

OFFSHORE WIND PROJECT IN MOROCCO

OFFSHORE WIND CONGRESS



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AGENDA



I

Moroccan Renewable Energy strategy



II

Moroccan Wind Offshore Potential



III

The interest of Spanish industry towards the Moroccan market



I- Moroccan Renewable Energy strategy



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A ROYAL VISION TO MEET THE ENERGY CHALLENGE

INITIATED IN THE 1960S BY HM THE LATE KING HASSAN II, THE DAM POLICY WILL BE THE STARTING POINT FOR THE DEVELOPMENT OF RE PROJECTS IN THE KINGDOM...



INAUGURATION, IN 1997 BY HM THE LATE KING HASSAN II, OF THE AL WAHDA DAM IN OUZZANE



INAUGURATION BY HM THE KING MOHAMMED VI OF THE FIRST WIND FARM IN TANGER



INAUGURATION BY HM THE KING MOHAMMED VI, OF THE SOLAR POWER PLANT NOOR OUARZAZATE I

... A VISION PURSUED AND ACCELERATED UNDER THE REIGN OF HM THE KING MOHAMMED VI, BY THE ESTABLISHMENT OF AN ENERGY STRATEGY BASED ON THE DECARBONIZATION OF THE NATIONAL ELECTRICITY MIX

MASEN : A DEDICATED ACTOR RELYING ON A STRONG LEGAL AND INSTITUTIONAL FRAMEWORK...

Legal framework

2009

Law 57-09 initially establishing Masen

Object

Development of solar integrated projects with a target of at least 2000 MW by 2020.

Legal Form

Limited liability company, created in March 2010.

Shareholding

State, ONEE⁽¹⁾, Hassan II Fund⁽²⁾ and SIE⁽³⁾ - equal shares.

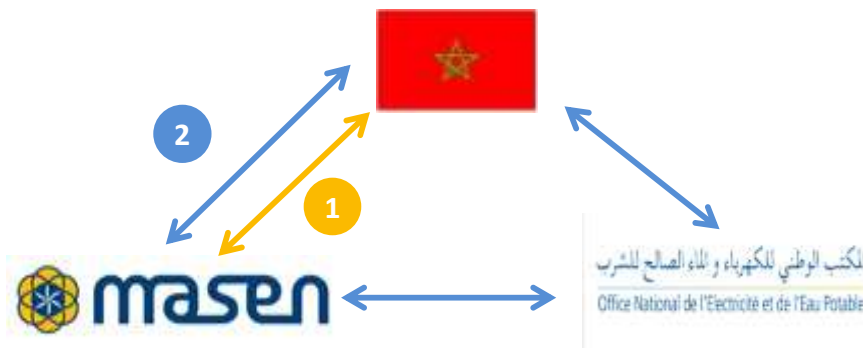
2016

Law 37-16 amending and completing the Law 57-09

Object

- Change of Masen's name from "Moroccan Agency for Solar Energy" to "Moroccan Agency for Sustainable Energy".
- Enlargement of Masen's scope from developing only solar energy plants to all types of renewable energy in Morocco and abroad⁽⁴⁾

Institutional framework



1 **State-Masen Agreement (decree):** Conditions, technical requirements and guarantee of the financial equilibrium of Masen's projects.

2 **State-ONEE-Masen Agreement:** Take or pay including terms and conditions for the purchase, supply, transport and commercialization of electricity produced.

(1) ONEE: Office National de l'Électricité et de l'Eau, the national utility

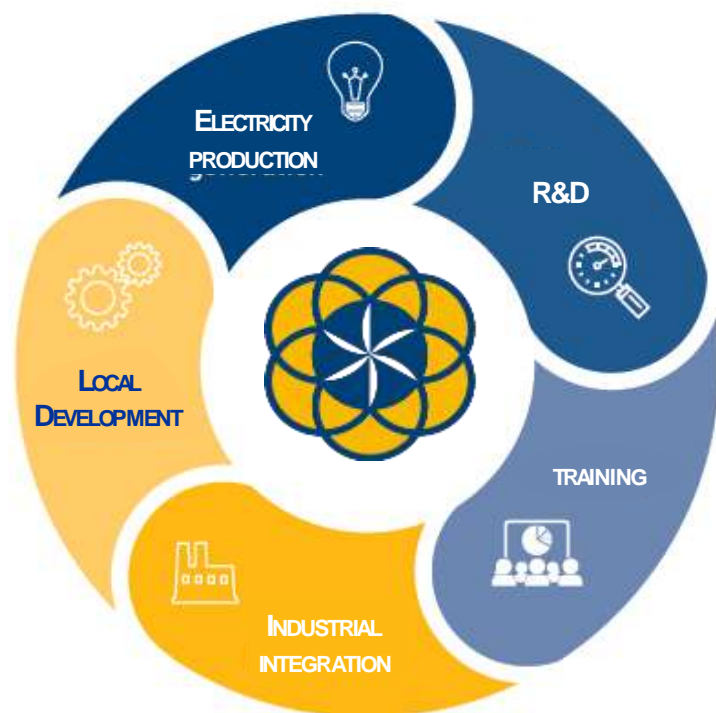
(2) Hassan II Fund for Economic and Social Development

(3) Société d'Investissements Energétiques

(4) Except the assets dedicated to the stabilization of the grid and PSP

MASEN: CONTRIBUTION TO THE DEVELOPMENT OF AN INTEGRATED REN ECOSYSTEM

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



SEVERAL ACTIONS FOR AN INTEGRATED DEVELOPMENT

Solar Cluster

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



R&D

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



Local development

- 6 sectors of intervention and 4 territories
- More than 220 actions led since 2010
- More than 100 000 beneficiaries



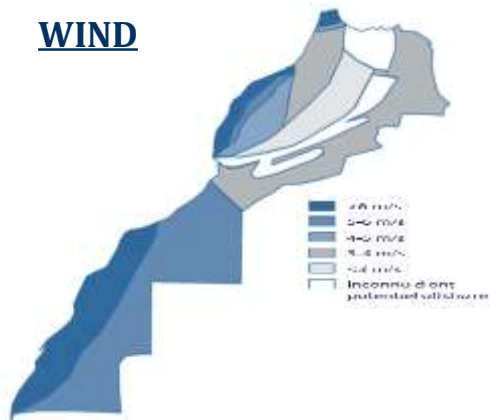
...for the development of an integrated RENecosystem



MOROCCO – A COUNTRY WITH AN IMPORTANT POTENTIAL IN RENEWABLE ENERGY TO MEET NATIONAL OBJECTIVES

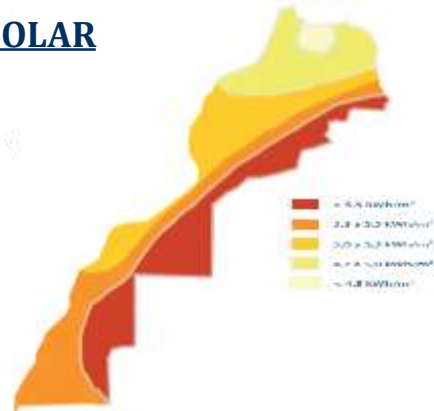
RENEWABLE POTENTIAL IN MOROCCO

WIND



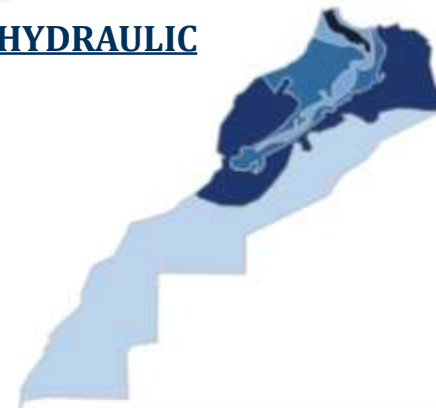
HUGE POTENTIAL

SOLAR

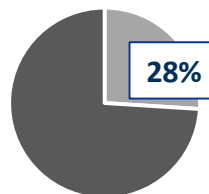


2500 kWh/m²/PER YEAR OF RADIATION

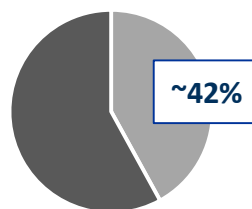
HYDRAULIC



POTENTIAL OF 3,800 MW



2008



2023



2030

An additional target of 6 GW by 2030 to be developed by MASEN

ENGAGED ACTORS TO ACHIEVE NATIONAL ENERGY TARGETS

Private actors

Law 13-09 / 40-19

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



Law 57-09 / Law 37-16



+ 6000 MW in 2030

Strictement confidentiel

MORE THAN 4600 MW OF RENEWABLE ENERGY PROJECTS IN OPERATION

SOLAR PROJECTS – 827 MW

- 1 AIN BENI MATHAR – 20 MW
- 2 NOOR OUARZAZATE I – 160 MW
- 3 NOOR OUARZAZATE II – 200 MW
- 4 NOOR OUARZAZATE III – 150 MW
- 5 NOOR OUARZAZATE IV – 72 MW
- 6 NOOR LAAYOUNE I – 85 MW
- 7 NOOR BOUJOUR I – 20 MW
- 8 NOOR TAFILALET (ZAGORA, ERFUOD, MISSOUR) – 120 MW

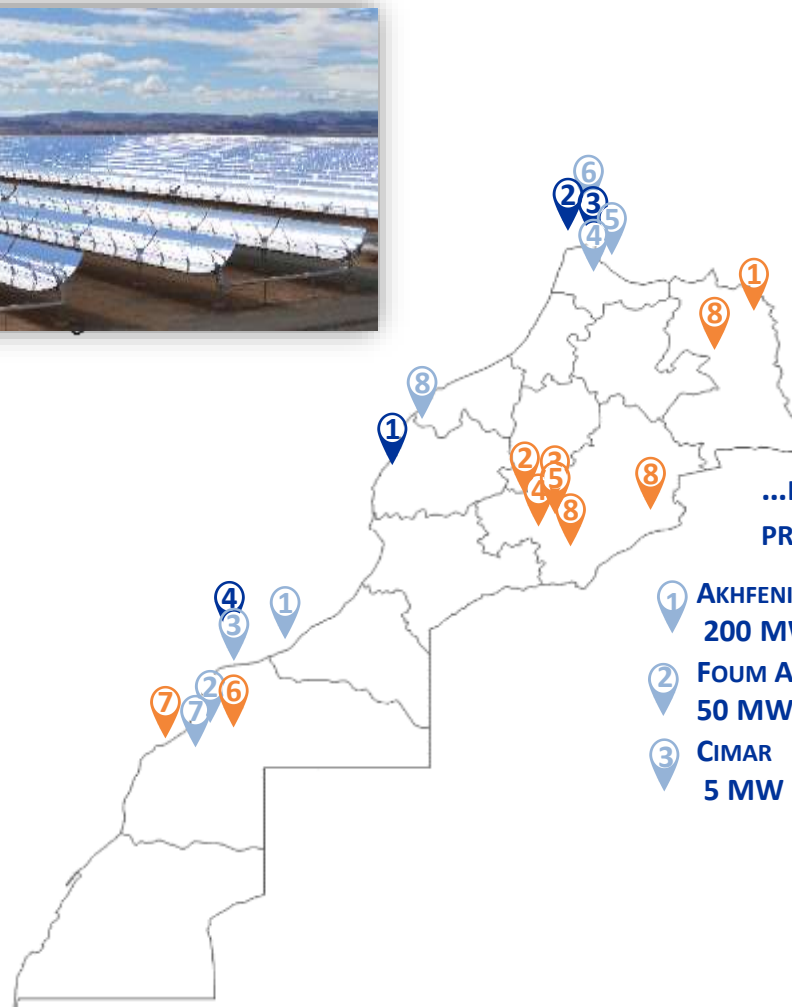


HYDROELECTRIC PROJECTS – 1 770 MW

+ 20+ HYDROELECTRIC PLANTS ACROSS THE KINGDOM



Map of RE projects in operation



WIND PROJECTS – 2010 MW

- 1 NASSIM AMOUGDOUL – 60 MW
- 2 NASSIM TANGER I – 140 MW
- 3 NASSIM KOUDIA AL BAIDA – 50 MW
- 4 NASSIM TARFAYA – 300 MW
- 5 NASSIM MIDELT – 180 MW
- 6 NASSIM TAZA I – 87 MW
- 6 NASSIM BOUJOUR – 300 MW

...INCLUDING 893 MW DEVELOPED BY THE PRIVATE SECTOR (LAW 13-09)

- 1 AKHFENIR 1 & 2 200 MW
- 2 FOUM AL OUED 50 MW
- 3 CIMAR 5 MW
- 4 HAOUIMA 50 MW
- 5 LAFARGE 32 MW
- 6 JBAL KHALLADI 120 MW
- 7 AFTISSAT 1 & 2 400 MW
- 8 OUALIDIA 36 MW



OPENING ON NEW TECHNOLOGIES: RENEWABLE ENERGIES APPLICATION

MASEN, THROUGH THE TECHNICAL TEAM, IS STUDYING NEW RENEWABLE ENERGIES APPLICATION

DESALINATION



GREEN HYDROGEN



WASTE TO ENERGY



FLOATING PV



WAVE TO ENERGY



WIND OFFSHORE



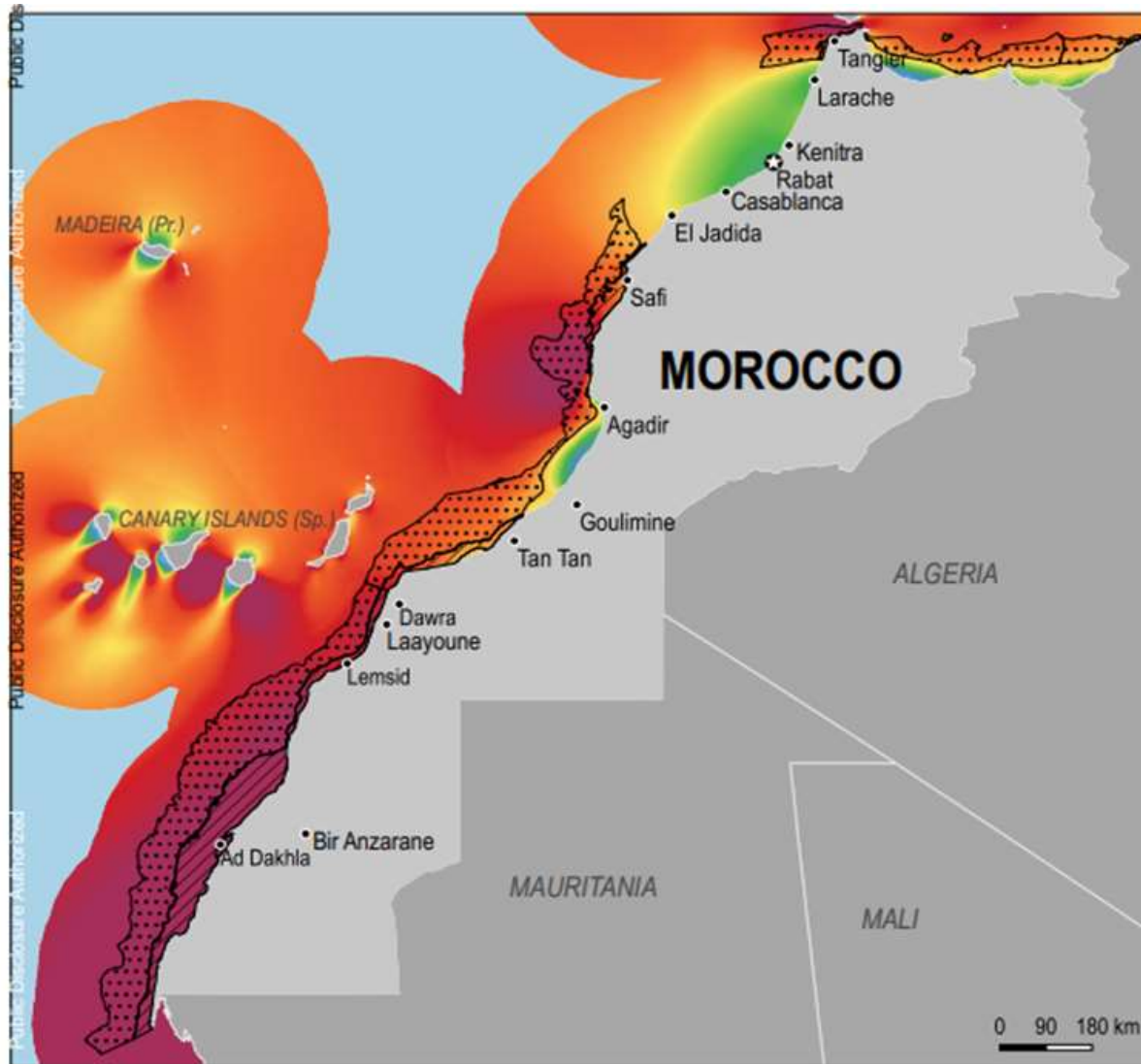


II- Moroccan Wind Offshore Potential



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MOROCCO – A COUNTRY WITH AN IMPORTANT POTENTIAL IN OFFSHORE WIND ASSESSED BY THE WORLD BANK



Morocco has a “fantastic” offshore wind resource “that is too attractive to ignore

- Mark Leybourne, World Bank senior energy specialist offshore wind

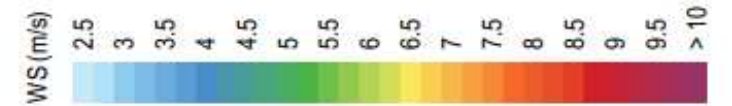


Offshore Wind Technical Potential in Morocco

RISE score: 67

Fixed: 126 GW || Floating: 412 GW || Total: 538 GW

- Fixed (water depth < 50m)
- Floating (water depth < 1000m)



This map shows the estimated technical potential for fixed and floating offshore wind in Morocco in terms of installed power capacity in megawatts (MW) within 200 kilometers of the shoreline. It is provided under a World Bank Group (WBG) initiative on offshore wind that is funded and led by the Energy Sector Management Assistance Program (ESMAP). For more information and to obtain maps for other WBG client countries please visit: <https://esmap.org/offshore-wind>. For further details on the RISE score provided please visit: <https://rise.esmap.org/>.

The methodology used to create this map is described in the WBG report published in October 2019 titled *Going Global: Expanding Offshore Wind to Emerging Markets*. The wind resource data is from the Global Wind Atlas (version 3.0), a free, web-based application that provides data with a 250 m resolution based on the latest input datasets and modeling methodologies. For more information: <https://globalwindatlas.info>.

The World Bank and ESMAP do not guarantee the accuracy of this data and accept no responsibility whatsoever for any consequences of their use. The boundaries, colors, denominations, and other information shown on any map in this series do not imply on the part of the World Bank any judgement on the legal status of any territory or the endorsement or acceptance of such boundaries.



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The potential for offshore wind energy in Morocco is highly attractive for concessional investments

The project aims to develop an offshore wind power plant along the Moroccan coasts. The objective of the offshore wind pilot project in Morocco is to demonstrate the technical and economic feasibility and assess the competitiveness of offshore wind in Morocco in the short/medium term.



DNV

- A pre-feasibility study developed with the assistance of the EBRD and the advisor DNV, demonstrated that :
 - the Atlantic coast was judged more favorable.
 - The site selection turned towards the Essaouira-Agadir region, with a focus on the Essaouira area as highlighted in the world bank study.

REGION OF ESSAOUIRA - AGADIR



Pre-Feasibility study



- Grant of EUR 2 million from the EIB for the preparation of the technical and economic feasibility study for an offshore wind project.
- Mobilization in progress of an additional donation of 3 MEUR in order to complete the study.



Feasibility study



III- The interest of Spanish industry towards the Moroccan market



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The Moroccan offshore wind market presents a significant opportunity for the Spanish industry

- Integration of Spanish industry into the entire value chain of offshore project development in Morocco

