combined effect of increased volume (up 6%) and a 24.9% increase in the average price of imported energy because of higher world oil prices. Indeed, this is cutting into Morocco's trade balance, with the cost of energy imports having offset export value so far, leading to a slight widening of Morocco's trade deficit to MAD 151.3 billion (US$ 18 billion).

43. A reform of the price compensation mechanism is underway. Both petroleum products and electricity are sold to consumers at below cost of supply, through a compensation system administered by the State in the case of petroleum products or through State support to ONE in the case of electricity. The largest subsidies are on LPG. With the globally rising food and energy prices, the budgetary envelope for the subsidies had grown from MAD 5 billion in 2003 (or around one percent of GDP) to MAD 31.5 billion in 2008. Lower oil prices in 2009 resulted in a decline to around MAD 13 billion (or 1.7% of GDP). The higher oil prices in 2010, and increasing imports, resulted in a strong increase in the total subsidy level, and the annual budget of MAD 14 billion was exhausted by mid-year. For the full year 2010, subsidies reached MAD 27.2 billion (3.5% of GDP), nearly as much as in 2008. For 2011, as oil prices have steadily been increasing following the unrests in the MENA region, subsidies are estimated to reach a record level of MAD 45 billion (5.6% of GDP).

[47] Annual fuel savings would amount to 32,000 tons of coal, 354,000 mbtu of natural gas and 67,000 tons of fuel oil. Assuming US$ 150 per ton of coal, US$ 450 per ton of fuel oil and US$ 10 per mbtu for natural gas, the annual savings would reach US$ 38.5 million.

Table 23 - Subsidies are High and Constitute a Heavy Burden on the Budget

Morocco Subsidies	2007	2008	2009	2010	Est 2011
MAD billion					
Food	6.0	7.3	4.8	5.4	10.0
Fuels	10.4	24.2	8.0	21.8	35.0
Total Subsidies	**16.4**	**31.5**	**12.8**	**27.2**	**45.0**
Allocation in % of total					
Food	36.7	23.2	37.5	19.9	22.2
Fuels	63.3	76.8	62.5	80.1	77.8
Total Subsidies	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
US$ million					
Food	732	942	593	642	1,244
Fuels	1,263	3,116	988	2,590	4,354
Total Subsidies	**1,996**	**4,058**	**1,581**	**3,231**	**5,598**
In % of GDP					
Food	1.0	1.1	0.7	0.7	1.2
Fuels	1.7	3.5	1.1	2.8	4.3
Total Subsidies	**2.7**	**4.6**	**1.7**	**3.5**	**5.5**

44. Thus, a reform of the energy price system is becoming an imperative to lessen the burden on state finances, especially at a time when the GoM is committed to financing solar energy, and the process was initiated in 2009-10. Work is under way to identify efficiency improvements in the petroleum distribution sector to reduce the level of subsidies. Similarly, an electricity tariff study was launched in order to the assess the cost of serving different categories of customers and a full reform of the electricity pricing system will be undertaken when the tariff study is completed. These tariff reform measures will be combined with targeted social assistance programs promoting the insertion of poor and vulnerable groups in the economy, which are also currently being developed. At the same time, there is no generalized price incentive scheme for renewable generated electricity, but the government has committed to finance the Morocco Solar Plan in part directly from State budget.

Annex 9: Clean Technology Fund (CTF) Annex
Morocco: Ouarzazate I Concentrated Solar Power Project

Summary of CTF Impact Indicators

Key Indicators	CTF/World Bank Project Ouarzazate I	Ouarzazate I, II and III	Morocco's Solar Plan
Solar power generation capacity	160 MW gross 143 MW net	500 MW gross	2,000 MW gross
Power generation (GWh per year)	370	1,200	4,600
Avoided CO_2 - tons per year - lifetime (tons/30 years)	 240,000 7 million	 750,000 22 million	 3 million 90 million
CTF Investment leverage ratio	5	15 (if no additional CTF for Ouarzazate)	
CTF Investment cost effectiveness (per tonne of CO_2 avoided)	US$ 28	US$ 9	
Environmental co-benefits in terms of avoided local pollution (US$ million)	2.3	7.2	28.8
Improved energy security - RE share - reduction in electricity imports	 <2% small	 8% of PG capacity Small reduction in imports	 42% of PG capacity in 2020 No more imports, some exports
Other benefits - Development of local industry - Increased employment - CSP cost reduction	Negligible	Initiation of local activities in Ouarzazate Local jobs for servicing and maintenance No cost reduction yet	Significant at both national and local levels 11 000 jobs created country wide Some cost reductions

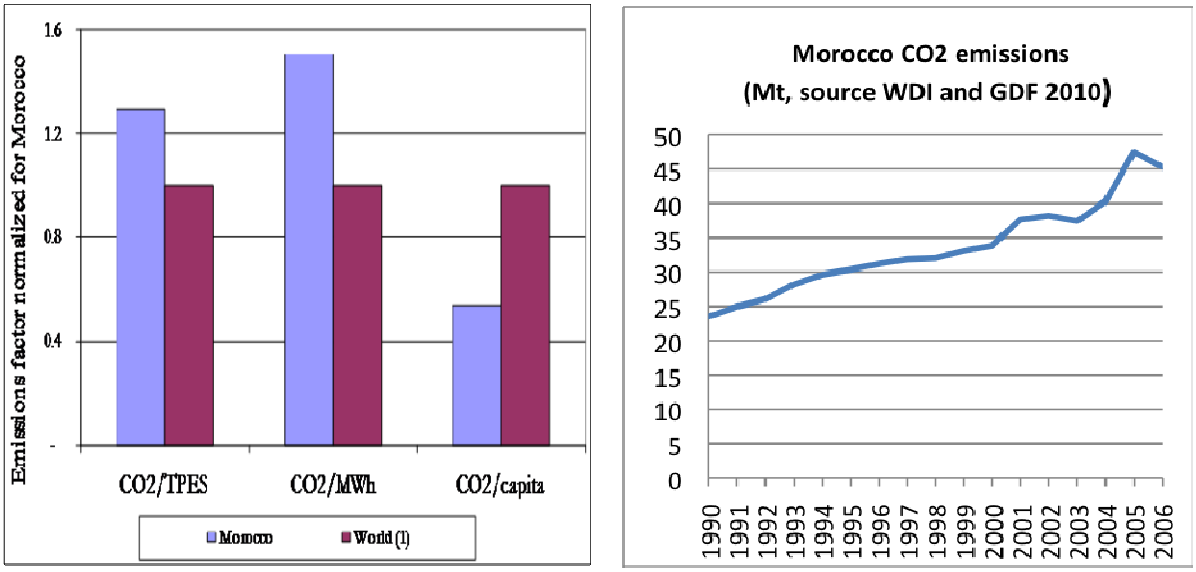
I. Introduction

1. Morocco is experiencing strong real GDP growth. This raises challenges of long-run energy security and management of the country's increasing GHG emissions (see Figure 1 (b)), given both that Morocco imports nearly all its energy needs (97%, excluding non-commercial forms of energy) and that its energy mix is dominated by fossil fuels (oil: 61% of primary energy demand; coal: 28%). Power generation in Morocco is dominated by coal (between 50% and 70%

of power generation over the last five years depending on hydro availability), which makes Morocco a CO_2 intensive country, with CO_2 emissions per kWh generated, 50% higher than the world average despite a low total CO_2 per capita (see Figure 20 (a)).

Figure 20 - Morocco: CO_2 Emission Intensity (2008) and Emission Trend (1990-2006)

(a) (b)



2. Improving energy security and climate change mitigation are therefore two key objectives of the country's energy policy. This should be done without jeopardizing energy access for all citizens and businesses, and at the lowest cost possible. The commitment of Morocco to a low carbon growth is evidenced by its high level participation in the December 2009 COP-15 meeting in Copenhagen and the December 2010 COP-16 meeting in Cancun, with an explicit commitment to climate change mitigation. In preparation for the COP meetings, the Government of Morocco (GoM) released a National Action Plan against Global Warming, which lists adaptation and mitigation measures either already implemented or under consideration across a range of sectors.

3. To achieve these objectives, the key elements of Morocco's energy strategy are: (a) diversification and optimization of the energy mix using reliable and competitive energy technologies, in order to reduce the share of oil to 40% in primary energy consumption by 2030; (b) development of the national renewable energy potential by increasing the RE power generation capacity to 42% of installed capacity by 2020; (c) improvements in energy efficiency to induce energy savings of 15% from the "business as usual' scenario by 2020 and 25% by 2030; (d) development of indigenous energy resources by intensifying hydrocarbon exploration activities and developing conventional and non-conventional oil sources; and (e) integration into the regional energy market, through enhanced cooperation and trade with Maghreb and EU countries.

4. Morocco's Solar Plan, launched in November 2009, is the cornerstone of the country's renewable energy and climate change mitigation strategy. This US$ 9 billion plan calls for the commissioning of five solar power generation plants by 2020 for a total capacity of 2,000 MW, starting with the ambitious Ouarzazate project structured as a public-private partnership (PPP).

In addition to fostering low-carbon development of the energy sector and enhancing energy security, the implementation of this plan will stimulate large investments and enhance Morocco's competitiveness. This is an integrated plan in the sense that it calls for local manufacturing, as well as related training, education and research activities, therefore boosting economic growth and contributing to job creation.

5. Morocco has physical attributes that make it particularly promising for scale-up of solar technologies with particular focus on concentrated solar power (CSP): abundant sunshine, low humidity and plenty of unused flat land close to road networks and transmission grids. These attributes, together with access to 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. CSP is a technology that is of particular interest to utilities as it is more predictable than most renewable energy options and is closest to economically viable energy storage, and therefore easy to integrate into conventional electricity systems. CSP is also a technology with substantial cost reduction potential, in part because of unexploited economies of scale in manufacturing. Cost reductions would be dependent upon: scale effects (larger projects would result in improved economies of scale), learning curve effects (history has shown that CSP costs fall by 15% or so for doubling of deployed capacity as a result of experience effects), plant convoy effects (executing multiple identical projects in the same area can drive a 5-15% reduction in capital costs), and improvements in technology (advancements in this area is expected to result in a reduction of up to 20% in capital costs across various technologies).

6. The implementation of the solar program was entrusted to the Moroccan Agency for Solar Energy (MASEN), a fully state-owned limited liability company created on 26 March, 2010 to develop at least 2,000 MW of solar power capacity by 2020. MASEN is governed by a Board of Directors (the Directoire) and an oversight council (the Conseil de Surveillance).

II. Morocco and the CTF MENA CSP Investment Plan

7. The World Bank Group and the AfDB, together with other donors, such as the European Investment Bank, the Agence Française de Développement, and Kreditanstalt für Wiederaufbau, have worked together to accelerate CSP deployment in the region. A significant part of this initiative is the CTF MENA CSP Investment Plan (MENA CSP IP), endorsed on 2 December 2009 and updated on 12 November 2010. This plan aims to mobilize US$ 5.6 billion (including US$ 750 million from the CTF) to accelerate the deployment of CSP projects in Algeria, Egypt, Jordan, Morocco and Tunisia. The MENA CSP IP aims to act as a demonstrator: the project consists of cofinancing nine commercial-scale power plants capable of generating around 1 GW over three to five years and two transmission projects designed to improve the Mediterranean grid and increase exports. The MENA CSP IP has earmarked US$ 197 million for Morocco, to be channeled by the World Bank and the African Development Bank (AfDB).

8. The MENA CSP IP has strong synergy with other initiatives that seek to develop the renewable potential of the Mediterranean Basin, while creating the conditions for a regional market linking the North and the South banks to optimize resource use - namely the Mediterranean Solar Plan, Desertec, Medgrid and the World Bank's Arab World Initiative. The vision of the Mediterranean Solar Plan, under the Union for the Mediterranean initiative, is to take the world-scale renewable energy potential of the Southern Mediterranean, and the green

electricity needs of the entire Mediterranean Basin, and transform it into a massive opportunity - by linking large scale renewable power production through reinforced transmission grids to demand centers of the Mediterranean region. As it moves toward its ambitious objectives of reducing GHG emissions, Europe will increasingly have to look for additional sources of low carbon energy. On the Southern side, electricity consumption in MENA is among the fastest growing in the world and scaling up CSP will help meet growing demand, enhance energy security and diversify the energy mix for power generation

9. Within the MENA CSP IP, Morocco is proposing the largest capacity and is the first one to launch the development of a project, the ambitious Ouarzazate complex, which is one of the largest CSP plants planned in the world.

10. The World Bank, the AfDB and other IFIs are involved with MASEN in the competitive selection of one or several qualified and financially robust private partners to establish a PPP, which would be responsible for the preparation and implementation of the first phase of the Ouarzazate CSP plant. This first phase Ouarzazate I consists of up to 160 MW of CSP parabolic trough—technology selected after a technology neutral prequalification process—and potential PPP partners have already been prequalified. Based on the preliminary technical studies and the recent comparable projects in the MENA region, the total financing required for the first phase would be close to US$ 1 billion for the initial investment (or approximately $6,000/kW). This is substantially higher than anticipated when the Investment Plan (IP)[48] was originally submitted to the CTF Trust Fund Committee essentially because more has been learned about CSP costs as more plants are being developed and it has been assessed that storage is needed (in order to provide the maximum benefits to the Moroccan power system), which has not been considered in the IP. Given a rapidly expanding and increasingly competitive market for CSP plants, this estimate is expected to be a ceiling on what bidders will offer. Analysis by ONE and the technical consultant WorleyParsons indicate that 3 h of storage would optimize the contribution of storage to cover peak demand, which occurs between 7pm and 10pm, and maximize fossil fuel savings.

11. Moreover electricity exports are unlikely for Ouarzazate I. Therefore the full CTF allocation to Morocco, i.e. US$ 197 million, is required to blend with the World Bank, AfDB and other financier loans and grants to reduce government subsidies to an affordable level. The financial analysis that was conducted for the proposed project indicates that government subsidies will be required to bridge the incremental cost due to the higher generation cost of CSP compared to coal.

12. The proposed loan and grant package from multilateral and bilateral donors, especially CTF funding, is essential for MASEN to initiate the implementation of Morocco's ambitious solar development plan. The World Bank/CTF and other financiers support will establish MASEN as a solid partner for private developers to scale up solar development and reach the government's ambitious target of installing 2,000 MW by 2020.

[48] The unit investment cost used in the IP and the supplemental document was $4,400/kW.

III. Assessment of the Proposed Project with CTF Investment Criteria

Potential for CHG Emission Savings

13. Absent any further development of renewable resources, GHG emissions from power generation have been forecast by the GoM to increase from an estimated 16 million tons per year in 2007 to an estimated 36 million tons by 2020 – an increase of 20 million tons. Using the underlying fuel savings estimated by ONE and the typical CO_2 emission rates of the different types of power plants[49], the CO_2 saving is estimated at 240,000 tons per year for the first phase (160 MW) and 750,000 tons per year for the planned 500 MW. Over the 30 year-lifetime of a CSP plant, the cumulative emissions reduction of CO_2 is an estimated 7 million tons for the 160 MW first tranche and 22 million tons for 500 MW.

Cost-effectiveness

14. Considering CTF support for the first phase and the projected emissions savings of about 7 million tons of CO_2, the cost of each ton of CO_2 saved would amount to approximately US$ 28 of CTF funding However, the initial US$ 197 million will not only contribute to the up to 160 MW Ouarzazate I, but also initiate the full development of the 500 MW plant. When measured against this, the CTF investment cost effectiveness is US$ 9 per tonne of CO_2 saved.

CTF contribution

15. The financial analysis and the sensitivities developed for this analysis show that the CTF contribution will have a substantial impact in bringing down generation cost of the project. The direct impact of CTF, although significant, is not huge, due to the current low level of interest rates: if the CTF contribution was replaced by conventional IFI funding, the project's LCOE would be increased by less than 5%. If such contribution was replaced by commercial loans, the impact would be approximately 10-15%.

16. Beyond its direct financial impact, the CTF will be instrumental in bringing in the other donors. Together with such donors, the CTF will also bring strong reassurance to the private sponsor(s) about the willingness and capability of Morocco to subsidize solar electricity over a long period of time. Such reassurance will no doubt be useful, especially in the current political context. It will contribute to keeping the equity rate of return required by the sponsor at a reasonable level. The sensitivities run with the Ouarzazate financial model show that the project's LCOE could vary in a plus/minus 15% range, depending on the equity internal rate of return, i.e. on the level of risk perceived by the sponsor. Combining direct and indirect financial impact of the CTF, one can reasonably assume that the cost of CSP generated kilowatt-hours at the Ouarzazate 1 plant could be higher by up to 15-20% without the CTF contribution.

Demonstration Potential at Scale

17. *Scope of avoided GHG emissions through replication.* The country program calls for the installation of 2,000 MW by 2020, twelve times the size of the capacity to be installed under the first phase of Ouarzazate. This would lead to an important increase of emission reductions. If the Ouarzazate numbers were extrapolated for the capacity additions, the potential of GHG emission

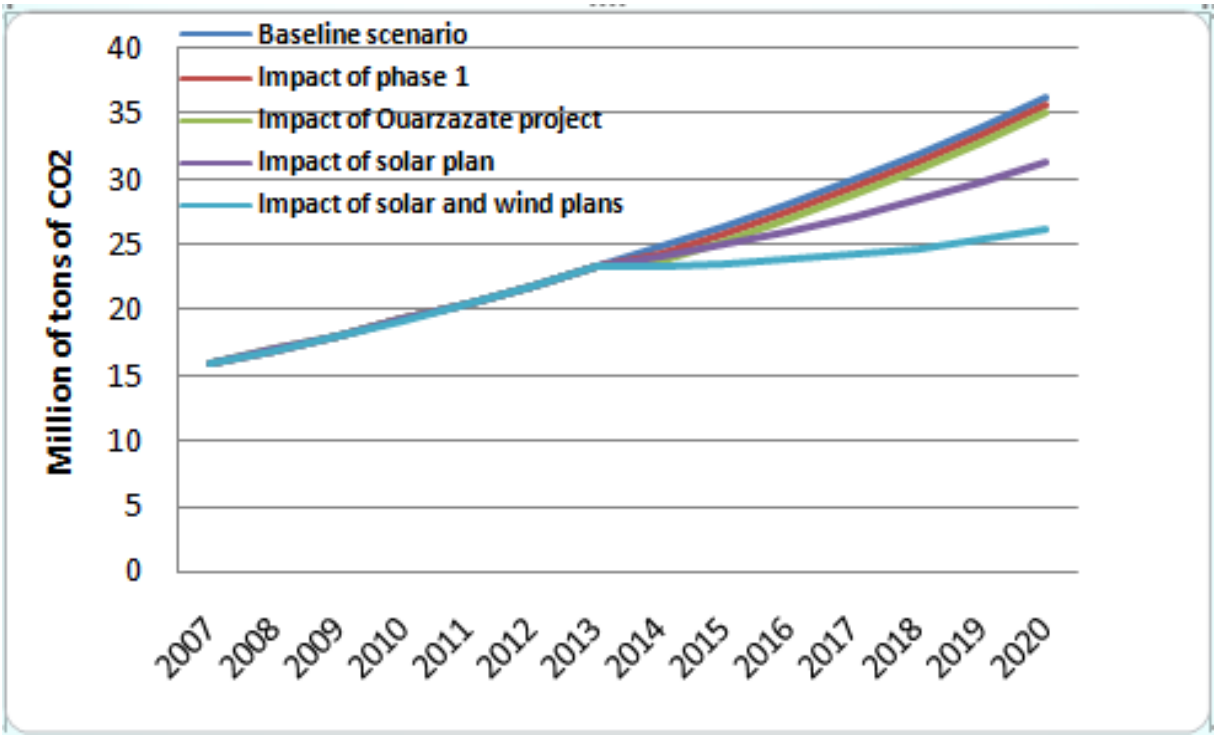
[49] 990 kg/MWh for coal, 590 kg/MWh for oil and 400 kg/MWh for gas (combined cycle).

savings for the government's target would reach about 3 million tons of CO_2 emission reductions per year in 2020 and about 90 million tons during the lifetime of the program (see Table 25 and Figure 20 below).

Table 24 - Avoided CO_2 Emissions

New Solar Capacity	Avoided CO_2 emissions	Avoided CO_2 emissions
	Millions of tons per year	Millions of tons on life-cycle basis
160 MW (Ouarzazate I)	0.24	7
500 MW (Ouarzazate plant)	0.75	22
2,000 MW (Morocco Solar Plan)	3	90

Figure 21 - Impact of Large Scale Solar Developments on Annual Emissions



18. *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 in building a sound foundation for a successful implementation of the solar plan and installation of 2,000 MW of solar generation capacity by 2020: (a) a successful completion of the transactions envisaged under the proposed project will establish MASEN as a solid partner to private developers interested in CSP/solar development - this transformation is essential as the program requires funds well beyond the public sector financing capability and the country's capacity to raise debt; (b) the focusing of the management on one project and the selection of high level consultants combined with the assistance provided by all financiers during project preparation and implementation will build 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; (c) the contractual arrangements developed during the selection of the partner will set the standards for future transactions as they will adequately address possible conflict of interest by adequately ring fencing the different functions entrusted by the government to MASEN; (d) successful construction of the first phase of Ouarzazate will therefore build the foundation for achieving the government target, provide confidence to manufacturers and developers in the country's solar market leading to more investments locally and cost reduction.

- *At the regional level,* the proposed project is the most ambitious solar project and more importantly the only one involving private sector to date. Its success will provide other countries in the region with confidence to consider PPP as a reliable mean to raise the sizeable funds required for the development of CSP at the regional level. The financial close of the proposed PPP will reinforce interest of international developers in the development of local capacity in manufacturing and support services triggered by the MENA CSP IP. Furthermore, Morocco's ambitious solar program has been followed by the disclosure of ambitious development targets in many countries of the region such as Libya and Algeria.
- *At the global level,* Ouarzazate is one of the largest CSP project announced to date. It is particularly important because it attracted the developers' attention to the solar potential in the MENA region. The successful completion of the transactions under the proposed project will show that mitigation of institutional and market risks are possible through adequate contractual arrangements, even in developing countries. The project will contribute to achieving the 1.2 GW target envisaged under the MENA CSP IP, and to localizing manufacturing capacity in the region to reduce cost and contribute to local value creation.

Development Impact

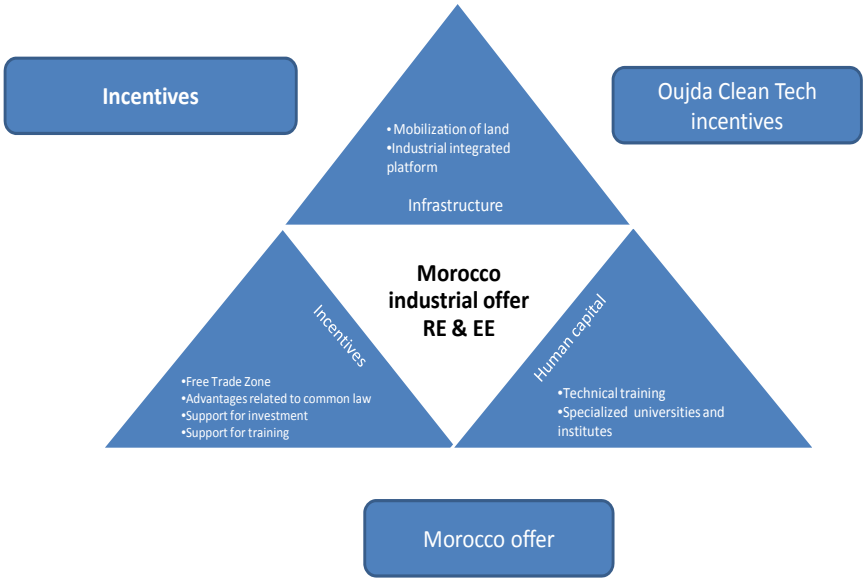
19. The development of solar energy will have significant benefits in terms of the reliability and security of electricity supply to Moroccan consumers, which is a high development priority for the Government. Tapping the country's huge solar resources will help reducing the carbon intensity of power generation (the full 500 MW Ouarzazate plant would reduce CO_2 emissions by almost 1 million tons per year).

20. The development of this first project through a PPP is also a clear commitment of the government to involving the private sector in the solar program. This will provide confidence not only to foreign investors but also to Moroccan private companies to increase their involvement and invest in goods and services to contribute to increased local industrial integration and job creation.

21. In terms of energy security, further development of renewable resources will increase energy security in a country that imports 18% of its electricity from Spain and is overall 97% dependent on imports. Diversity 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. While Ouarzazate production will initially be for local consumption, a growing share of the electricity produced under Morocco's Solar Plan will be exported to Europe over the medium term. In the longer-term, this share is expected to peak, and to decline when the CSP costs go down, therefore making the technology more affordable to serve local markets.

22. Scale-up of solar development will support industrial infrastructure and strengthen the foundation for sustainable development. The Government also intends to promote local manufacturing to increase local content of the solar program. The development of the solar sub-sector in Morocco would further strengthen the country's role as a leader in renewable energy development in the region. In this context, the Ministry of Energy and the Ministry of Industry are jointly developing an "Offre Maroc" which essentially consists of incentives and specialized training aimed at attracting local and foreign investments in the renewable sector.

Figure 22 - Accompanying Measures for the "Offre Maroc"



23. To support the MENA CSP IP and assess derived economic benefits, a study commissioned by the World Bank analyzed the potential for 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 2,000 MW CSP capacity installed by 2020, the total potential of local content of CSP plants will increase constantly and could reach almost 50 % as average value for all CSP projects.
- ***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.

- ***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 2 GW will reach over 11,000.
- ***Foreign trade impact:*** Additional impacts on job creation and growth of GDP could come from export of CSP components.

Environmental Benefits

24. With respect to environmental benefits, the generated power is expected to replace oil fired combustion turbines, coal fired steam power plants and gas fuelled combined cycle plants, which emit nitrous oxide (NO_x) and sulfur dioxide (SO_2), which are harmful to the environment and to health.

Table 25 - Estimated SO_2 and NOx Emissions Avoided by Morocco's Solar Plan

New Solar Capacity	Avoided NO_x emissions	Avoided SO_2 emissions
	tons per year	tons per year
160 MW (Ouarzazate I)	1,000	4,000
500 MW	3,125	12,500
2,000 MW	12,500	50,000

MW=megawatt; $NO_{x=}$ nitrous oxide; SO_2=sulfur dioxide

Implementation Potential

25. *Public policies and the institutional set-up* in Morocco are very supportive for this project. The Government has in recent years undertaken a substantial effort to promote renewable energy, establish an adequate legal framework, set up a dedicated agency for energy efficiency and renewable energy development, and set up an institution specifically dedicated to implementing the Solar Plan (MASEN).

26. A renewable law 13-09 was approved in 2010. It provides a legal framework for the creation and operation of facilities producing electricity from renewable energy sources. It allows public and private corporations to compete with ONE, the publicly owned utility, in the production of electricity from renewable energy and have access to the electricity transmission system operated by ONE.

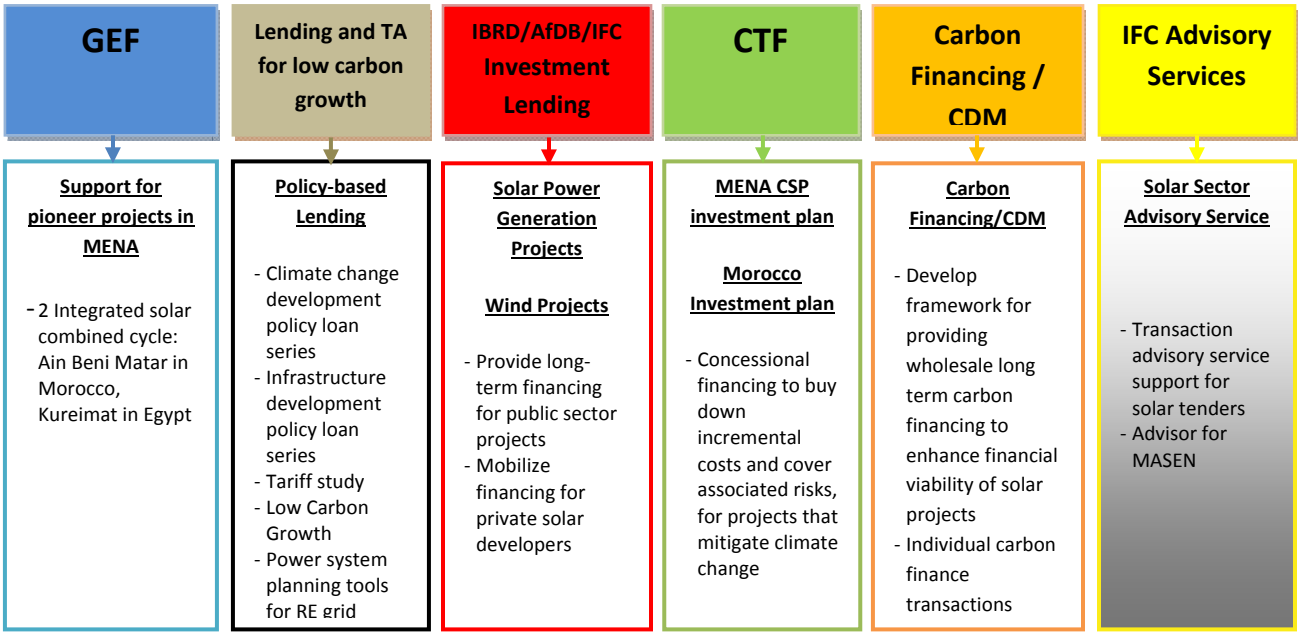
27. The Government is also undertaking extensive efforts to implement cost-reflective energy pricing and is launching energy conservation programs that will ease the transition to cost-reflective pricing by keeping consumer electricity expenditures steady.

28. *Sustainability of Transformation.* In addition, the World Bank and the African Development Bank are engaged with the Government to enhance the overall sector policy framework and advance reforms aimed at improving the sector's commercial environment and financial sustainability. The Government recognizes that ONE operates under tight financial constraints and has demonstrated its willingness to gradually increase tariffs toward covering costs, and provide budget and other support in the meantime. A study aimed at proposing a cost-

reflective structure for electricity tariffs has been launched. In parallel, a study was also launched to define the missions of a new regulatory authority to be created.

29. As illustrated below, the World Bank and the AfDB 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.

Figure 23 - Utilizing different instruments to make a transformational impact



30. *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 national solar plan. There is already considerable coordination as well as collaboration of these efforts. This is exemplified by the various sources of financing announced for Ourazazate as follows (indicative amounts):

CTF	US$ 197 million
World Bank	US$ 200 million
AfDB	US$ 300 million
AFD/EIB/KfW	US$ 675 million
NIF	US$ 45 million

31. *Leverage:* The CTF co-financing will directly lead to the development of up to 160 MW of CSP capacity that is estimated to cost about $ 1 billion in investment. The US$ 197 million allocation from the CTF will be leveraged about 5 times.

Additional Cost/Risk Premium

32. The CTF and AfDB/World Bank loans are critical to enhancing the financial viability of the project. In the absence of the CTF funds, the resulting cost increase would place pressure on fiscal subsidies or burden electricity consumers in the unlikely case where additional costs could be passed on to consumers. Furthermore, the CTF funds will also enable MASEN to take greater calculated risks and look to achieving breakthroughs, where boundaries are being pushed in terms of development that go beyond what many private companies would be willing to undertake.

33. Technology risk is non negligible especially with the size of the plant targeted by MASEN and the very tight schedule for implementation.

Implementation Readiness

34. A request for Expression of Interest for Ouarzazate has resulted in 185 responses and the prequalification for Ouarzazate I received 19 applications. Four candidates were prequalified for the bidding process and notified on December 24th 2010.

35. The request for proposals has been issued in May 2011 and financial closure is expected to occur in mid-2012. Plant construction would then begin in the third quarter 2012 and the plant would be commissioned in mid 2014.