

KINGDOM OF MOROCCO



ENERGY IN MOROCCO : AN AMBITIOUS STRATEGY AND HUGE OPPORTUNITIES FOR INVESTMENTS

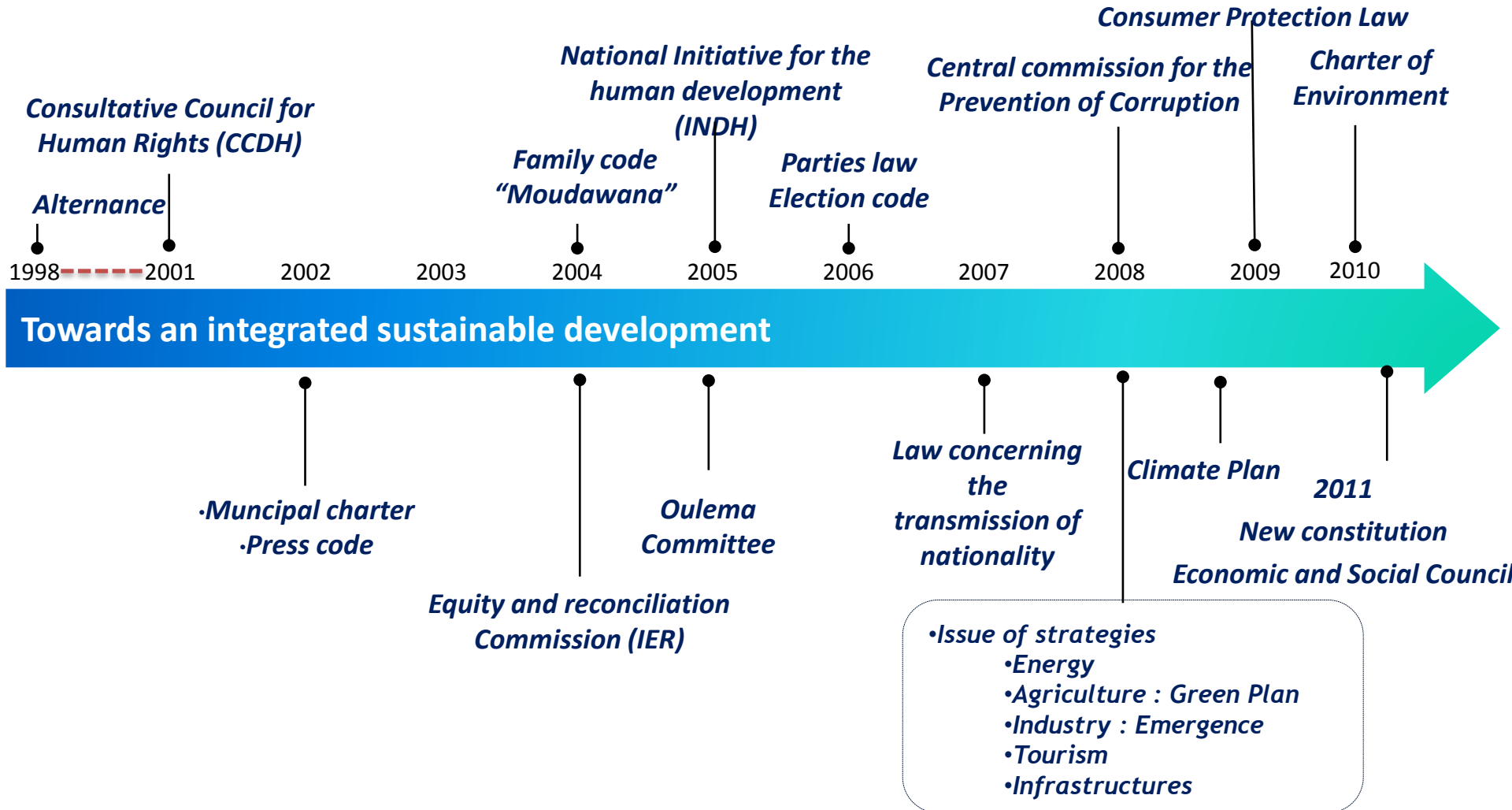
Oil Council Africa-Paris
KEYNOTE SPEECH OF DR. AMINA BENKHADRA

Summary

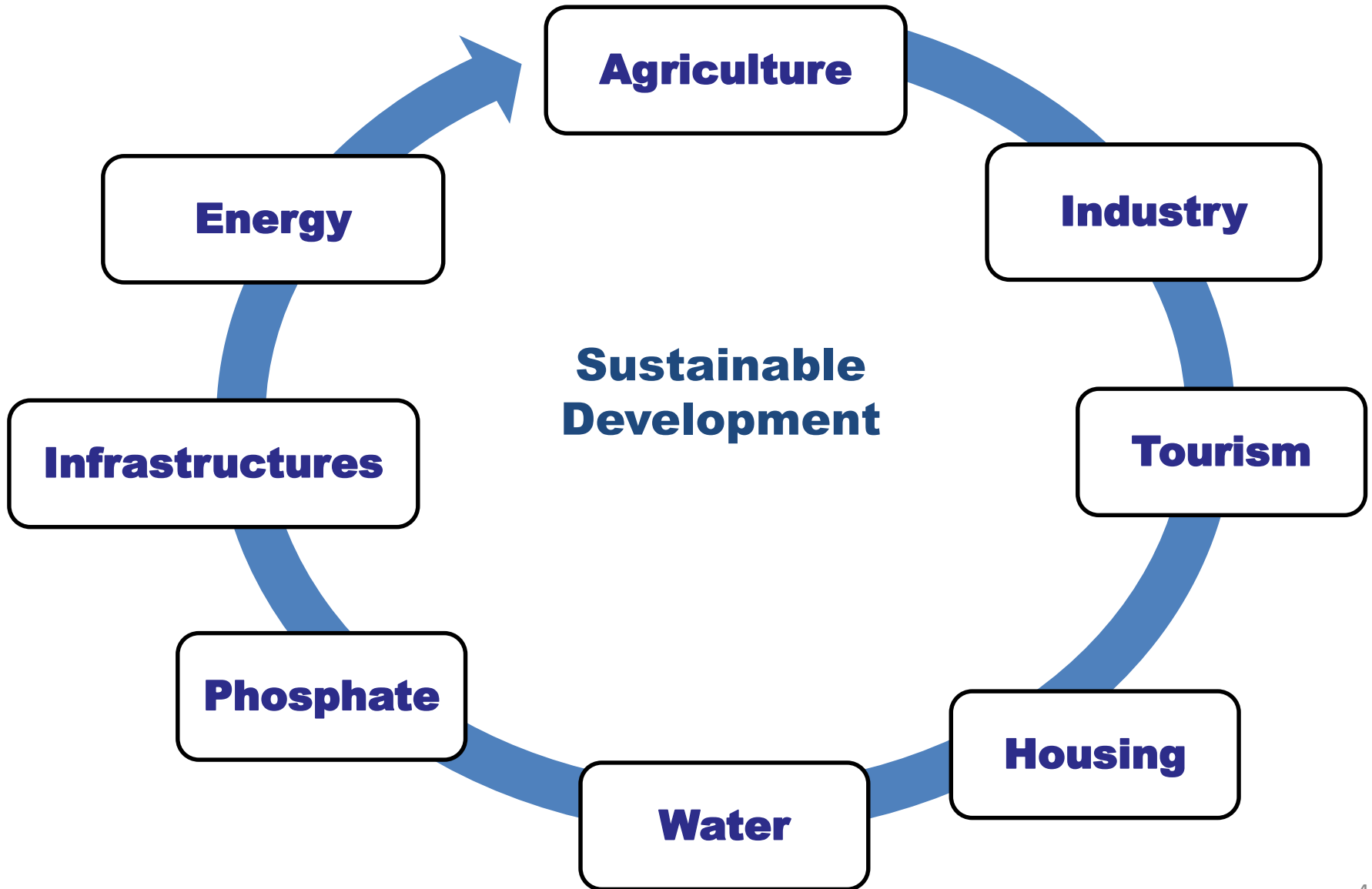
- I. Country profile**
- II. The energy sector and Policy in Morocco**
- III. Hydrocarbon exploration outlook**
- IV. Morocco Sub Sahara cooperation**
- V. Conclusions**

POLITICAL EVOLUTION

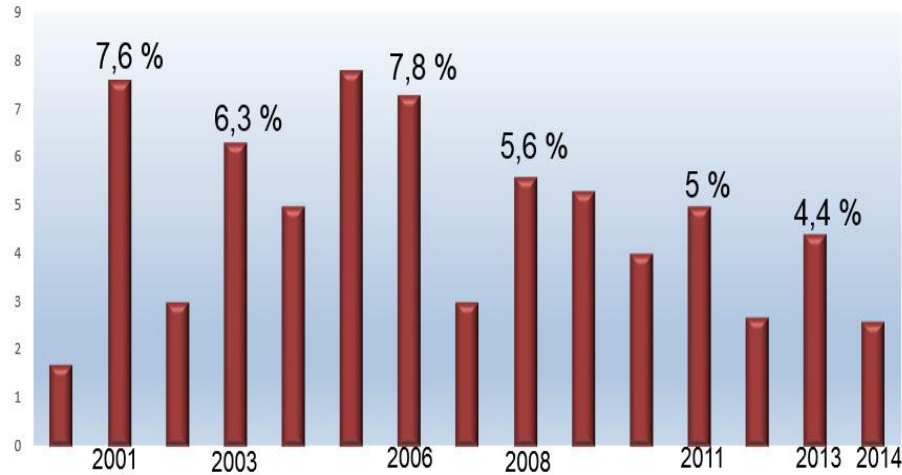
An integrated development



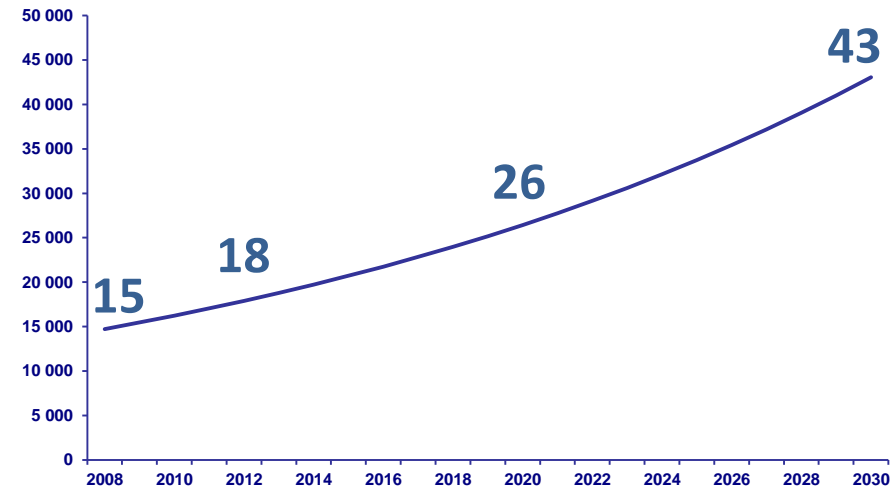
MOROCCO: A COUNTRY IN DEVELOPEMENT IN ALL SECTORS



GDP GROWTH : 5%/YEAR



Primary energy : X2 by 2020 AND X3 by 2030
Electricity : X2 by 2020 and X3 by 2030



Four fundamental objectives

- ✓ Security of supply and energy availability ;
- ✓ Widespread access to energy at low costs ;
- ✓ Demand management ;
- ✓ Preservation of the environment ;

Four Strategic Orientations

- ✓ Diversified mix, optimized by reliable and competitive technology ;
- ✓ Mobilization of national resources
- ✓ Energy Efficiency ;
- ✓ Regional integration ;

10000 MW of additional installed capacity between 2012 and 2025

SOLAR POWER

2000 MW

Inv. : 9 billion USD

Energy saved:

1 million TOE/year

MASEN

WIND POWER

2000 MW

Inv. : 3,5 billion USD

Energy saved

1,5 million TOE/year

ONEE

HYDRAULIC

Construction of two hydraulic plants of 550MW (at MdeZ El Mnz el and Abdelmoumen)

FOSSIL ENERGIES

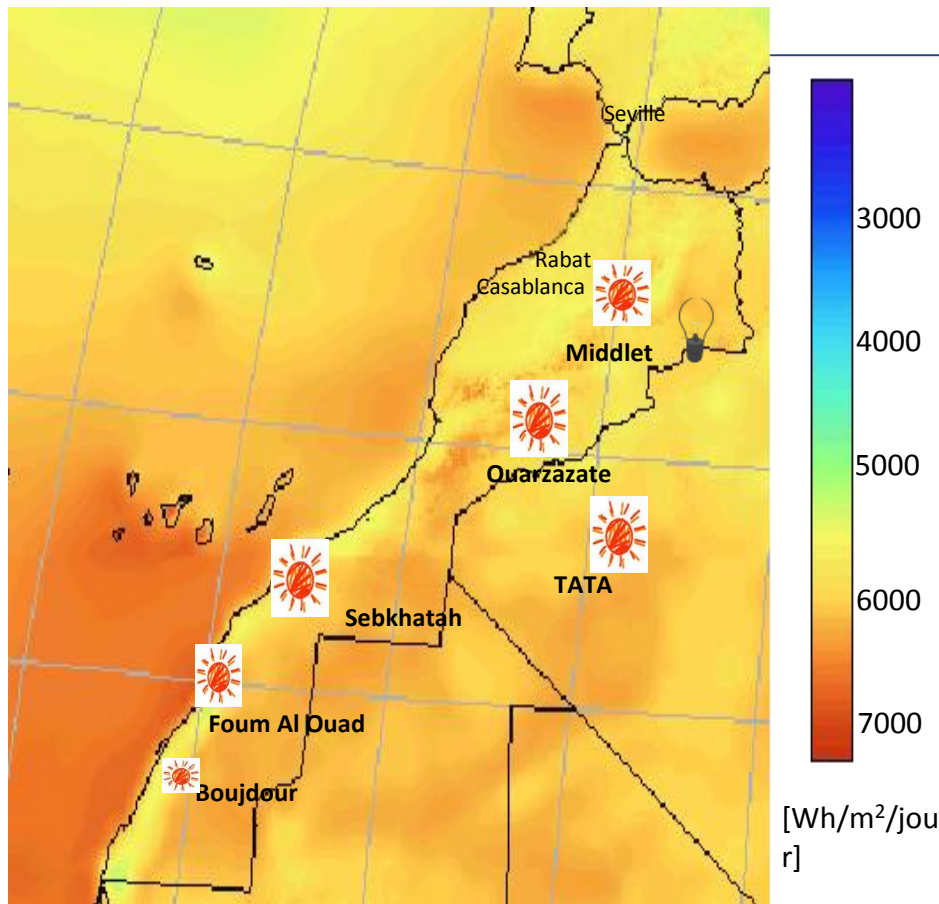
Thermal plants are being developed (2010-2015): 2500MW

Complementary projects of 1000MW (gas or clean coal) starting from 2018

ENERGY EFFICIENCY

Housing, transportation, industry : 12% of energy saved by 2020, 15% by 2030

An Integrated Solar Power Project lead by the Moroccan Agency for Solar Energy



Installed capacity

• 2000 MW

Energy production

• 4500 GWH

Investment

• 9 billion
USD

Energy saved (per year)

• 1 million
TOE

Emissions of CO₂ avoided (/per year)

• 3,7millions
tons



Integrated Wind power project

Sendouk 2 (150 MW) ■ ■ Koudia Al Baida (300 MW)

■ Taza 150 MW

Tender for offer launched in may 2011
Choice of adjudicator in December 2011
Implementation: june 2014

■ Tiskrad 300 MW

■ Boujdour 100 MW

Installed capacity

• 2000 MW

Energy production

• 6600 GWH

Investment

• 3,5 billion USD

Energy saved per year

• 1,5 millions TOE

Emissions of CO2 avoided per year

• 5,6 millions tons

The introduction of LNG: a need to complete the energy mix



Total gas needs : 5 bcm in 2025
Investment : 4,6 billions USD



Investment opportunities :

- Achievement of gas infrastructure : **2.4 billion US**
- Completion of the first phase of electricity infrastructure : **2700 MW**
(combined cycle) : **2.2 billion USD**
- Private investors and national and international institutional in PPP

Guidelines

- **Gas to Power** : Meet the needs in additional electricity production capacity
- **Gas to industry**: develop the use of natural gas

Public private Partnership

- Moroccan stakeholders : ONEE-SIE- Fonds Hassan II
- Majority of private investors in the capital

Electricity purchase

- PPA contracts between ONE and project companies

Industrial Integration

- Best cost
- R D
- Regional development

ENERGY DEVELOPMENT

FORECAST FOR PETROLEUM PRODUCTS INVESTMENTS

- **Deep mutation of the petroleum downstream sector :**
 - new topping at the oil refinery and reinforcement of LPG storage capacities are planned
- **Natural gas supply :**
 - 2021: New LNG terminal - Capacity of 5 BCM -4 billions dollars
- **3 new ports :**
 - **Safi** (250 km south of Casablanca) : 18 meters-draught & 6 jetties
 - **Nador** (north of Morocco) : 18 meters-draught & 4 jetties
 - **Jorf Lasfar**

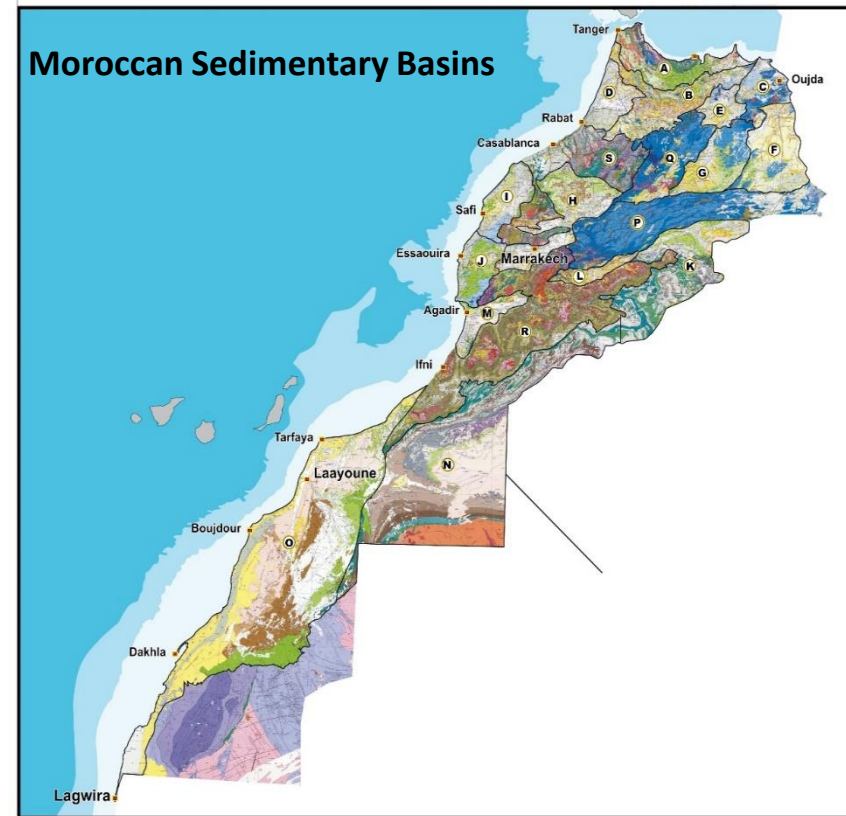
ENERGY SECTOR INVESTMENT BY 2020

	Billion US \$
RENEWABLE ENERGIES	13
CONVENTIONAL ENERGY	9
LNG- OIL PRODUCTS	2,5
TRANSPORT AND INTERCONNECTIONS	1,1
TOTAL	25.6

Hydrocarbon exploration outlook

Hydrocarbon exploration : Keys facts

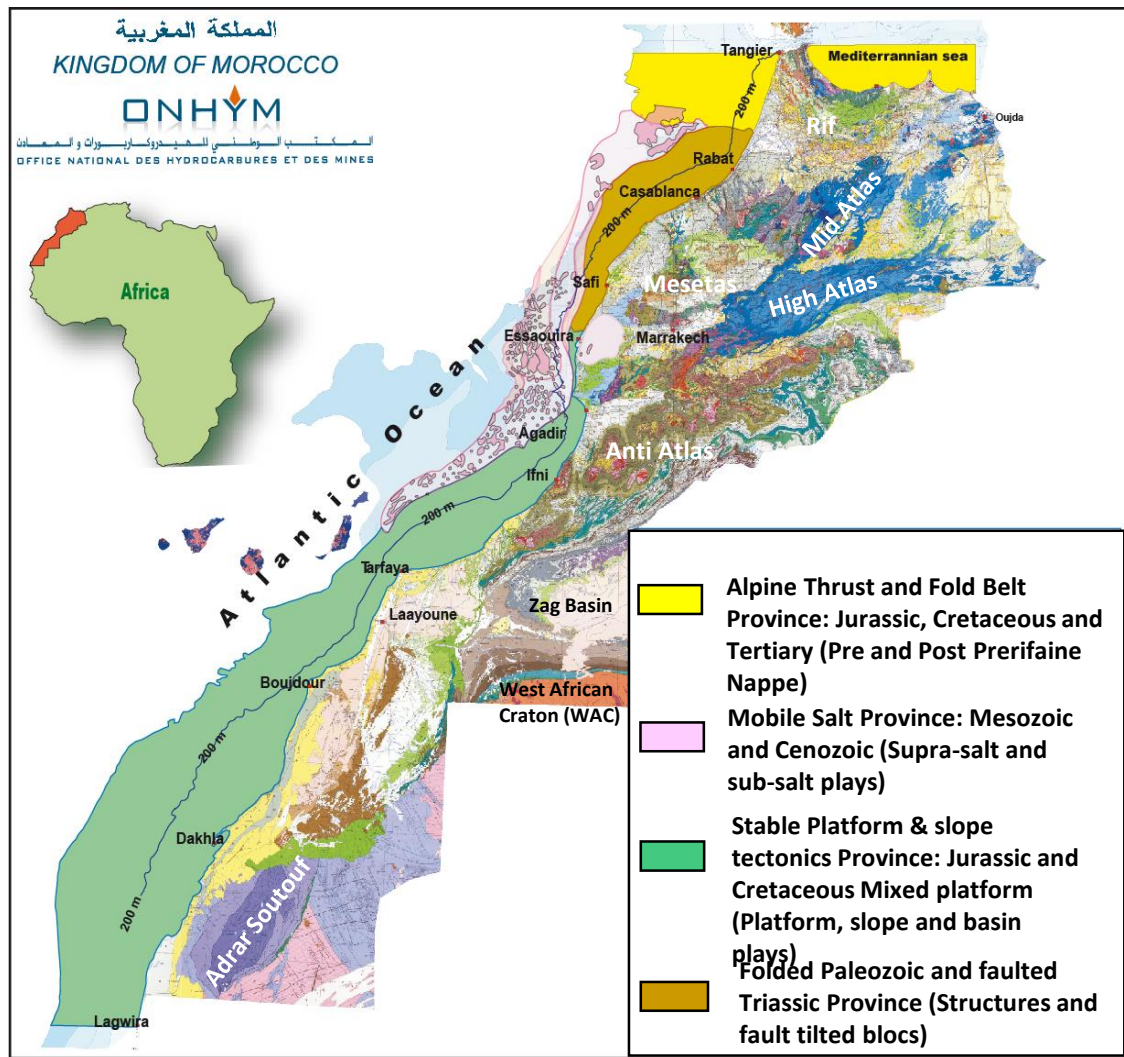
- Large sedimentary basins of several types : Total surface area : 918 237Km²
- A very extended offshore domain of more than 300 000 Km², consisting of Mesozoic and Cenozoic basins,



Hydrocarbon exploration : Geological snapshot (offshore)

Objectives ranging from Paleozoic to Neogene in four main provinces

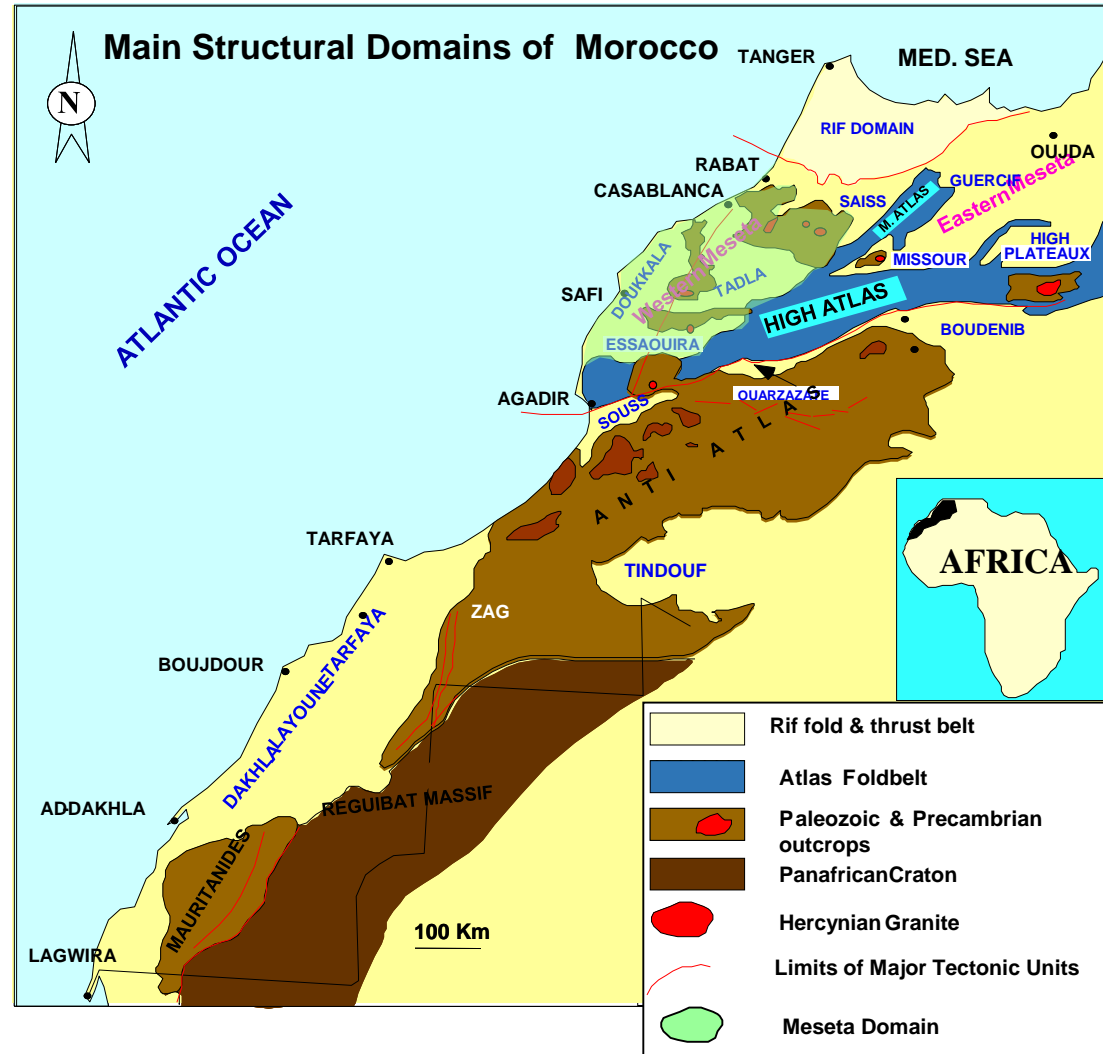
- **Alpine thrust and fold belt province** (Jurassic, Cretaceous and Tertiary) ;
- **Northern Shallow Offshore Province** (Paleozoic and Triassic) ;
- **Mobile salt province** (Jurassic, Cretaceous and Tertiary) ;
- **Platform and Deep Offshore Province** (Jurassic, Cretaceous and Tertiary).



Hydrocarbon exploration : Geological snapshot (onshore)

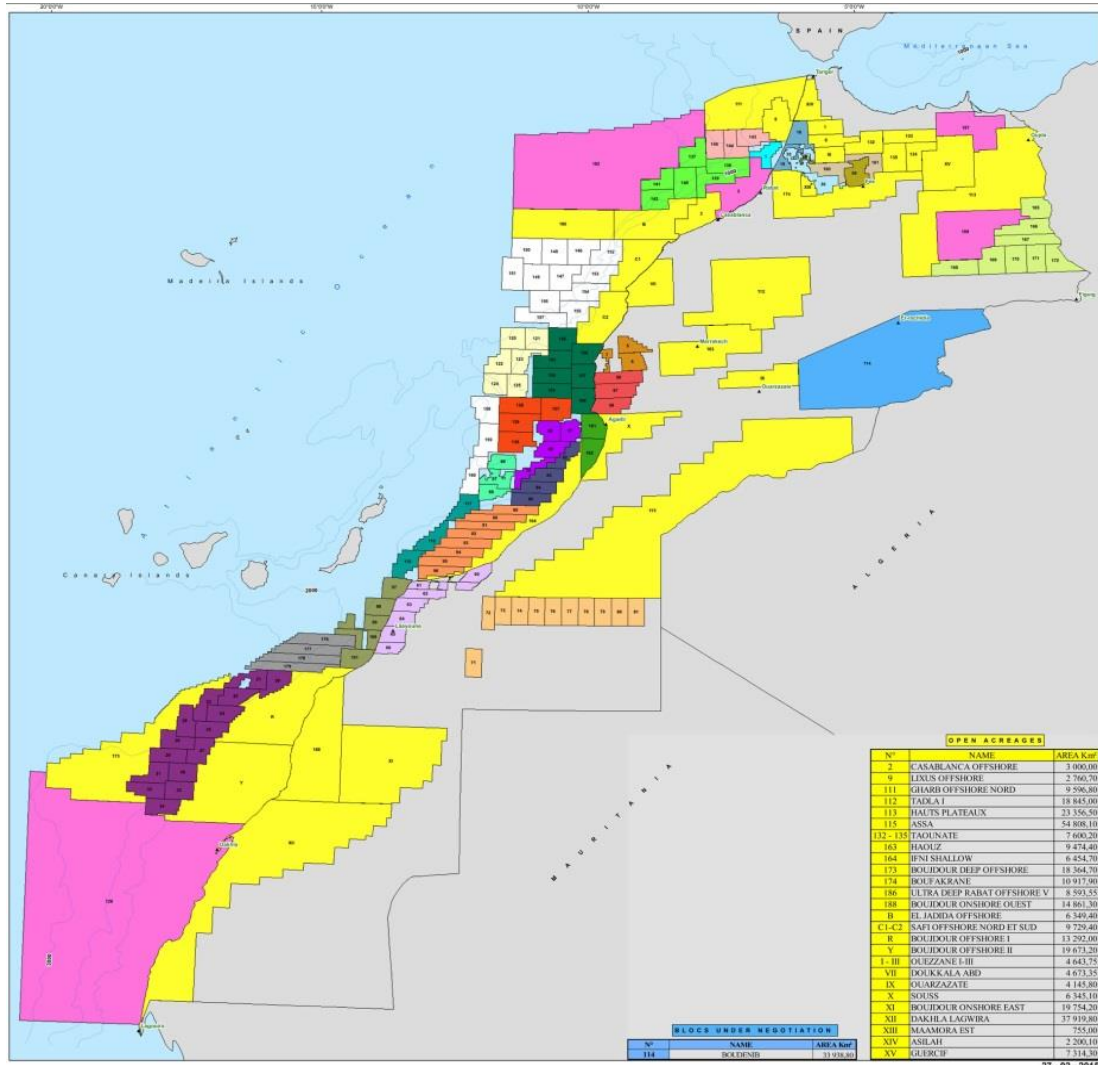
Objectives related to the Main structural domains :

- The Rif fold and thrust belt (Mesozoic and Tertiary)
- The Meseta domain (Paleozoic, Triassic and Jurassic)
- The Atlas fold belt (Triassic and Jurassic)
- The Anti Atlas and Zag Hercynian domain (Paleozoic)
- The Coastal basins (Triassic, Jurassic, Cretaceous and Tertiary)



Hydrocarbon exploration

Permit map – May 2015



32 ONHYM Partners on:

- 127 Exploration Permits
- 5 Reconnaissance Licenses
- 4 MOU for Oil Shale
- 9 Concessions
- **Total : 345 261,95 Km²**



woodside



Gulfsands
Petroleum

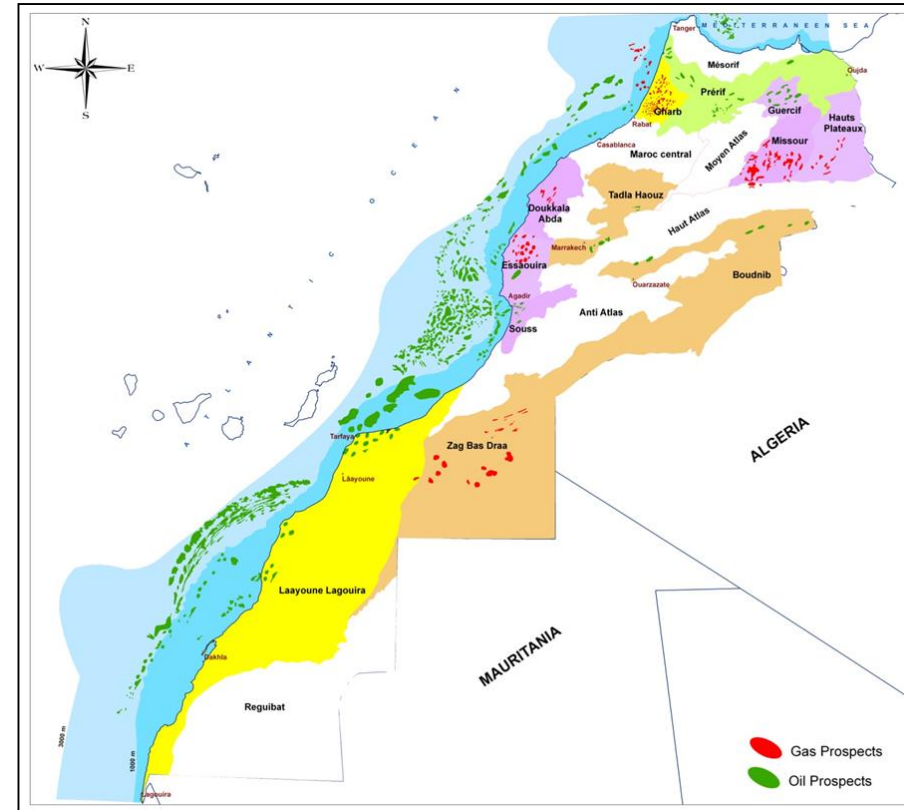


Circle Oil Plc



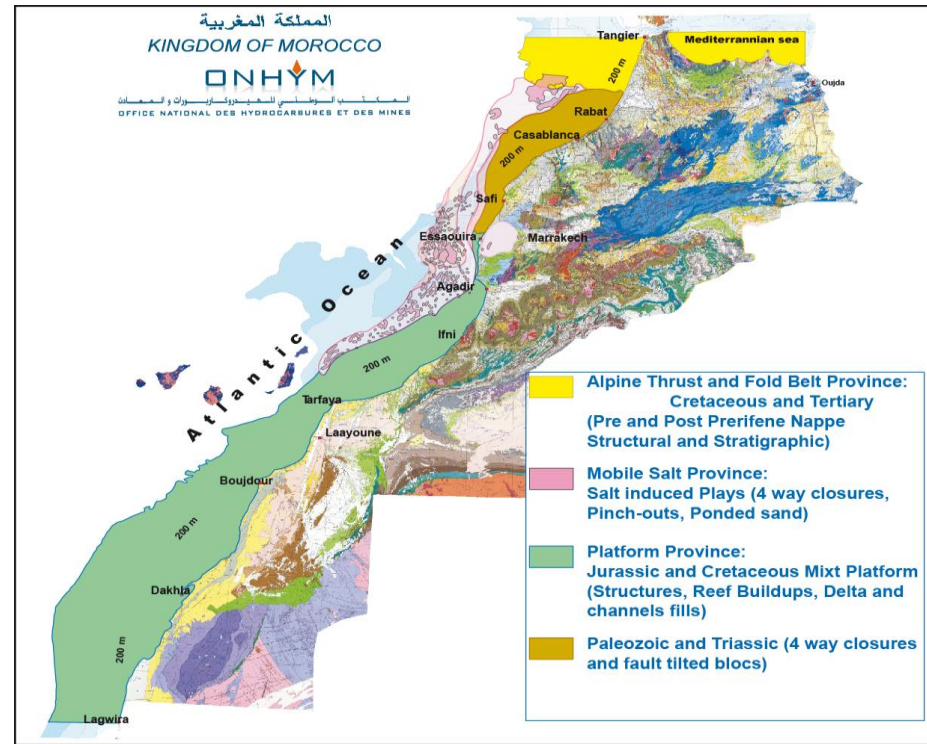
Hydrocarbon exploration : Prospects & Leads

- The identified petroleum systems in several Moroccan sedimentary basins are functional.
- More than 800 prospects & leads have been identified in onshore and offshore, waiting to be tested.



Hydrocarbon exploration

- **Upgrading of the existing Leads**
 - Additional seismic (2D and 3D) ;
 - Special studies (geological, PSDM, AVO, inversion etc...) ;
 - Consideration of old plays (Upper Cretaceous and Tertiary) in other zones ;
- **Drilling (ongoing)**
 - Continue testing the Mature prospects ;
- **New play concepts and new areas**
 - Subsalt , Subtrust , Deep Objectives, ultra Deep area ;
 - Paleozoic and Triassic Plays in shallow offshore .



Hydrocarbon exploration : Drilling Activities Summary

Wells drilled in offshore in 2013/2014

Offshore:

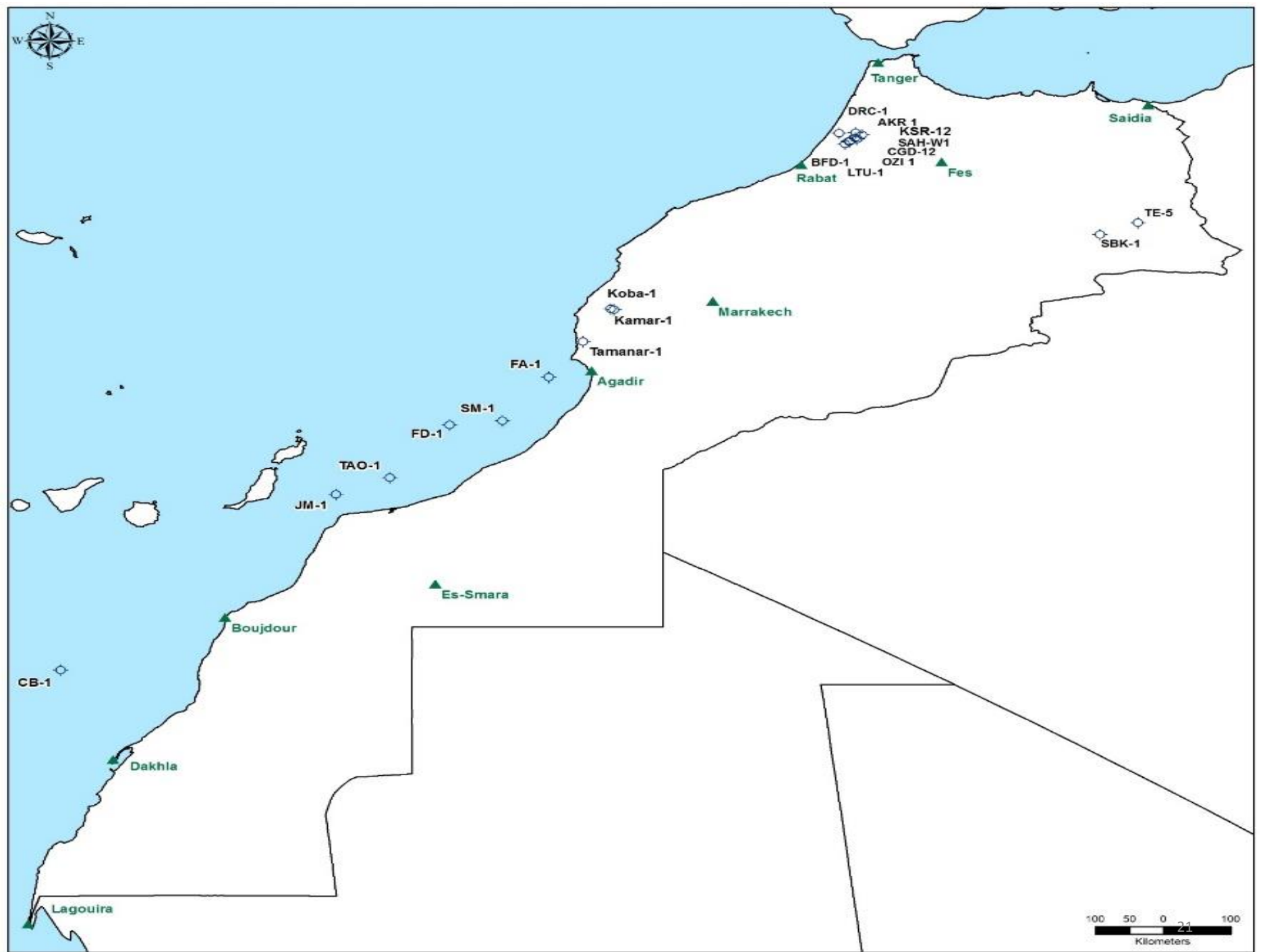
- 5/6 wells drilled offshore in 2013 and during 2014 encountered either oil or gas shows or heavy oil and 1 hit a non commercial gas and condensate discovery

Onshore :

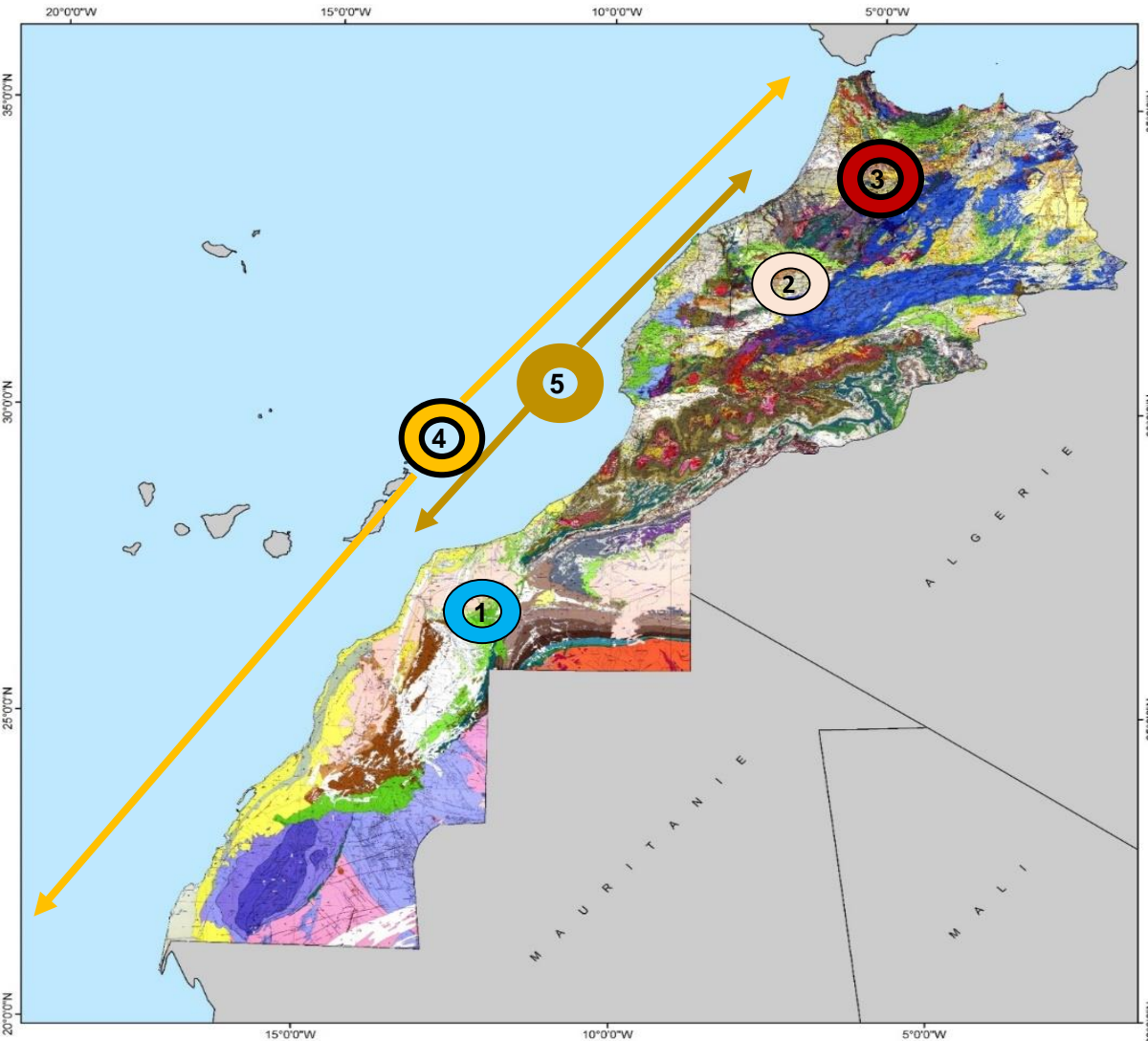
- **Sidi Moktar permits** (Essaouira basin) : gas discovery in 2 wells (to be confirmed with a testing program)
- **Gharb basin** :5/6 wells drilled in 2014 identified the presence of gas
- **Tendrara basin** (East) : Gas discovery

Presence of working petroleum systems in the Moroccan sedimentary basins both onshore and offshore (needs to be confirmed with one or more discoveries). This requires, of course, a intensive a drilling exploration effort ;

- **Investment in 2014 : 6 billions dirhams**



Exploration Work scheduled by ONHYM in 2015



① Objectives : Jurassic ,
Cretaceous & Tertiary
Lemsid coastal area

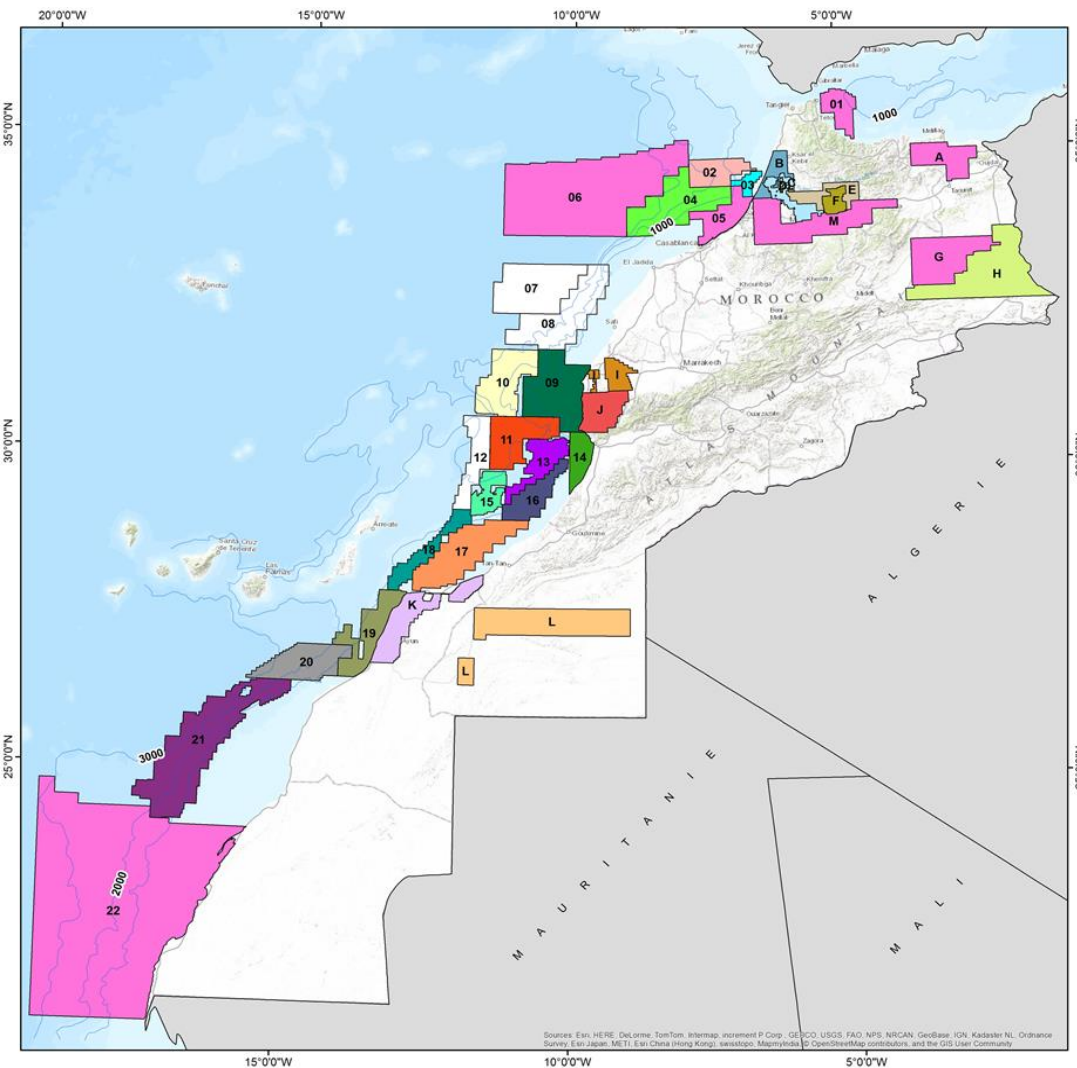
② Objectives : Jurassic and
Triassic Reservoirs
Moyen Atlas Oriental

③ Objectives : Triassic,
Jurassic and Cretaceous
Mesorif Basin

④ Objectives : Atlantic
continental plateau
extension

⑤ Objectives : Jurassic,
Cretaceous & Tertiary
Offshore Rabat-Tarfaya

Exploration Work scheduled by ONHYM partners in 2015



ONSHORE

- **B-D: Circle Oil** (Lalla Mimouna et Sebou): Drilling six (6) wells
- **E: Gulfsands** (Moulay Bouchta): Acquisition of 500 Km of 2D seismic
- **K: San Leon** (Tarfaya onshore): Drilling one (1) well

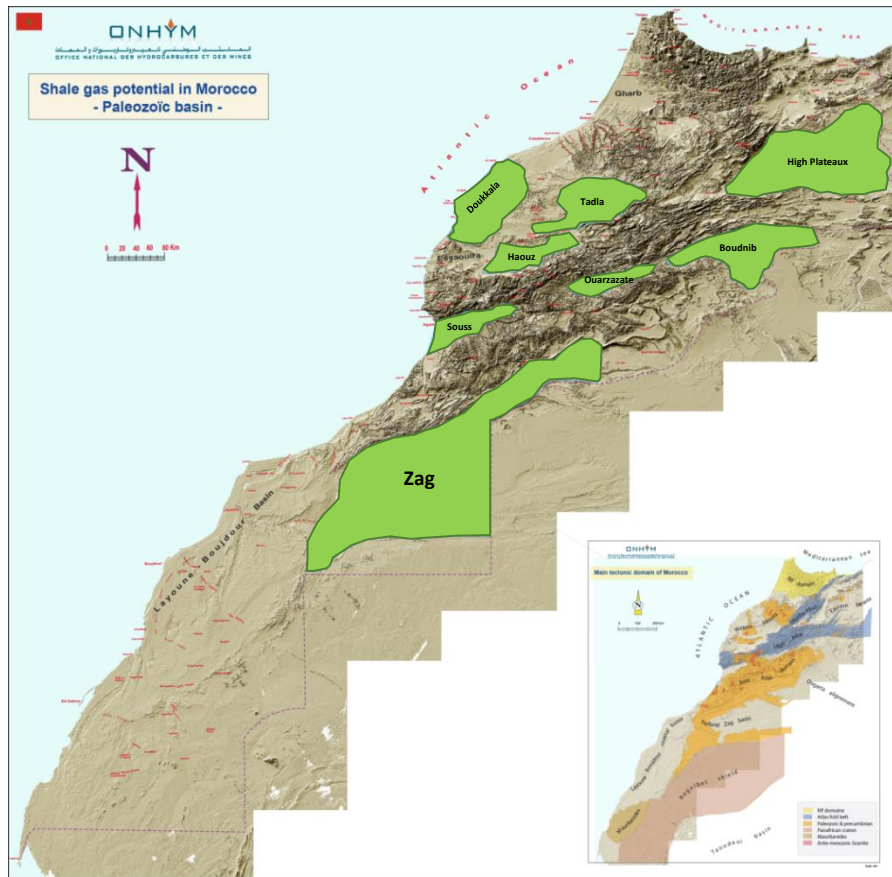
OFFSHORE

- **2: Repsol** (Gharb offshore sud): Acquisition of 500 Km² of 3D seismic
- **6: Woodside** (Rabat Ultra deep offshore): Acquisition of 1000 Km of 2D seismic
- **7-8: Chevron** (Cap Cantin, Cap walidiya deep offshore): Interpretation of 3453 Km of 2D seismic
- **10: PXP** (Mazagan offshore): Drilling one (1) well
- **9-11: Kosmos** (Essaouira et Tarhazoute offshore): Processing and interpretation of 4400 km² of 3D seismic
- **12: Chevron** (Cap Ghir deep offshore): Interpretation of 1795 Km of 2D and Acquisition of 1073 Km² of 3D seismic
- **20: New Age /Glencore** (Fom Ognit) : Processing and interpretation of 2226 Km of 2D seismic
- **21: Kosmos** (Cap Boujdour offshore): Processing and interpretation of 5144Km² of 3D seismic
- **22: Total** (Anzarane offshore): Acquisition of 1500 Km of 2D seismic

Partners forecast for 2015 :

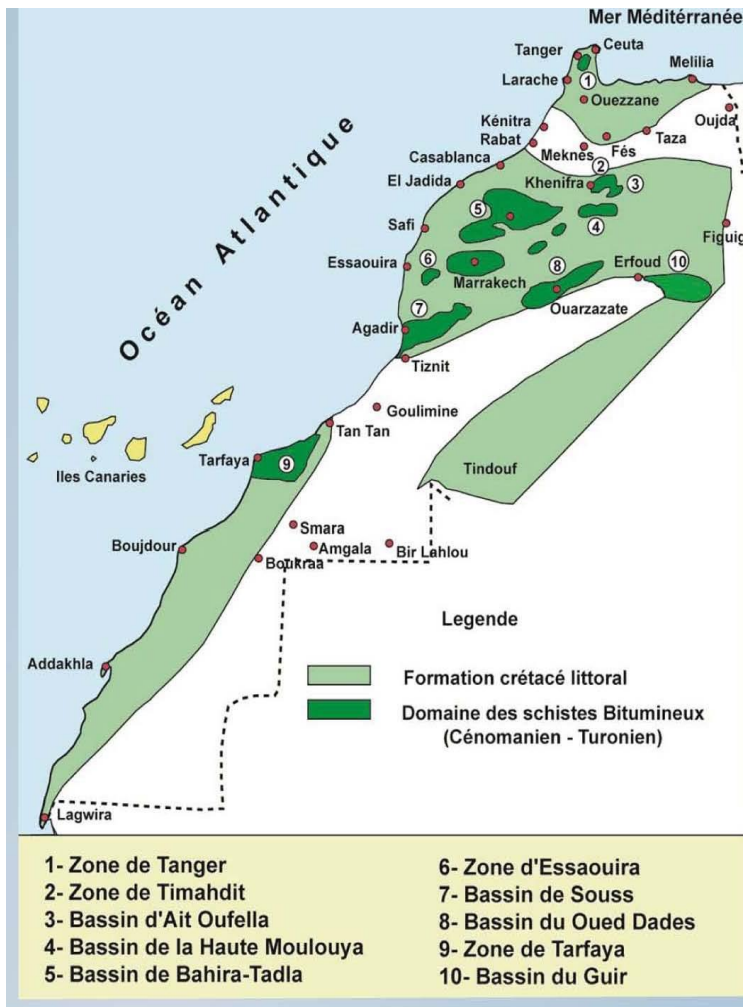
Drilling 8 wells, Acquisition of 3000 Km of 2D seismic and 1573 Km² of 3D seismic

Hydrocarbon exploration :SHALE GAS



- Regional geology opportunity's for shale gas exploration and production
- Third largest opportunity in North Africa
- 4 Basins geologically favorable for shale gas resources :
 - Bas – Draa Zag
 - Boudenib & Ouarzazate basins
 - Hauts Plateaux
 - Tadla & Haouz

Hydrocarbon exploration : SHALE OIL



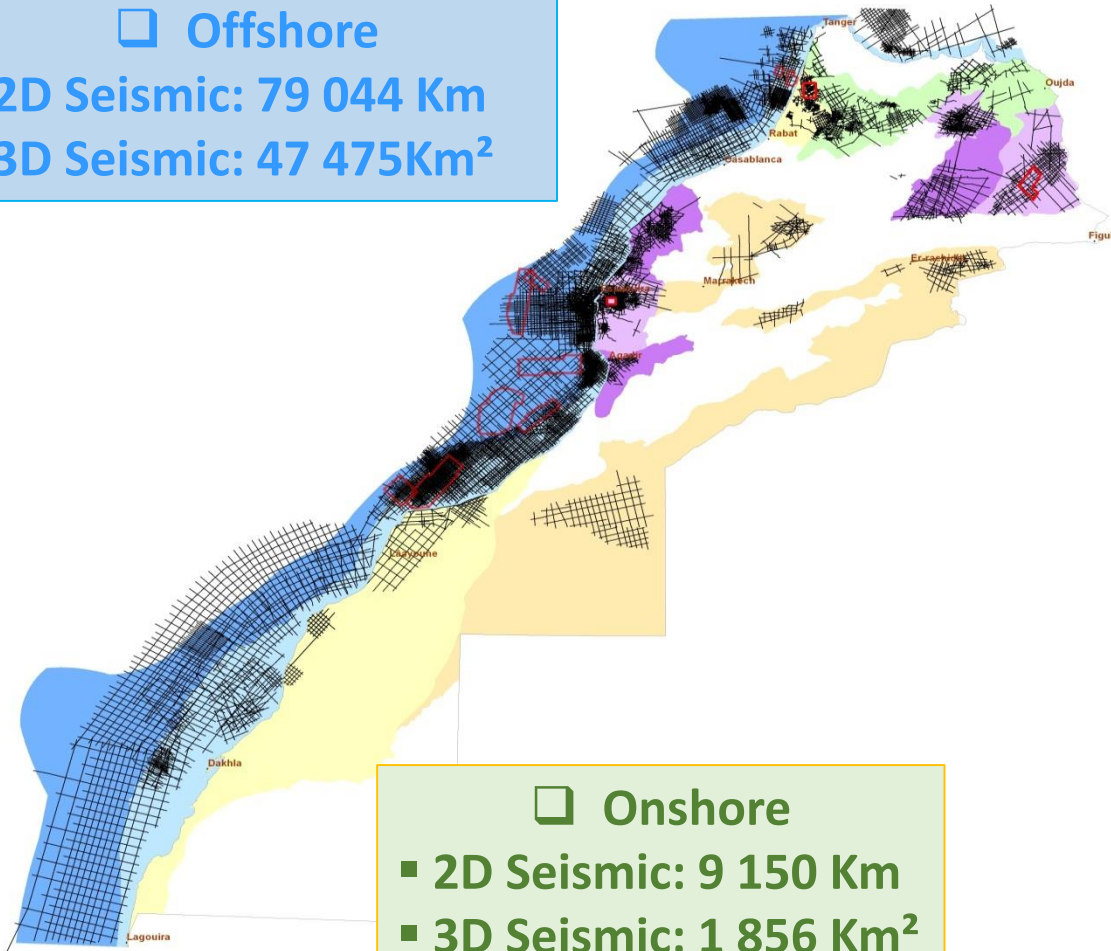
- Important oil shale resources
- Over 10 oil shale indications and the main fields :
 - **Timahdit**: supplies evaluated to 15 billion barrels of oil;
 - **Tarfaya**: supplies evaluated to 23 billion barrels of oil.

Moroccan oil shale belongs to **Upper Cretaceous formations with organic and marine origin distributed in the Rif, Atlas and Southern provinces.**

Seismic Acquisition 2000 – 2015 (June)

Offshore

- 2D Seismic: 79 044 Km
- 3D Seismic: 47 475Km²



Onshore

- 2D Seismic: 9 150 Km
- 3D Seismic: 1 856 Km²

2000-2015 :

- 2D Seismic : 88 194 Km
- 3D Seismic : 47 475 Km²

The interpretation of the acquired seismic and its integration with all available data led to the **identification of different play concepts, leads and prospects.**

Some of them were tested by drilling

Drilling 2000 – 2015 (June)

- **A total of 72 wells were drilled both onshore and offshore**
- **Some wells led to small commercial gas discoveries in the Gharb onshore basin (Circle Oil, Cabre, Gulfsands).**
- **Repsol, Longreach ,ONHYM and MPE made discoveries in the Gharb offshore basin, Essaouira onshore basin and the high Plateau that need further evaluation.**
- **3 of the 5 wells drilled in the Atlantic offshore in 2014 encountered either oil or gas and condensate and therefore proving the existence of viable petroleum systems in this area**

The Moroccan Hydrocarbon Law : One of the most attractive in the world

- Government interest share : 25% maximum
- Corporate tax : total exemption for ten-year period
- Surtax : None
- Tax exemption
 - **With-holding tax on profits**
 - **Value added tax**
 - **Business activity tax**
 - **Urban tax**
 - **Tax on non-improved urban land**

Easiness of doing business

No restrictions to capital for non-residents

Free repatriation of profits and capital for non-residents

More than 100 protection foreign investment agreements and double taxation

EXPLORATION STATUS

- Moroccan sedimentary basins are underexplored both onshore and offshore
- ONHYM and Partners exploration activities permitted to develop new play concepts and define new prospective zones .
- The play concepts developed are very similar to those identified in Nova Scotia, West Africa and the Gulf of Mexico;
- The so far drilled wells have proved working petroleum systems as well as modest local production;
- Deep objectives have not yet been tested;

Morocco Sub Saharan Africa cooperation

MOROCCO'S ASSETS

A GATEWAY TO EUROPE AND AFRICA



**Strong regional interconnections:
huge potential to export green
energy to Europe**

South Spain



Gibraltar strait

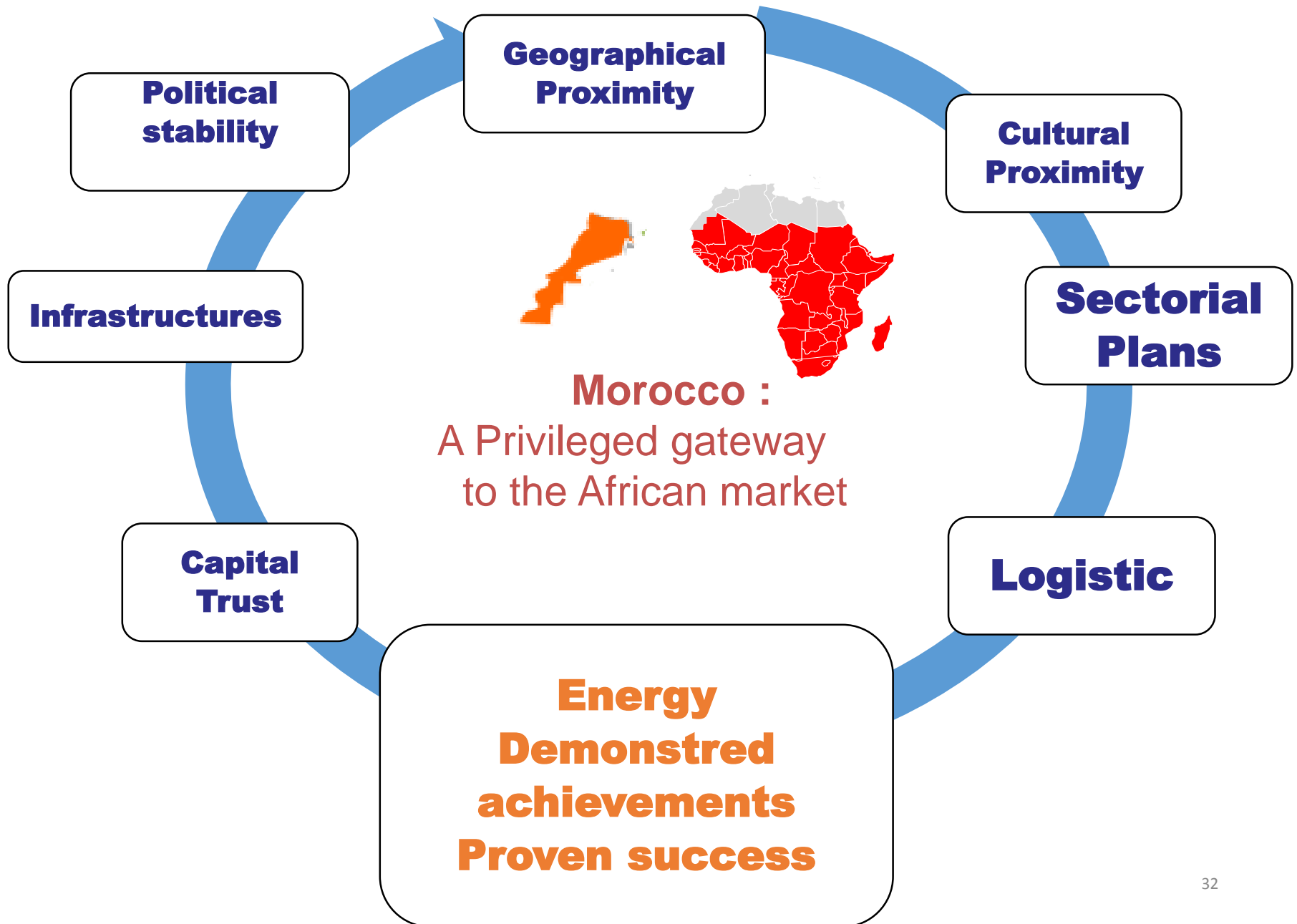


North Morocco

Natural Gas

- **Founding member of the COMELEC**
- **Fourth player on the OMEL Market since 1999**
- **The sole southern Mediterranean interface to the UCTE (Union for the Co-ordination of Transmission of Electricity)**

MOROCCAN ENERGY PARTNERSHIP A HUB FOR AFRICA



Key success factors

Latest technologies in the electric field

A training knowledge

A modern banking system

A secular historical presence in the region

Private sector with a know how

Model of economic development cooperation

Human resources

Research and development

- A strong South-South cooperation extended to many African countries by providing technical assistance and expertise
Senegal, Gambia, Sierra Leone, Mali , Mauritania, Chad, Niger, and Cape Verde
- Enhanced by Visit of His Majesty King Mohammed VI on 2014 (and 2015), May God Assist Him, to four African countries, with a cooperation agreements marked by a strong commitment of public and private sectors:
Mali, Guinea Conakry , Ivory Coast and Gabon
Senegal, Guinea Bissau,
- ONHYM has strengthened its cooperation with several African countries, including Senegal, Guinea Conacky, Mali and Tunisia by the signing of memoranda of agreements on scientific and technical cooperation, exchange of expertise and staff training in various areas related to geology, geophysics and laboratories.



Morocco : A link for energy access in Sub Saharan Africa

MOROCCAN SUCCESS IN THE ENERGY SECTOR

The national program of rural electrification (PERG)



The Energy strategy (energy mix)



A Knowledge in the Energy Projects by PPP



Expertise In the electricity network



Interconnection with europe and maghreb



South South Cooperation



Successfull experiences to share with african brothers countries

A proven leadership to support african energy transition

- Morocco is greatly dependent on energy import ;
- Moroccan geology is significantly favorable for oil and gas exploration and production : good evidences for the existence of viable petroleum systems ;
- Myriad of play concepts are developed in different sedimentary basins and different geological times in Morocco ;
- New incentives and hydrocarbon potential has attracted and continue to attract new investors to explore in Morocco.
- Africa cooperation is a priority to promote mutually beneficial South-South cooperation, involving both public and private sectors ;
- Morocco has become a major player in the Africa as a platform and hub linking Africa with the rest of the world ;

What Morocco has to offer?

- **Freely accessible rich data base ;**
- **Growing local energy demand ;**
- **Developing infrastructure ;**
- **Favourable and attractive terms ;**
- **Acreage with good prospectivity ;**
- **An easy place to operate, and**
- **An exciting future...**