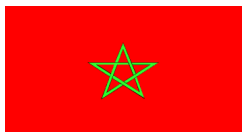




THE MOROCCAN EXPERIENCE - NOOR PLAN

Marrakech – April 13th 2015



AGENDA

1 NOOR Solar Plan Presentation

2 NOOR₀II & NOOR₀III projects

3 Next project and sites

NOOR Solar Plan

IN MOROCCO, AN AMBITIOUS ENERGY STRATEGY TO MEET NATIONAL NEEDS

Energy consumption increase: ~ 6% per year

Energy dependence: ~ 95%

Objectives of the Energy Strategy

Securing energy supply

Facilitation and optimization of energy access

Rationalization of energy consumption

Protection of the environment through clean energy

4 clear priorities

1

Diversification of energy supply

2

Development of domestic energy resources, particularly the Renewable Energy

3

Maximization of energy efficiency potential

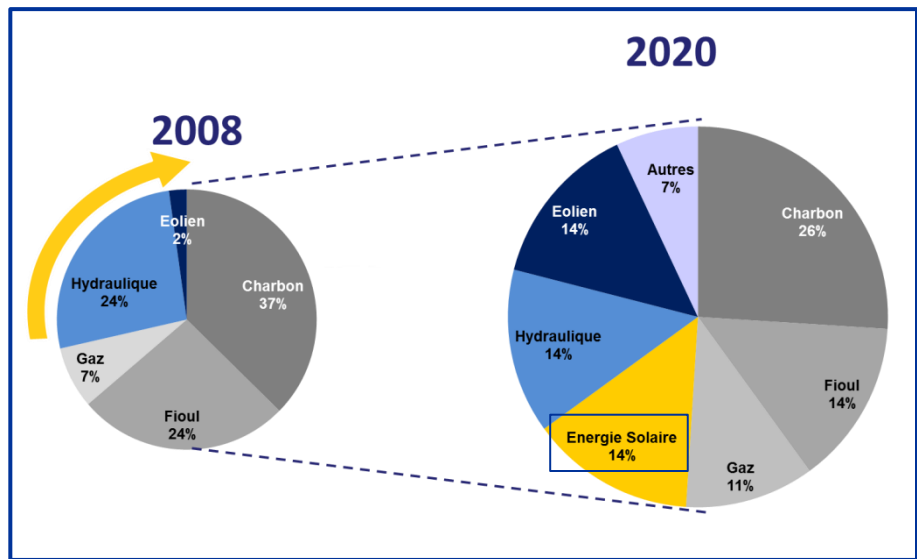
4

Integration of regional and international energy markets

RENEWABLE ENERGIES, AT THE HEART OF THE MOROCCAN ENERGY STRATEGY

Engaged in sustainable development dynamic, Morocco focuses on RE development

Breakdown of installed energy capacity by 2020



Launch of the Moroccan Solar Plan

Min 2000 MW

by

2020



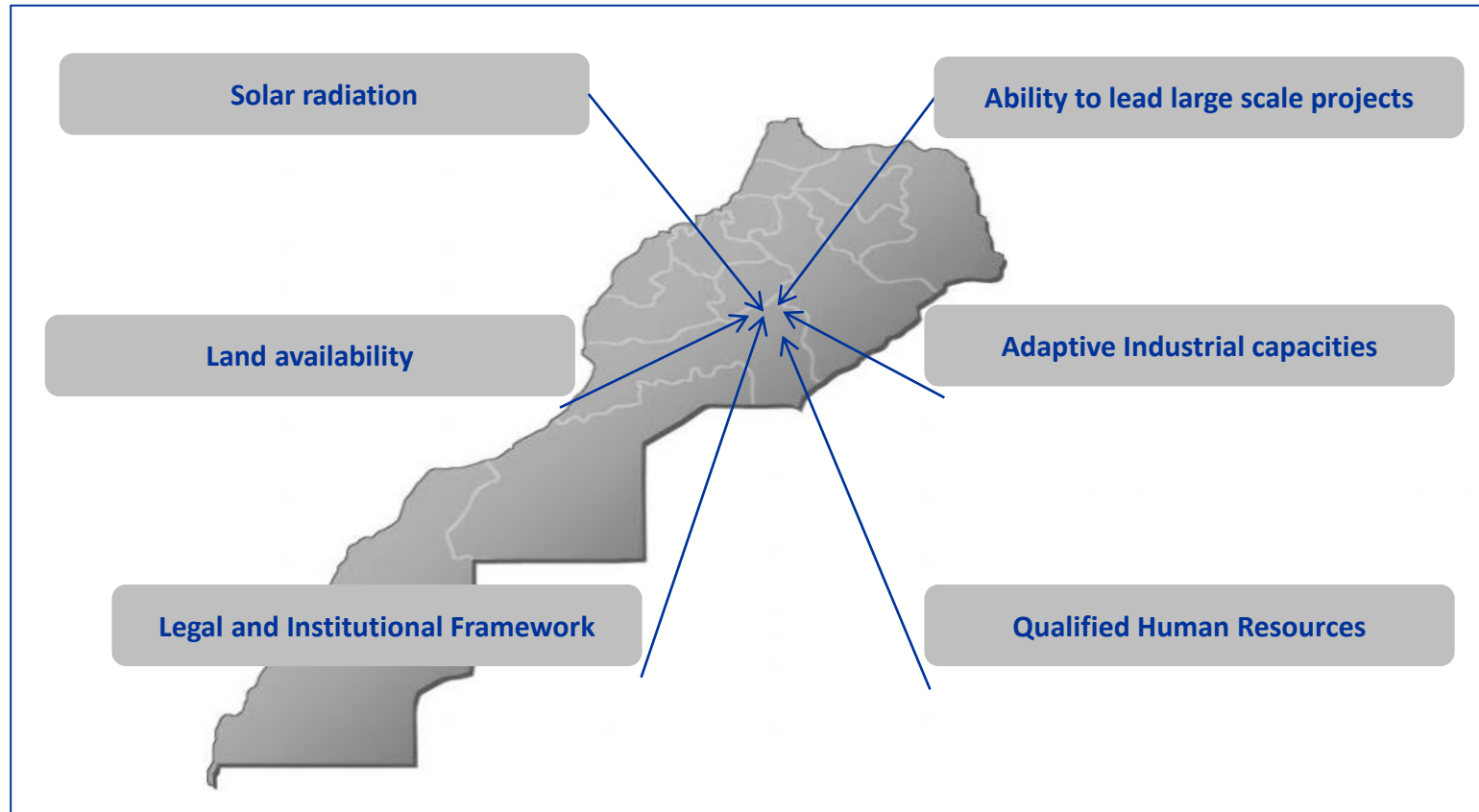
14% of total installed capacity by 2020

26%

of installed capacity

42%

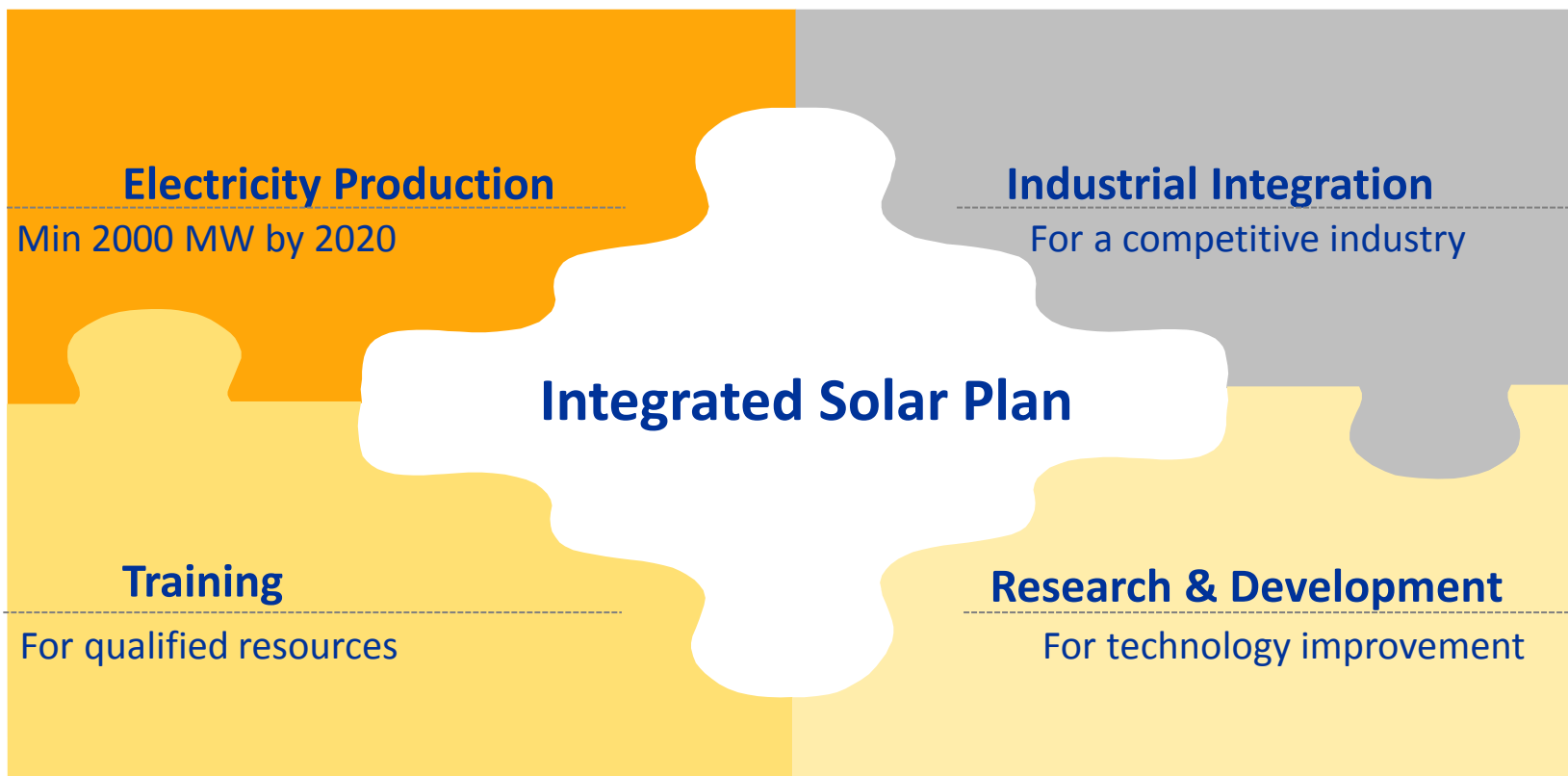
MOROCCAN SOLAR PLAN, NOOR, STRONG ASSETS BEHIND THE VISION



Opportunity to develop a competitive and sustainable solar socio-economic sector

IMPLEMENTATION THROUGH “INTEGRATED” PROJECTS

An “integrated” plan focusing on solar resource valorization



MASEN, DEDICATED ACTOR RELYING ON A STRONG INSTITUTIONAL FRAMEWORK

2 000 MW



By 2020

Law 57-09 establishing Masen

Object: Development of solar integrated projects with a minimum capacity of 2000 MW by 2020

Legal Form: Limited liability company, created in Mars 2010

Governance : Supervisory Board and Management Board

Capital : 2 250 000 000 dirhams
(State, ONE, Hassan II Fund and SIE - equal shares -)

A clear institutional framework, supporting Masen action

State-Masen Agreement (decree)

- ✓ Conditions, technical requirements and guaranty of financial balance for the realization of solar plan

State-ONEE-Masen Agreement

- ✓ Rules, conditions and guarantees for the purchase and supply, transportation and commercialization of electricity produced



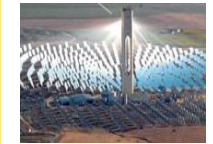
NOOR₀II & NOOR₀III, second phase of the Ouarzazate Solar Complex

masen



**NOOR OUARZAZATE
FIRST COMPLEX,
WITH A GRADUAL
DEPLOYMENT OF 500
MW**

**NOOR₀ III
100-150 MW**



CSP Tower

**NOOR₀ II
150-200 MW**

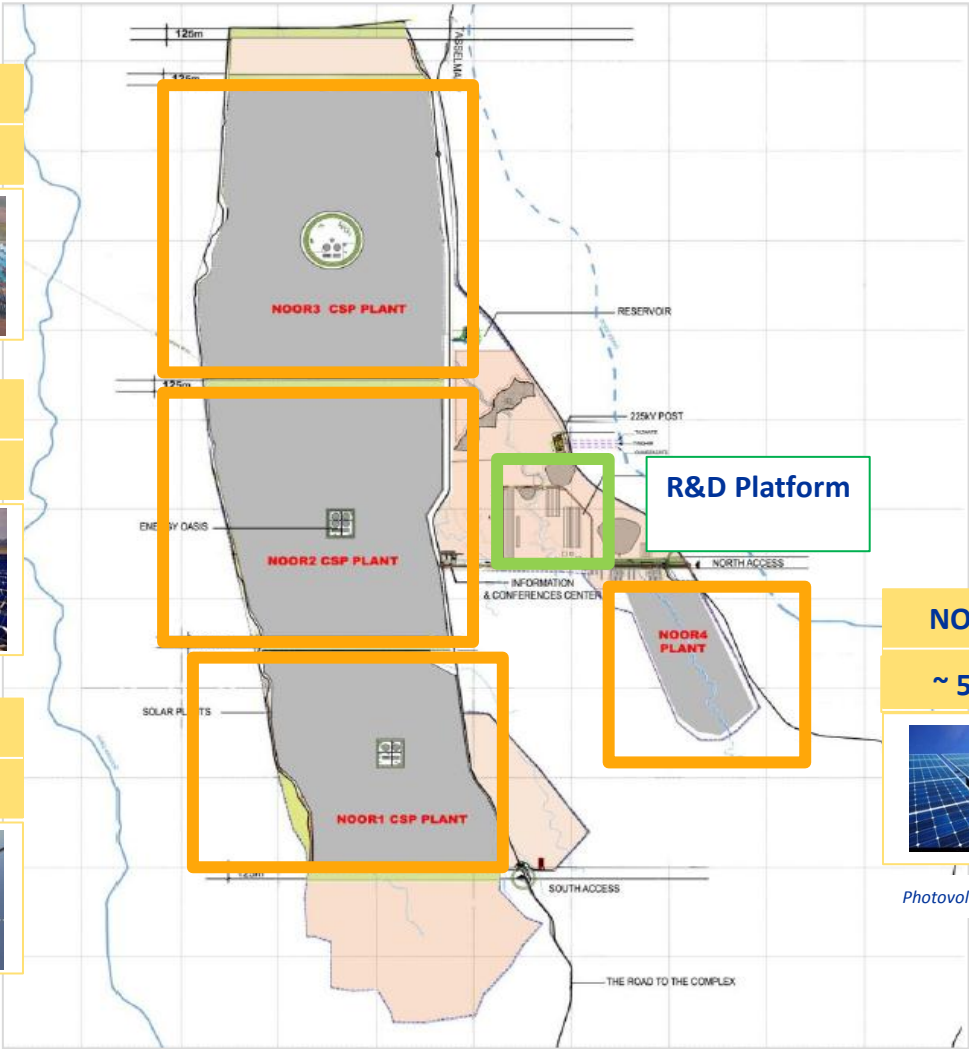


CSP Parabolic Trough

**NOOR₀ I
160 MW**



CSP Parabolic Trough



**NOOR₀ IV
~ 50 MW**



Photovoltaic

NOOR₀ I: A DEVELOPMENT ON TRACK



Developer

EPC

Owner's Engineer



Techno.

Concentrated Solar Power using parabolic troughs and molten salt Thermal Energy Storage

Capacity

160 MWe Gross Capacity

Storage

3 hours Thermal Energy Storage

Financial Insitutions



Key dates

Effectiveness

June 12, 2013

ICOD*

October 12, 2015



* Initial Commercial Operation Date

NOOR₀ I : FIRST LOOPS ON SITE



NOOR₀ I : SOLAR FIELD AERIAL VIEW



NOOR₀ I : POWER BLOCK AERIAL VIEW



NOOR₀ II & NOOR₀ III: TECHNOLOGICAL CONFIGURATION

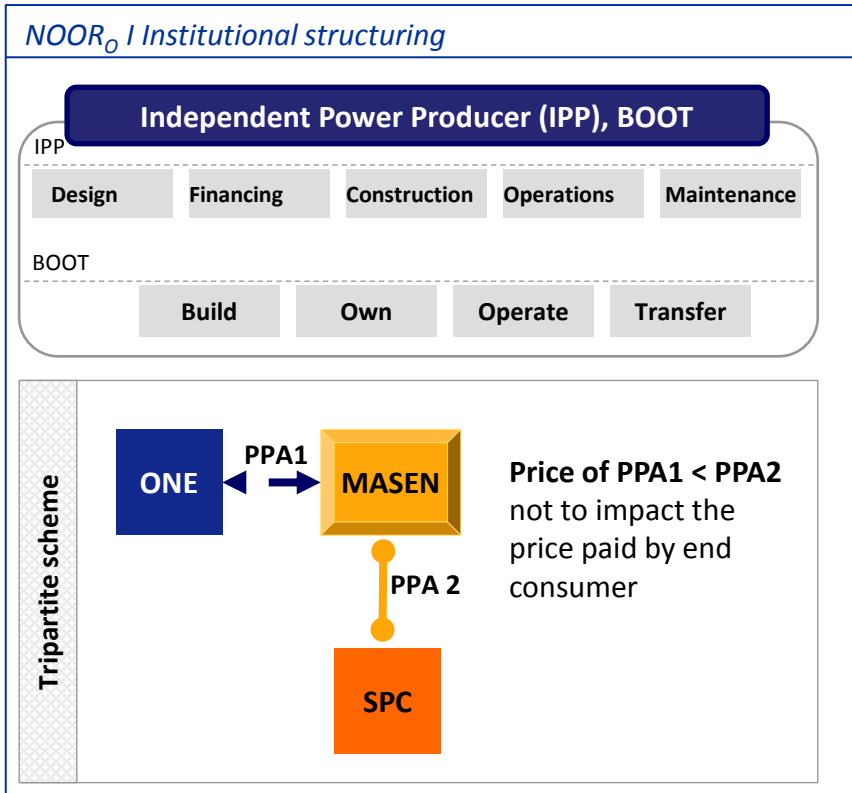
NOOR₀ II and NOOR₀ III, two plants to be developed and operated by skilled players

	NOOR ₀ II	NOOR ₀ III
Technology	CSP Parabolic trough	CSP Tower
Capacity	200 MW	150 MW
Cooling	Dry	Dry
Thermal Storage	Minimum 3h	Minimum 3 h
Peak Production	Minimum 35% per year	Minimum 35% per year
Surface	Maximum 680 ha	Maximum 750 ha

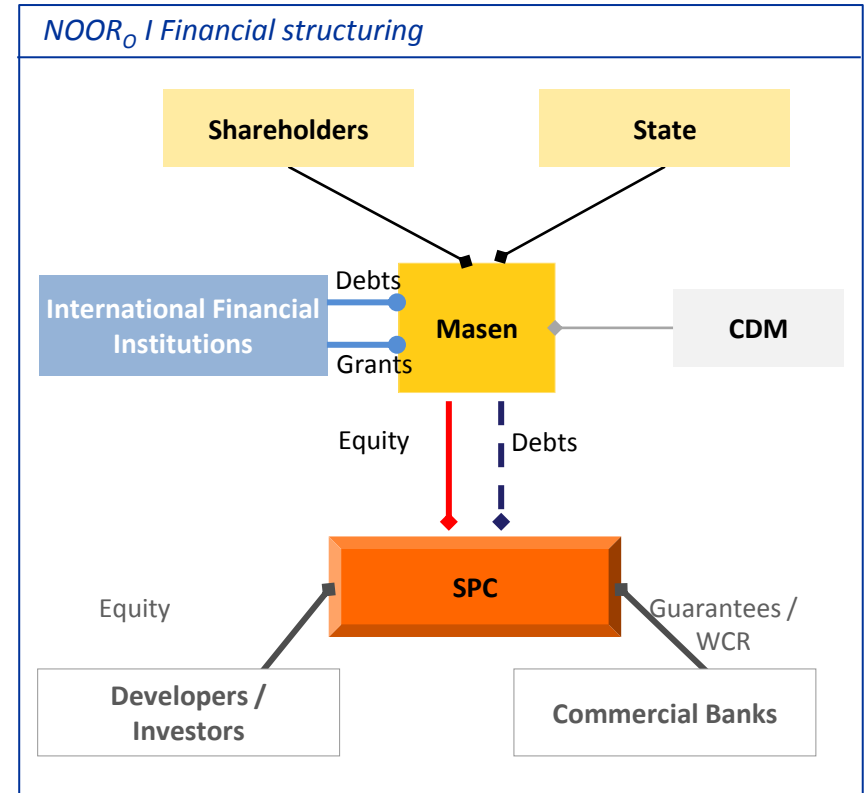
PROJECTS AWARDED IN JANUARY 2015 TO THE CONSORTIUM LED BY ACWA POWER

INSTITUTIONAL AND FINANCIAL STRUCTURING TO OPTIMIZE RISK ALLOCATION AND TO MINIMIZE THE COST OF KWH

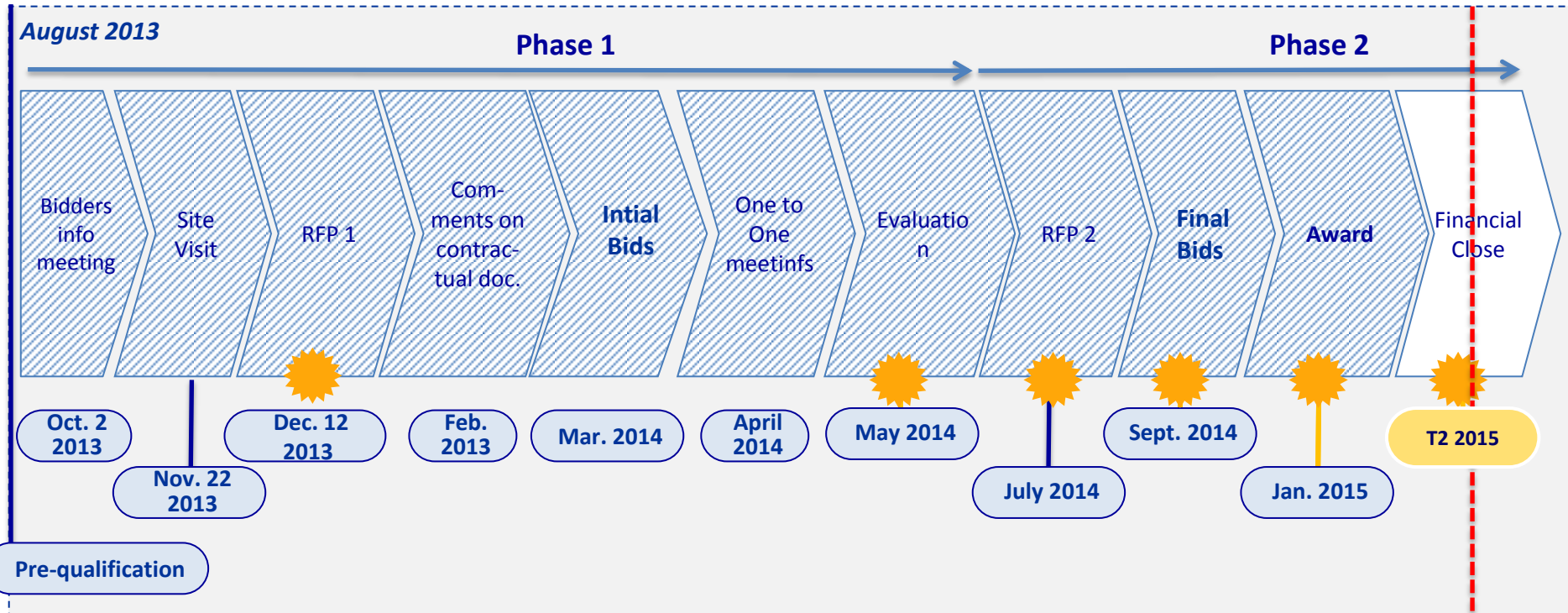
An institutional scheme to structure the relationship between the various stakeholders



An innovative financing scheme to optimize kWh cost



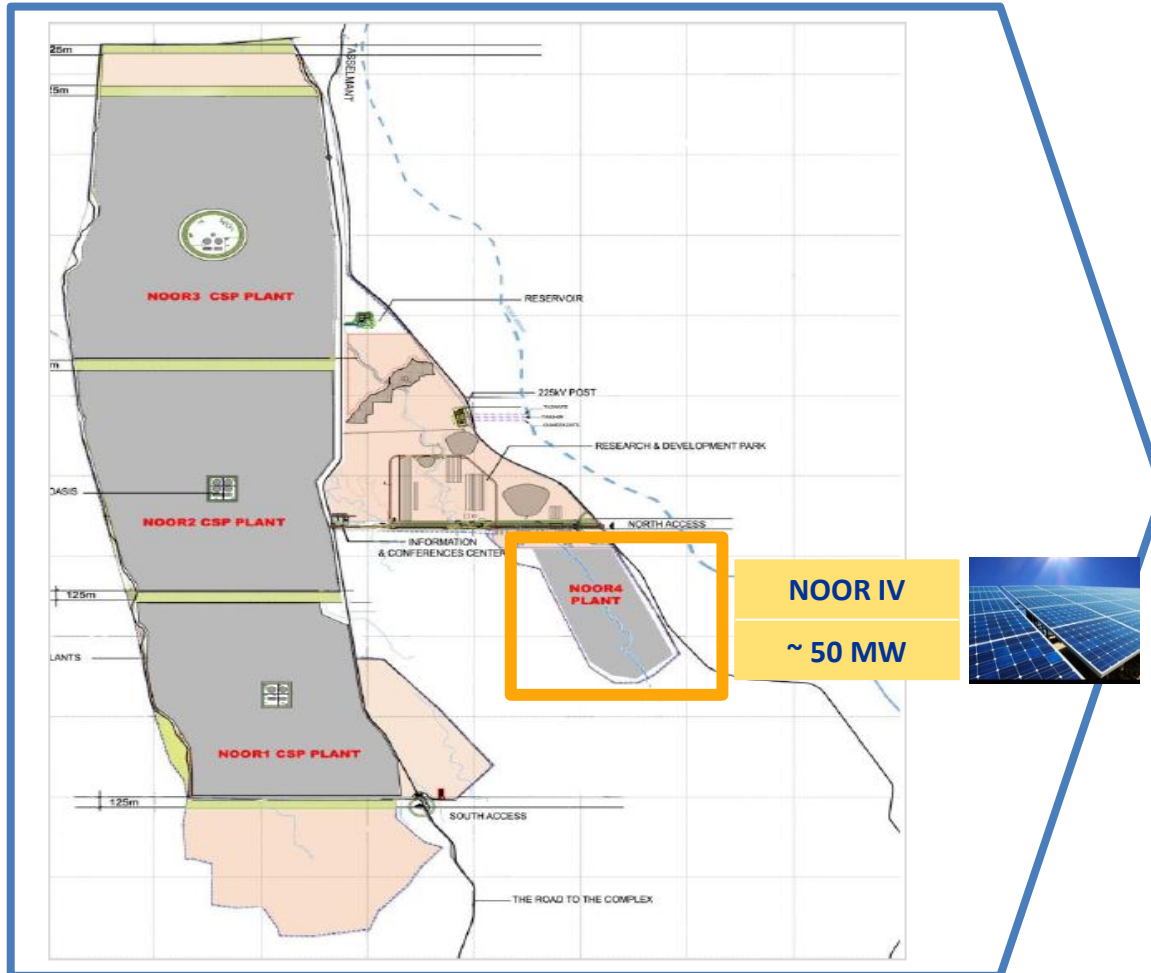
NOOR₀ II & NOOR₀ III : NEXT STEPS



Next project and sites to be deployed

m a s e n

NOOR₀ IV : FIRST PV PLANT, PAVING THE WAY FOR LARGER CAPACITY



✓ *Technology feasibility studies completed*

✓ *An interesting industrial integration potential*

✓ *Grid integration analysed with ONEE*

LAUNCH OF MOROCCAN SOLAR ATLAS AS WELL AS PRELIMINARY STUDIES TO SELECT MOST SUITABLE SITES

Establishment of a Moroccan Solar Atlas and different studies upstream to select sites with the suitable characteristics for the development of solar projects

Process to identify and select suitable sites

1

Implementation of Moroccan Solar Atlas

- ✓ Mapping of solar resources
- ✓ Identification of areas with solar potential using exclusion and selection criteria (High radiation, adequate land, nearby common infrastructures...)
- ✓ Identification of sites to be qualified refining the exclusion and selection criteria
- ✓ Organization of field visits taking into accounts local data



Identification of a suitable sites portfolio

2

Launch of qualification studies

- ✓ Launch of studies:
 - Topography ,
 - Seismicity,
 - Geotechnical,
 - Hydrological,
 - Environmental impact ...
- ✓ Thorough assessment of solar resources and meteorological data



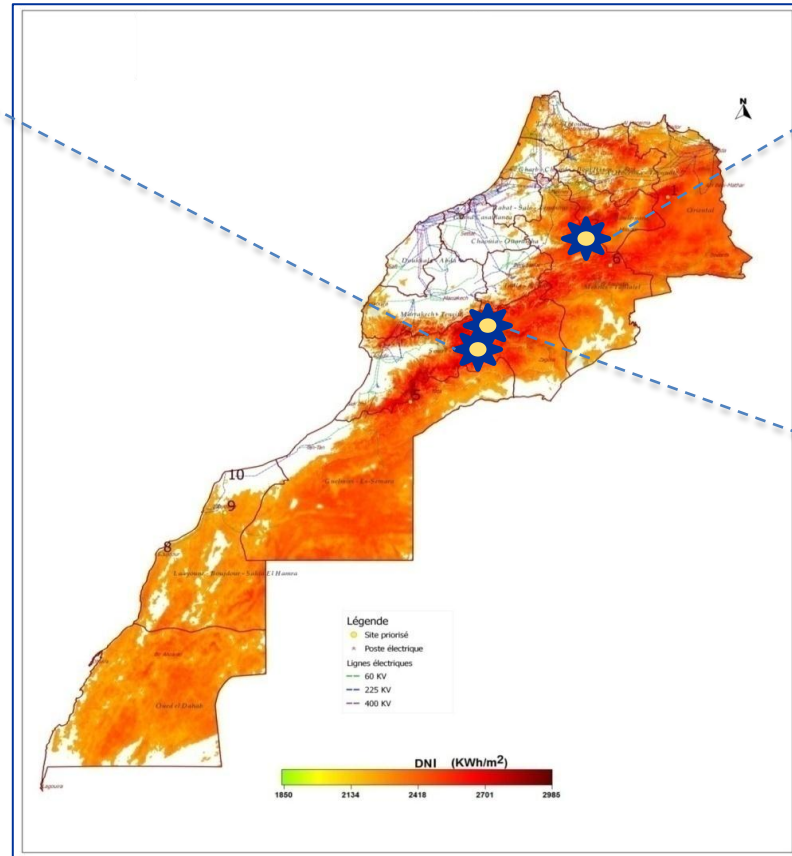
Selection of sites to be developed

NEXT SITES

1. NOOR Tata

2. NOOR Midelt

NOOR Ouarzazate





**Thank you
for your attention**

