

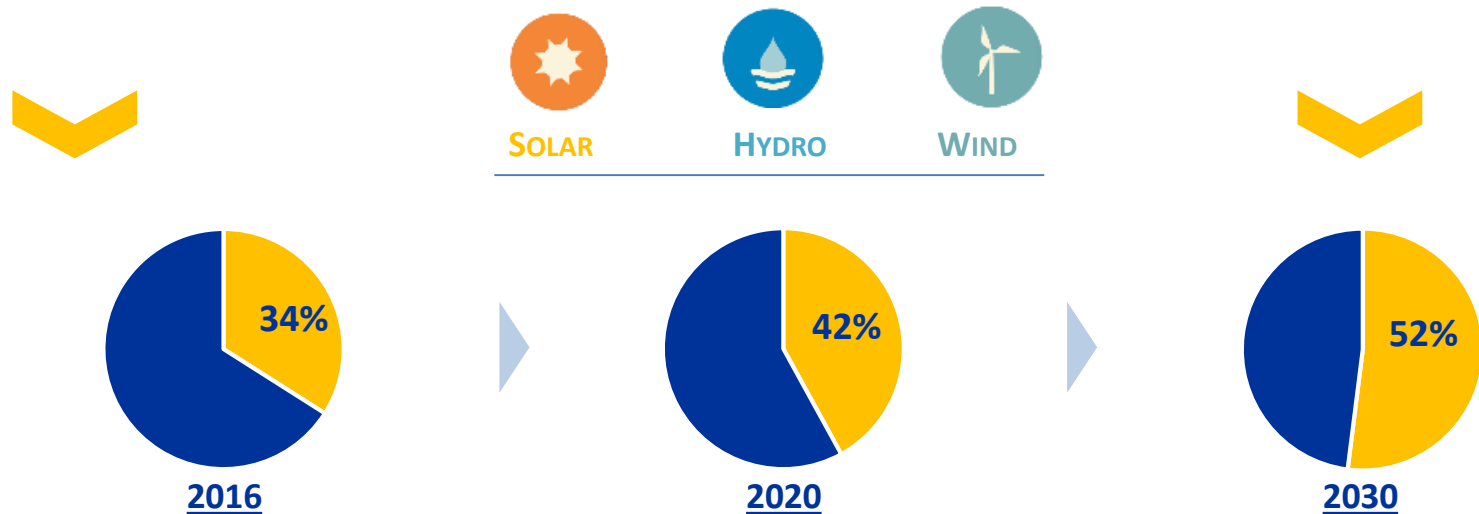
# MASEN PRESENTATION



**mase**n  
endless power for progress

# 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

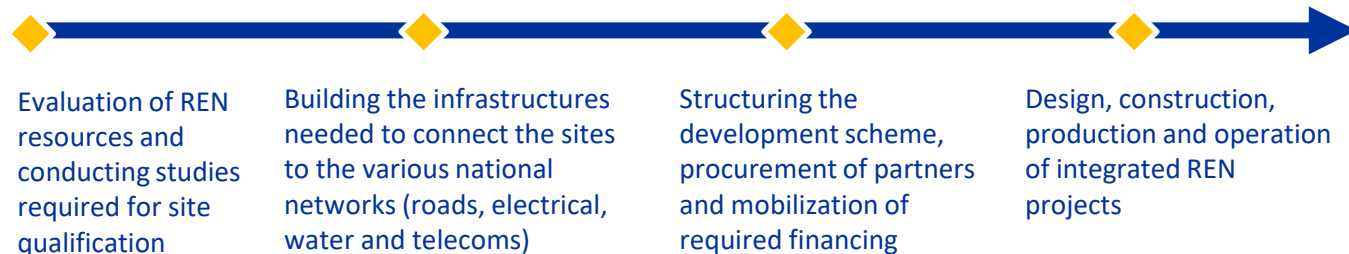


المكتب الوطني للكهرباء و الماء الصالح للشرب  
Office National de l'Electricité et de l'Eau Potable

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



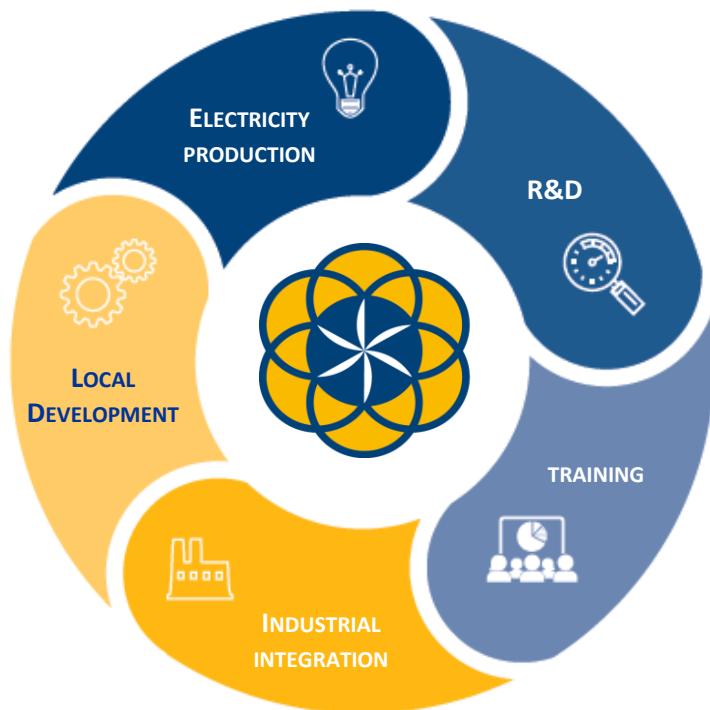
An outstanding mobilization of financing

\* CDM: Clean Development Mechanism

# 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

### Solar Cluster

- 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



# SOLAR CLUSTER : AN INITIATIVE LAUNCHED TO SUPPORT THE DEVELOPMENT OF A COMPETITIVE REN ECOSYSTEM

## CLUSTER SOLAIRE



➤ IMPLEMENTED IN **2014**



➤ **FIRST CLEANTECH HUB IN THE REGION AIMING TO SUPPORT GREEN AND CLEAN TECHNOLOGY ENTREPRENEURS FROM MOROCCO AND MENA REGION**

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**80 members, 300 companies**

**14 industrial projects** developed and more than **30 startups** incubated

More than **20 training and coaching sessions** delivered to **500 beneficiaries**

More than **15 events** organized to support the development of a competitive solar ecosystem

**3 millions of dirhams raised** to finance the Cluster's activities

## SEVERAL AREAS OF EXPERTISE

Projects  
development

Green entrepreneurship

Skills development

Market intelligence

Networking



# NOOR OUARZAZATE: A MULTI TECHNOLOGIES COMPLEX HOSTING AN R&D PLATFORM

AN R&D PLATFORM DEVELOPED IN NOOR OUARZAZATE COMPLEX TO MEET SEVERAL OBJECTIVES:

1 Qualify new solar technologies

2 Create a network gathering industrial actors and research institutions

## THIS PLATFORM HOSTS :



**Demonstration projects** in order to test, qualify and improve the different components of solar power plants



**Research projects** to encourage technology transfer and know-how on CSP and PV technologies



**Commercial services** provided to industrials and universities with high added value innovations



R&D ACTIONS JOINTLY IMPLEMENTED WITH NATIONAL AND INTERNATIONAL INSTITUTIONS INCLUDING:





# MORE THAN 3 500 MW OF RENEWABLE PROJECTS IN OPERATION

## SOLAR PROJECTS – 700 MW

AIN BENI MATHAR – 20 MW

NOOR OUARZAZATE I – 160 MW

NOOR OUARZAZATE II – 200 MW

NOOR OUARZAZATE III – 150 MW

NOOR OUARZAZATE IV – 72 MW

NOOR LAAYOUNE I – 85 MW

NOOR BOUJDOUR I – 20 MW



## HYDRO PROJECTS – 1 770 MW

MORE THAN 20 DAMS ACROSS THE KINGDOM



## WIND PROJECTS – 1 200 MW

① AMOUGDOUL – 60 MW

② TANGER I – 140 MW

③ TORRES / KOUDIA AL BAIDA – 50 MW

④ TARFAYA – 300 MW

...OF WHICH **657 MW** DEVELOPED BY THE PRIVATE UNDER 13-09 LAW

① AKHFENIR 1 & 2  
200 MW

② FOUM AL OUED  
50 MW

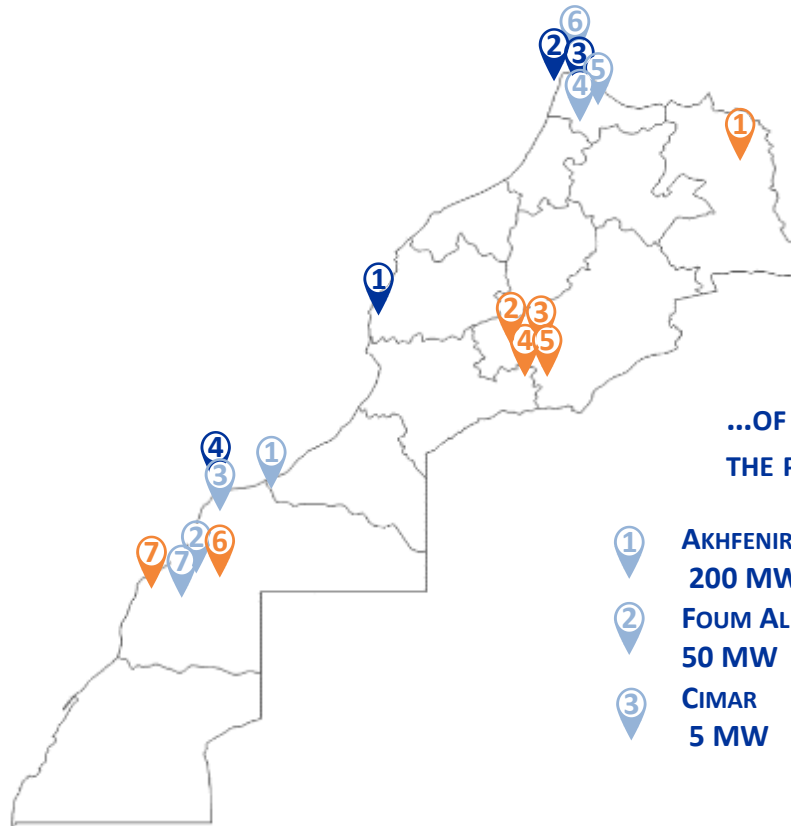
③ CIMAR  
5 MW

④ HAOUMA  
50 MW

⑤ LAFARGE  
32 MW

⑥ JBAL KHALADI  
120 MW

⑦ AFTISSAT  
200 MW



# NOOR OUARZAZATE: THE FIRST MULTI TECHNOLOGIES COMPLEX



A SOLAR COMPLEX OF 580 MW COMBINING 3 DIFFERENT SOLAR TECHNOLOGIES

## NOORo I



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



IN OPERATION

- 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



IN OPERATION

- 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



IN OPERATION

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



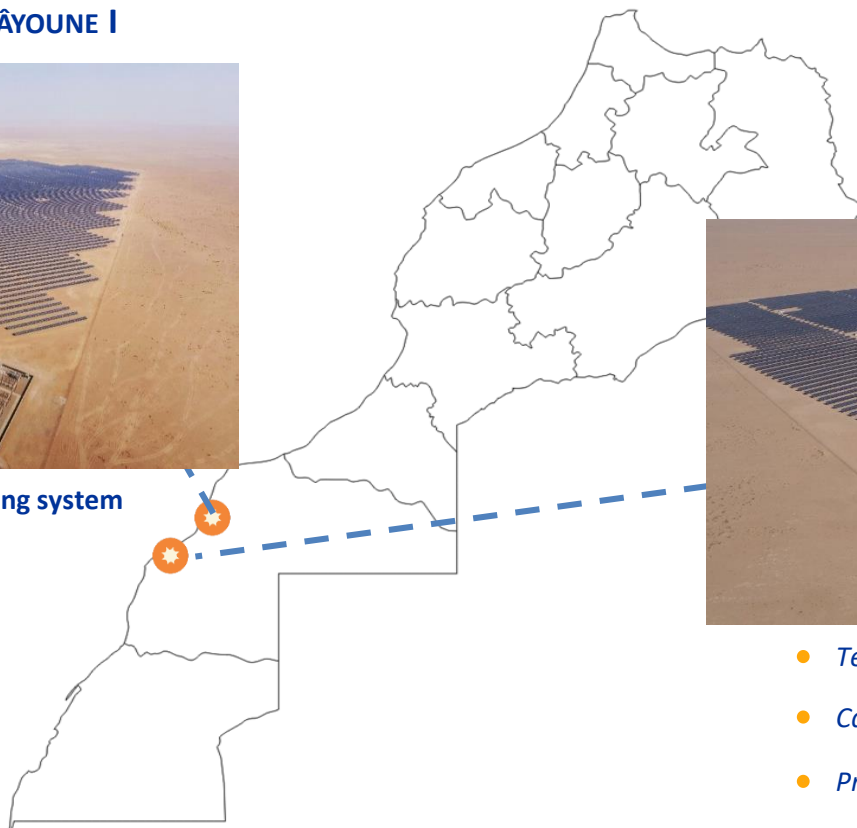
\* Real industrial integration reached: 34%

# NOOR LAÂYOUNE AND NOOR BOUJDOUR: TWO PV PLANTS WITH A CUMULATED CAPACITY OF 100 MW

## NOOR LAÂYOUNE I



- *Technology* : PV with tracking system
- *Capacity*: 85 MW
- *Price*: 0,44 MAD/kWh
- *Avoided CO2 emissions* :  
~ 104 000 tCO2/year



## NOOR BOUJDOUR I



- *Technology* : PV with tracking system
- *Capacity*: 20 MW
- *Price*: 0,64 MAD/kWh
- *Avoided CO2 emissions*:  
~ 24 000 tCO2/year

Projects financed through green bonds for a total amount of 1 200 millions de dirhams

# WIND PROJECTS UNDER DEVELOPMENT (2020 HORIZON)

## TAZA WIND PROJECT

**2 phases:**  
(100 MW and  
50 MW)

Projet Eolien Taza  
150 MW



## PEI 850

**5 sites for a  
total  
capacity of  
850 MW**

PEI 850 Midelt  
180 MW



PEI 850 Boujdour  
300 MW



PEI 850 Jbel Lahdid  
200 MW



PEI 850 Tiskrad  
100 MW



PEI 850 Tanger II  
70 MW



## KOUDIA AL BAIDA

**Repowering et  
extension\* for  
a total  
capacity of  
300 MW**

Repowering  
100 MW



\* Extension de 200 MW additionnels prévue au-delà de 2020



# FUTURE REN PROJECTS : OTHER PROJECTS PLANNED



## SOLAR PROJECTS



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



## WIND PROJECTS



**887 MW OF WIND PROJECTS IN OPERATION AND  
MORE THAN 1 000 MW IN DEVELOPMENT**



## HYDRO PROJECTS



**MORE THAN 20 DAMS IN OPERATION**

2020 / 2021



**NOOR ARGANA  
200 MW**



**NOOR ATLAS  
200 MW**



**NOOR PV II  
800 TO 1 000 MW**



**NOOR MIDELT I & II  
800 MW**



**WIND PROJECT -  
INTEGRATED PROJECT  
OF 850 MW**



**WIND PROJECT – TAZA  
150 MW**



**KOUDIA AL BAIDA  
REPOWERING –  
100 MW**

**DETAILED PROGRAMING ONGOING TO  
TAKE INTO ACCOUNT THE POSSIBLE  
SYNERGIES BETWEEN REN  
TECHNOLOGIES**



**+ 3000 MW by 2020  
+ 6000 MW by 2030**

NB: private projects developed under the Law 13-09 included

# AN EXCHANGE OPPORTUNITY WITH EUROPE THROUGH THE IMPLEMENTATION OF A RENEWABLE EXCHANGE ROADMAP

**SIGNATURE AT COP22 OF A JOINT DECLARATION TO IMPLEMENT A GREEN ELECTRICITY EXCHANGE ROADMAP BETWEEN MOROCCO AND EUROPE**



**COUNTRIES:**

**CINQ SIGNATORY COUNTRIES:**



**STEERING COMMITTEE**

**STEERING COMMITTEE SECRETARIAT BY MASEN**



**PHASE I**

**PHASE II**

**PHASE III**

**Project scope and synthesis of previous studies**

**Studies implementation and identification of target markets for the exchange of electricity between the five countries**

**Roadmap elaboration and preparation of the implementation**

**PARTNERS INVOLVED IN THE PROJECT**



Union for the Mediterranean  
Union pour la Méditerranée  
الإتحاد من أجل المتوسط

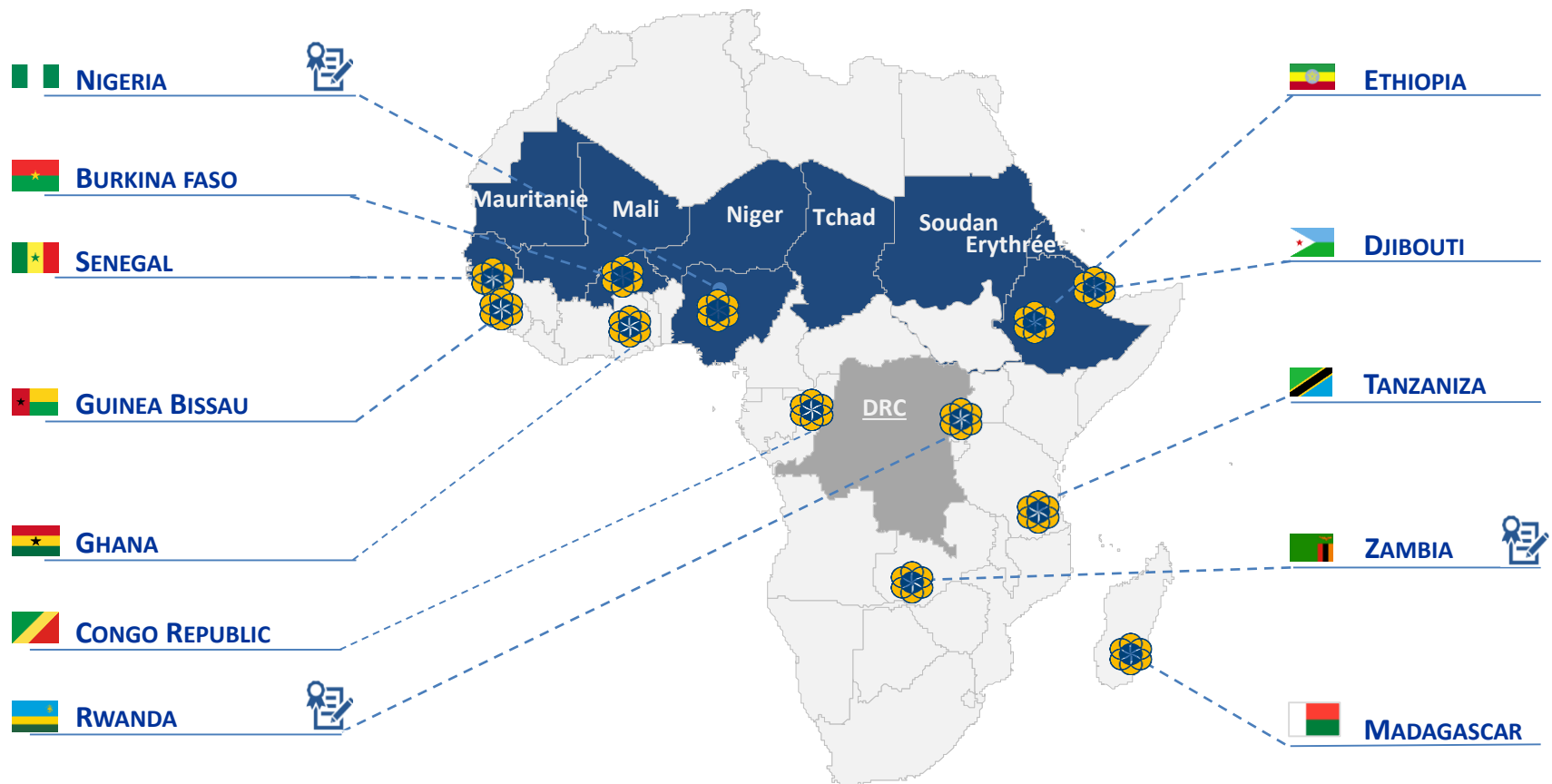


**THE WORLD BANK**  
IBRD • IDA

**Electricity transmission  
System Operators  
TSOs**

# SUPPORT FOR THE DEVELOPMENT OF RENEWABLE ENERGY ACROSS NATIONAL BORDERS

## SEVERAL MoU SIGNED IN AFRICA



IN ADDITION, SIGNATURE OF A PARTNERSHIP AGREEMENT WITH AfDB TO DEPLOY THE  
DESERT TO POWER INITIATIVE IN AFRICA



MoU signed with Masen



Other potential countries



Countries involved in the  
Desert To Power Initiative



Framework agreement signed or  
under signature



**masen**

endless power for progress