

MASEN PRESENTATION



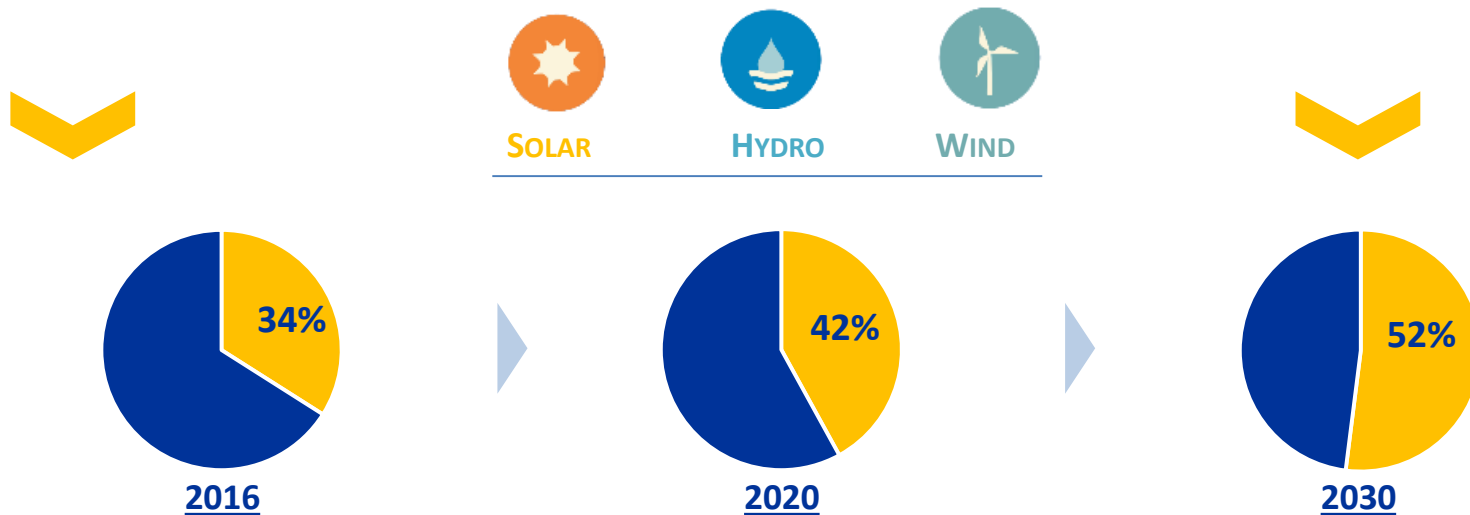
masen
endless power for progress

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January 2018

AN AMBITIOUS ENERGY STRATEGY WITH CLEAR OBJECTIVES

AMBITIOUS OBJECTIVES SET TO ENSURE THE ENERGY SECURITY OF THE COUNTRY, DIVERSIFY THE SOURCES OF ENERGY AND PRESERVE THE ENVIRONMENT



ENGAGED ACTORS TO ACHIEVE NATIONAL ENERGY TARGETS

PRIVATE ACTORS

Law 13-09

Key partner to develop REN projects

المكتب الوطني للكهرباء و الماء الصالح للشرب
Office National de l'Electricité et de l'Eau Potable



Law 57-09 / Law 37-16

MASEN'S NEW PREROGATIVES : DEDICATED ACTOR FOR IMPLEMENTATION OF REN INTEGRATED PROJECTS

MASEN BECOMES CENTRAL PLAYER FOR THE DEVELOPMENT OF INTEGRATED RENEWABLE ENERGY PROJECTS



SCOPE EXPANDED TO THE DEVELOPMENT OF REN PROJECTS

+ 3000 MW in 2020
+ 6000 MW in 2030



Multidisciplinary skills and expertise

Several related activities for an integrated development

REN production including production of heat, cooling and desalinization

Integration of new skills (consulting, additional services...)

Geographical scope enlarged to the continent above and beyond

**Publication of the law 37-16 in the Official Journal on October 2016 :
An adapted legal framework enabling Masen to deploy its new
prerogatives**

MASEN: A UNIQUE MODEL OF INTERVENTION

1

CLEAR LEGAL FRAMEWORK TO SUPPORT MASEN'S ACTIONS

STRONG SUPPORT FROM THE STATE

- **Law 57-09** establishing Masen completed by Law 37-16 following the new prerogatives
- **State – Masen agreement:** Conditions, technical requirements and guaranty of financial balance for the achievement of the solar plan
- **State – ONEE – Masen agreement:** Rules, conditions and guarantees for the purchase and supply, transportation and commercialization of electricity produced

2

DEDICATED ACTORS FOR COMPLEMENTARY ACTIONS



Development of REN integrated projects

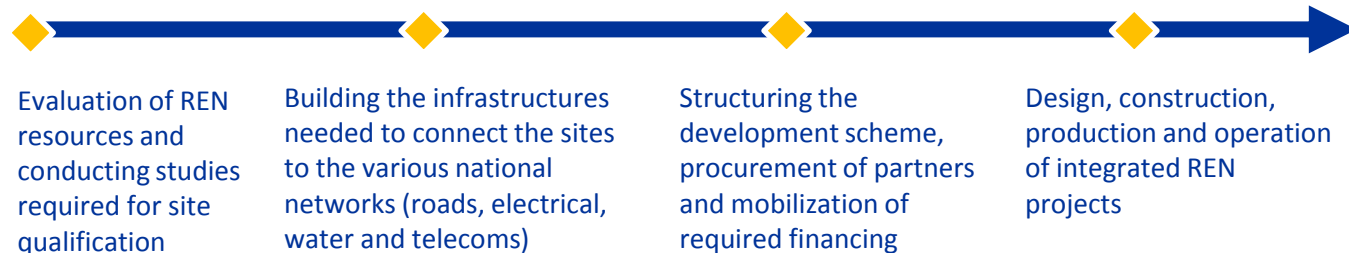


المكتب الوطني للكهرباء و الماء الصالح للشرب
Office National de l'Electricité et de l'Eau Potable

Key partner for the development of REN projects

3

MULTIDISCIPLINARY SKILLS AND EXPERTISE

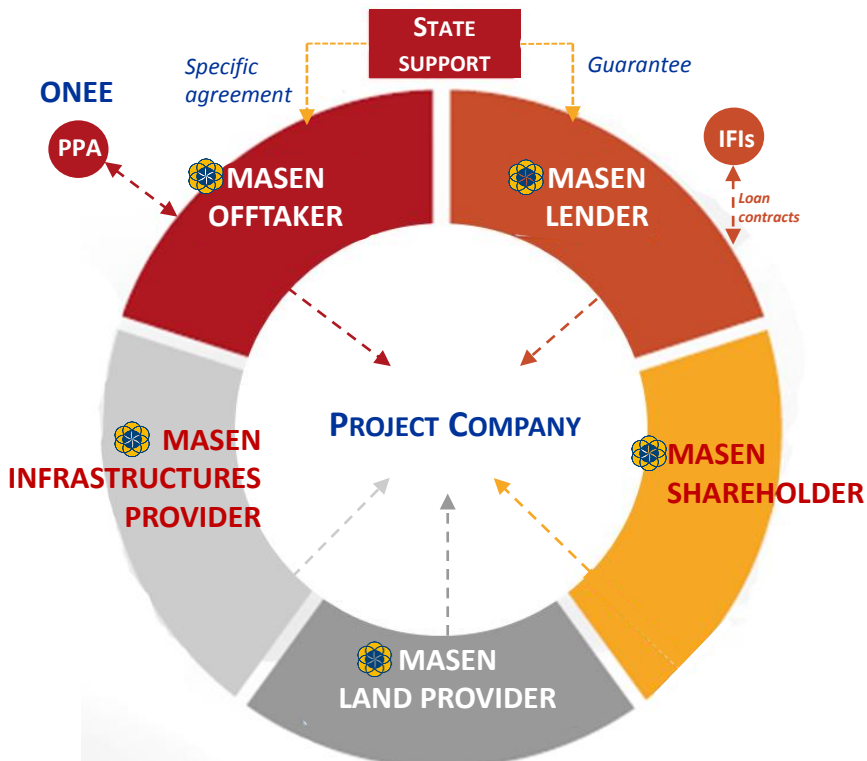


MASEN: AN INNOVATIVE INSTITUTIONAL SCHEME

4

A UNIQUE MODEL RELYING ON AN INNOVATIVE INSTITUTIONAL SCHEME

INNOVATIVE INSTITUTIONAL SCHEME



... designed to optimize the risk allocation

MOBILIZATION OF CONCESSIONAL FINANCING



An outstanding mobilization of financing

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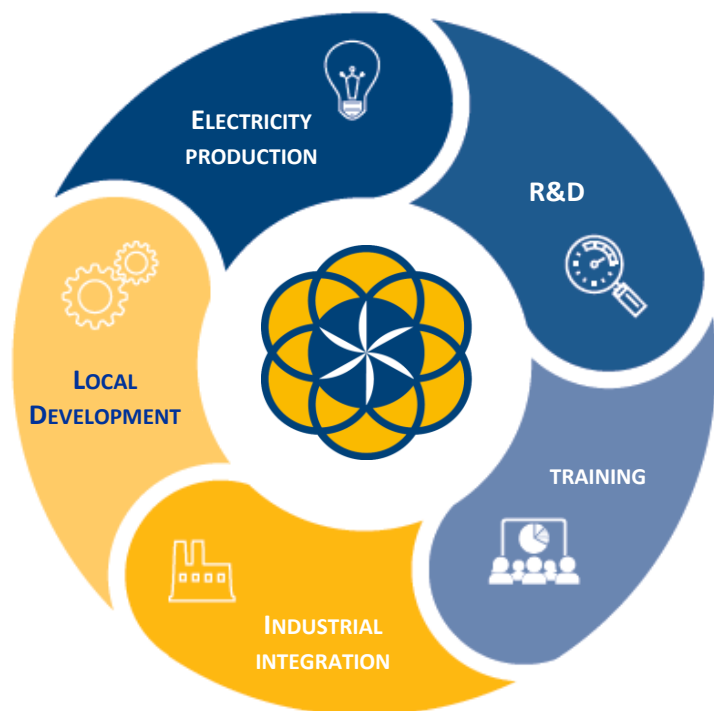


5

MASEN: CONTRIBUTION TO THE DEVELOPMENT OF AN INTEGRATED REN ECOSYSTEM

5

A UNIQUE MODEL RELYING ON AN INTEGRATED VISION OF REN PROJECTS DEVELOPMENT



SEVERAL ACTIONS FOR AN INTEGRATED DEVELOPMENT

Cluster Solaire Marocain

- 60 members and 300 companies connected
- Several projects incubated and financed

CLUSTER SOLAIRE



Local development

- 6 areas of intervention
- More than 60 actions led since 2010
- More than 30 000 beneficiaries



R&D

- Several partnerships
- European projects of R&D collaboration
- 1 demonstrator in operation, 1 demonstrator in construction and many others under study



HORIZON 2020

Sumitomo



... for the development of an integrated REN ecosystem

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NOOR OUARZAZATE: THE FIRST MULTI TECHNOLOGIES COMPLEX



A SOLAR COMPLEX OF 580 MW COMBINING 3 DIFFERENT SOLAR TECHNOLOGIES

NOORo I



PLANT IN OPERATION

- Technology: CSP trough
- Capacity: 160 MW
- Storage: 3 hours
- Price: 1,62 MAD/kWh
- CO2 emissions avoided:
~ 280 000 tCO2 / year
- Industrial integration: 30%*

NOORo II



PLANT UNDER CONSTRUCTION

- Technology: CSP trough
- Capacity: 200 MW
- Storage: > 7 hours
- Price: 1,36 MAD/kWh
- CO2 emissions avoided:
~ 380 000 tCO2 / year
- Industrial integration: 35%

NOORo III



PLANT UNDER CONSTRUCTION

- Technology: CSP Tower
- Capacity: 150 MW
- Storage: > 7 hours
- Price: 1,42 MAD/kWh
- CO2 emissions avoided:
~ 250 000 tCO2 / year
- Industrial integration: 35%

NOORo IV



PLANT UNDER CONSTRUCTION

- Technology: PV with tracking system
- Capacity: 70 MW
- Price: 0,44 MAD/kWh
- CO2 emissions avoided:
~ 87 000 tCO2 / year

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* Industrial integration reached: 34%



NEARLY 3,000 MW OF REN PROJECTS IN OPERATION TO DATE

SEVERAL REN PROJECTS IN OPERATION INCLUDING 12% OF PRIVATE PROJECTS ACROSS THE KINGDOM

SOLAR PLANTS – 180 MW

AIN BENI MATHAR – 20 MW



NOOR OUARZAZATE I – 160 MW



HYDROELECTRIC PLANTS – 1 769 MW

+ 20 DAMS ACROSS THE KINGDOM



WIND PARKS – 887 MW



AMOUGDOUL – 60 MW



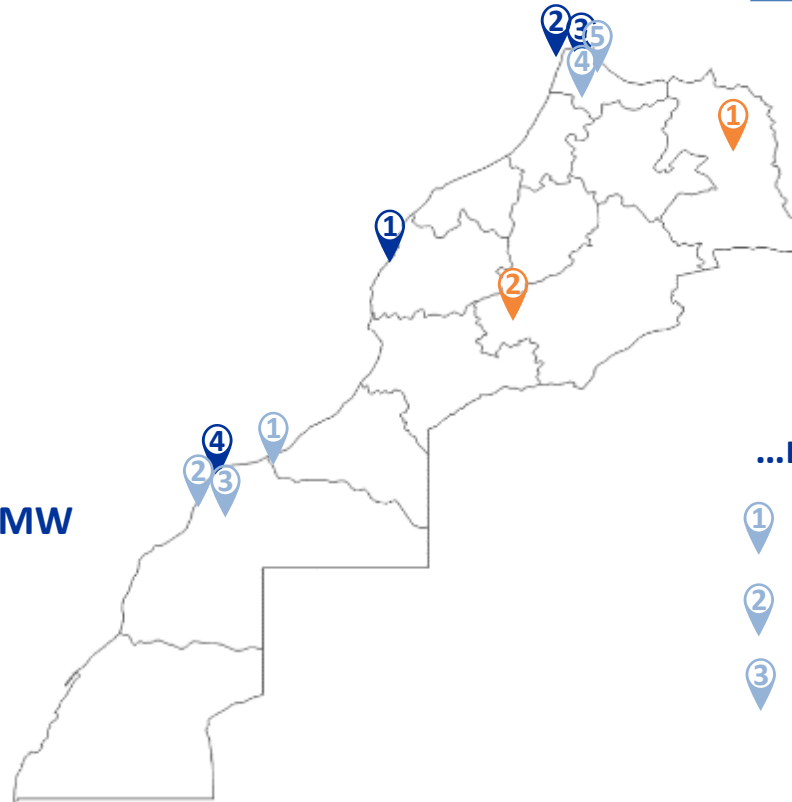
TANGER I – 140 MW



TORRES / KOUDIA AL
BAIDA – 50 MW



TARFAYA – 300 MW



...ET 337 MW FROM PRIVATE SECTOR



AKHFENIR 1 & 2
200 MW



FOUM AL OUED
50 MW
CIMAR
5 MW



HAOUMA
50 MW



LAFARGE
32 MW



FUTURE REN PROJECTS IN MOROCCO



SOLAR PROJECTS



**180 MW OF SOLAR PROJECTS IN OPERATION
AND MORE THAN 1 800 MW IN DEVELOPMENT**



WIND PROJECTS



**787 MW OF WIND PROJECTS IN OPERATION AND
MORE THAN 1 700 MW IN DEVELOPMENT**



HYDRO PROJECTS



MORE THAN 20 DAMS IN OPERATION

Main ongoing projects



NOOR MIDELT

- **Status:** RFP - Evaluation of the bids ongoing
- **Technological configuration:** 2 hybrid plants CSP/PV for the first phase



WIND PROJECT - INTEGRATED PROJECT OF 850 MW

- **Status:** Financial close ongoing
- **Sites:** Boujdour, Tanger II, Midelt, Tiskrad, Jbel Lahdid



WIND PROJECT – TAZA 150 MW

- **Status:** Financial close ongoing



NOOR TATA



NOOR PV II

**DEVELOPMENT OF AN ADAPTED
ECONOMIC MODEL AND SHARING
MOROCCAN EXPERTISE AT THE
INTERNATIONAL LEVEL**

Detailed programming ongoing to take into account potential synergies between REN technologies

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MASEN INTERNATIONAL DEPLOYMENT: A TRIANGULAR APPROACH TO CONTRIBUTE TO REN DEVELOPMENT WORLDWIDE



« Moroccan Agency for Sustainable Energy »



MASEN: A HUB FOR REN BETWEEN EUROPE, MENA REGION AND SOUTHERN AFRICA



FIRST ACTIONS IMPLEMENTED TO STRENGTHEN MASEN'S COOPERATION WITH:



AFRICA



EUROPE



MENA REGION



MASEN WILLINGNESS TO DEVELOP ITS ACTIVITIES WORLDWIDE : MORE THAN 10 MoU SIGNED WITH AFRICAN COUNTRIES





masen

endless power for progress