

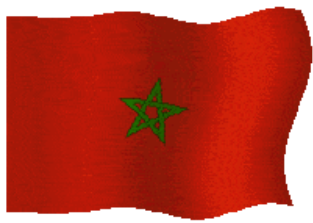
DESALINATION A SUSTAINABLE SOLUTION FOR WATER SUPPLY IN ARID AREAS

Lisbon, 13-14 March 2018

Mr Khalid TAHRI
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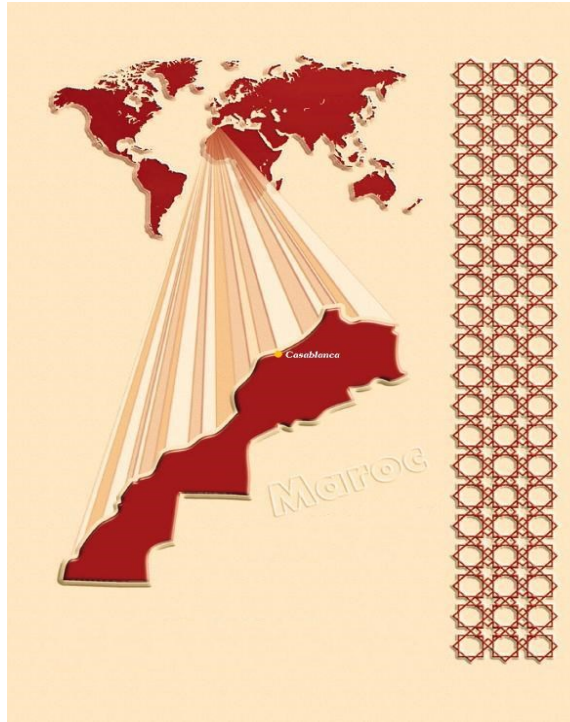
Outline

- Introduction
- Water strategy in Morocco
- ONEE, Moroccan Public Operator overview
- Desalination, a solution for water supply
- PPP: Agadir Case
- Conclusion



Morocco, in brief

- Position: North Africa, 14 km from Europe
- Area: 710 850 km²
- Population: 35 millions
- Climate: Mediterranean
- Parliamentary, democratic and social constitutional monarchy
- GDP : 2000 Euro/capita
- Growth: 3-4 % per year



Rabat (capital)



Casablanca



Marrakech



Fez



Tangier

Morocco, Main Plans

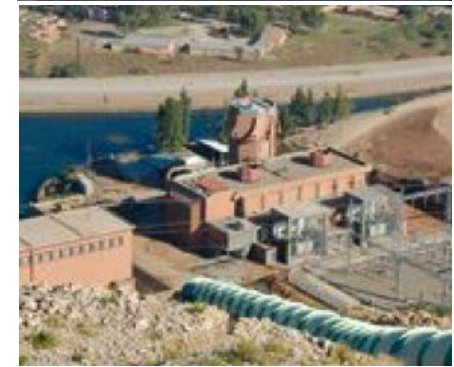


ENERGY IN MOROCCO

An important dependency to thermal energy of which 95% imported.

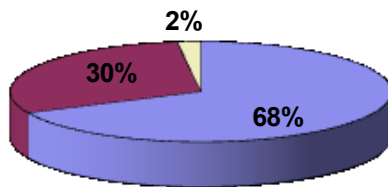


Energy bill is a real burden for the national economy



Energy allocation 2010

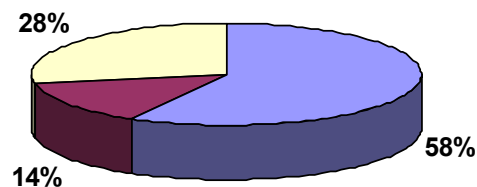
6000 MW



■ Thermal energy ■ Hydraulic energy ■ Renewable energy

Energy allocation 2020

14000 MW



■ Thermal energy ■ Hydraulic energy ■ Renewable energy

REGULATION: Water Law



Institutional

- Institutionalization of the Supreme Council for Water and Climate
- Creation of river-basins agencies throughout the national territory
- Creation of provincial and prefectural committees of the Water

Planning

- National Plan for Water
- Plan on Integrated Management of Water Resources at the regional level

Protection:

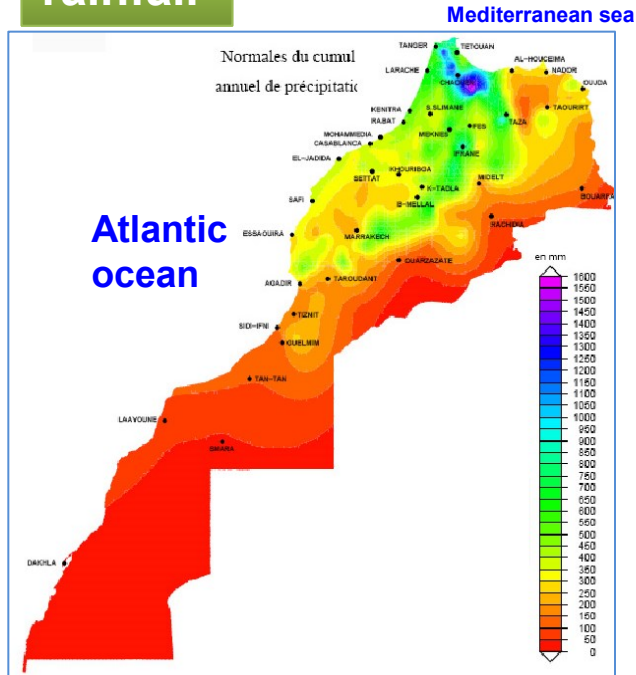
- Quantity: perimeter of protection and prohibition of groundwater
- Quality: protection against pollution

Financial:

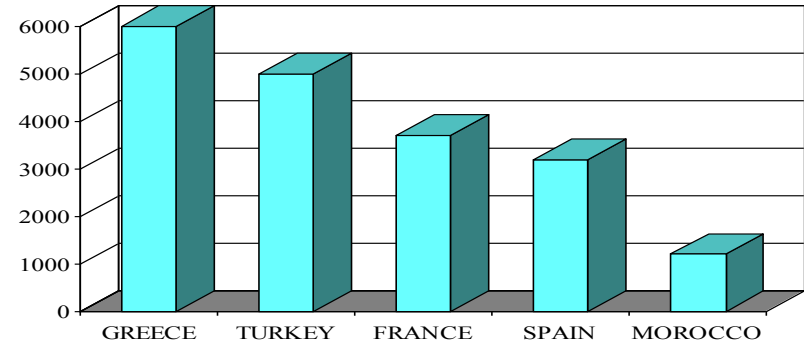
- Introduction of the principle sampler-pays and polluter-pays

Climate and water resources

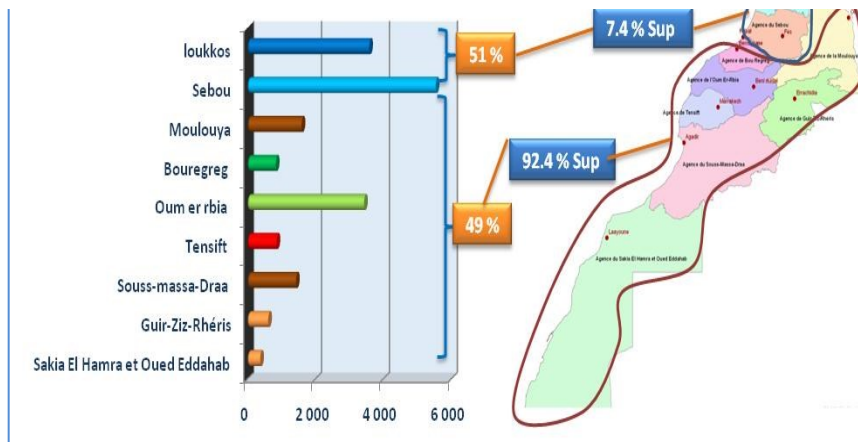
rainfall



Water resources in m³/inhabitant/year



Spatial distribution of Water resources

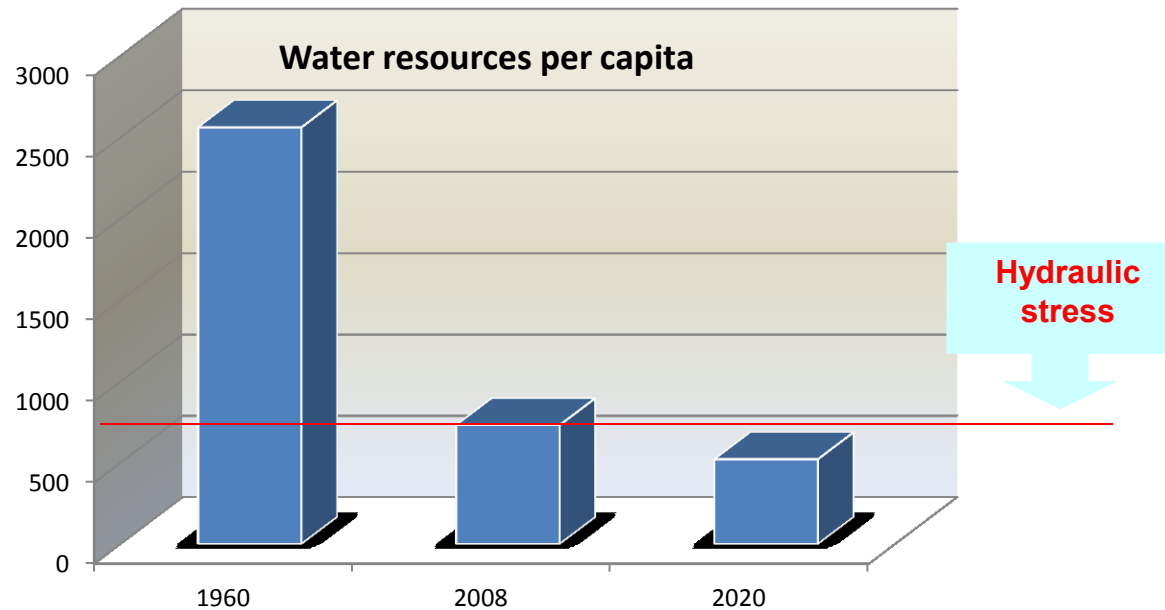


Potential of natural water Resources
22 Billion CM/Year

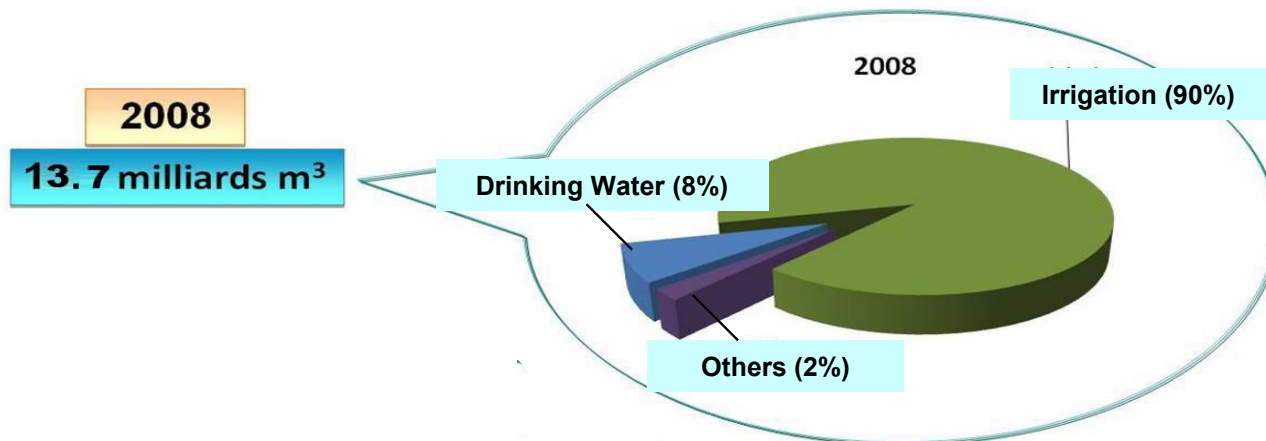
18 Billion CM/Year
Surface water

4 Billion CM/Year
Groundwater

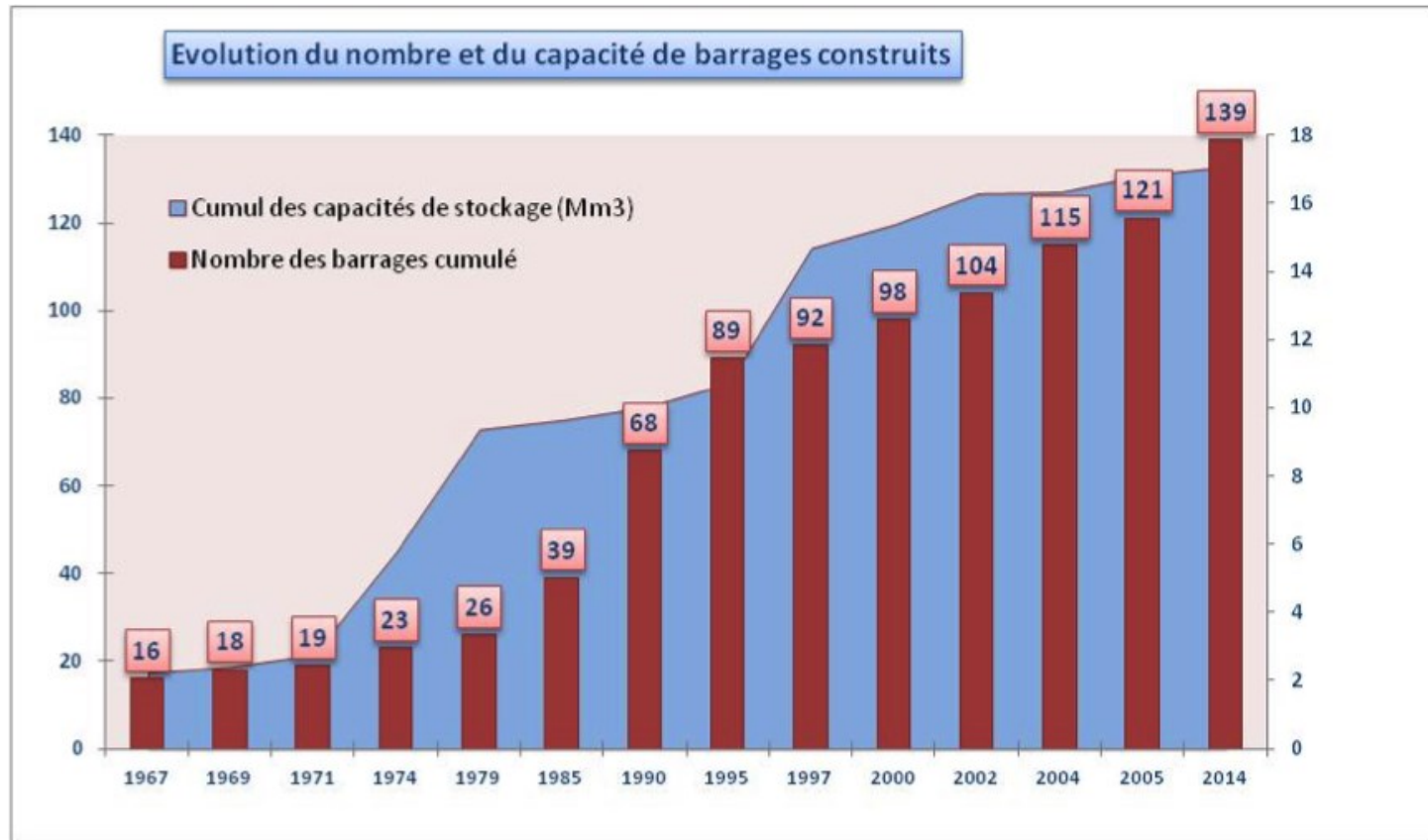
Water resources regarding offer



Water resources regarding demand



Mobilization of conventional water



- 140 large dams with a total capacity of nearly 18 billion CM
- Thousands of boreholes and wells
- 13 systems of water transfer: 1100 km and 210 m³/s

Mobilization of non conventional water

- *Desalination program*



- *Wastewater treatment and re-use program*



- *Rainfall capture*



ONEE, a Public Operator at National level

A strategy based on 4 axis



**Perpetuating,
securing and
reinforcing
existing
installations.**



**Improving
technical
performances.**



**Generalizing
potable water
access to rural
areas.**



**Developing
sewerage
systems for
communities.**

ONEE: Global Indicators – Water Branch

| Indicators | Unit | Till 2017 |
|--------------------------------|-------------------------|-----------|
| Urban | | |
| Investments 1999 – 2017 | Billions € | 2,5 |
| Installed capacity | m ³ /s | 71 |
| Production | Millions m ³ | 1.137 |
| Length of production pipes | Km | 11.000 |
| Length of distribution network | Km | 41.500 |
| Access rate | % | 97,1 |
| Rural | | |
| Investments 1999 – 2017 | Billions € | 1,2 |
| Access rate | % | 96,6 |
| beneficiary population | Millions inhabitants | ≈ 13,3 |
| Number of localities | U | 431 |

2,5% of produced water come from desalination

Development Program 2017 - 2021

Investment 2017- 2021

2,5 billions €

Urban water supply

1,6 billions €

Rural water supply

0,4 billions €

Sewerage systems

0,5 billions €

Projects in prospects: 2018-2020

Treatment plants under construction: 21 projects- 9 m³/s

Conventional treatment

| |
|------------------------------------|
| Marrakech 2500 l/s |
| Fès – Meknès 2000 l/s |
| Berkane 130 l/s |
| Taounate 100 l/s |
| Beni Mellal 190 l/s |
| Ben Guerir 100 l/s |
| El Kelaâ 60 l/s |
| Ouarzazate 250 l/s |
| Essaouira 250 l/s |
| Agadir 400 l/s |
| Taroudante 200 l/s |
| Tiznit 145 l/s |
| Imin Tanout – Chichaoua 300 l/s |

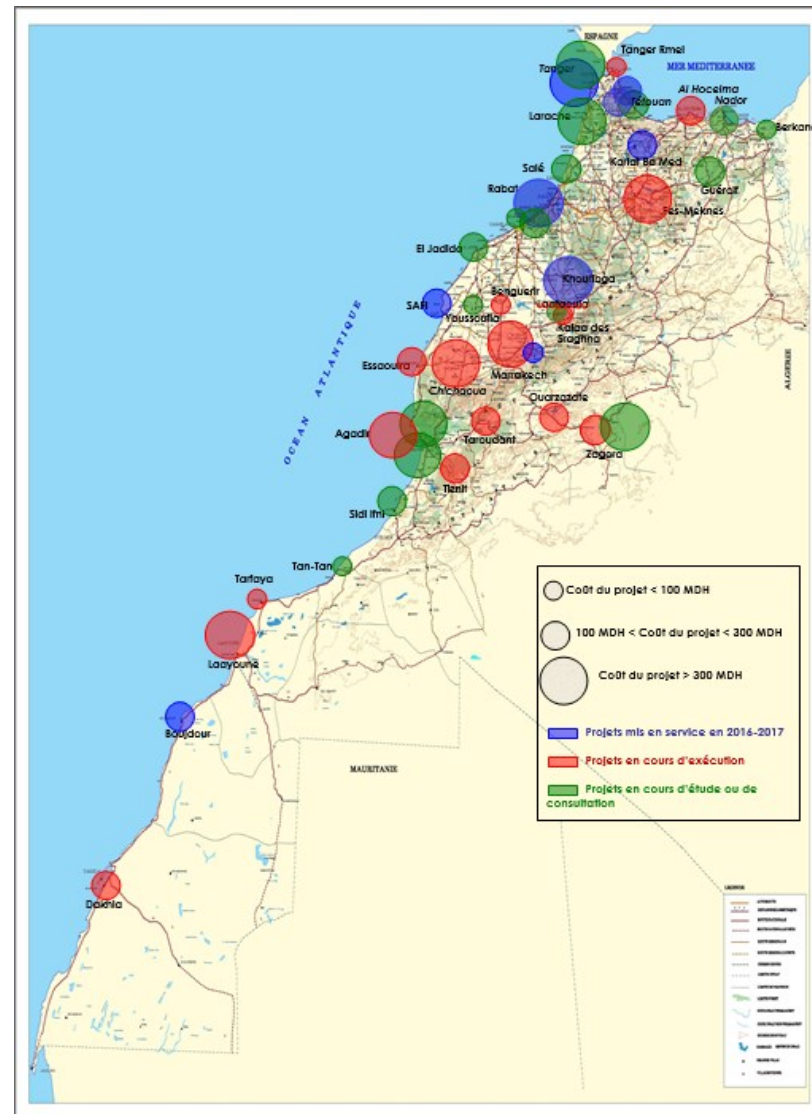
Desalination

| |
|-----------------------|
| Al Hoceima 300 l/s |
| Agadir 1740 l/s |
| Sidi Ifni 100 l/s |
| Tarfaya 15 l/s |
| Laâyoune 300 l/s |

Specific treatment

| |
|-----------------------|
| Zagora 56 l/s |
| Khouribga 1600 l/s |
| Dakhla 100 l/s |

45 projects of which 20 under design



Performance report: projects commissioned in 2017

Potable water Reinforcement of Rabat-Casablanca zone From Sidi Mohamed Ben Abdellah dam

- Treatment plant 5 m³/s, 18 Mw raw water pumping station, 80 km of pipes, HV electrical lines.
- Cost : 200 Millions €



Desalination Know-How advancement

Laayoune-Boujdour



Laayoune-Khenifra-
Khouribga-Tan Tan-
Dakhla- Al Hoceima

Tarfaya-Smara-Boujdour



Testing

1975-1995

ED-MCV-RO

South regions

Optimization

1995-2010

Energy recovery

Materials

Membrane

Automatism

Mastering

Beyond 2010

Large Scale units

Generalization to
other regions

Intakes

Environmental aspects

40 years experience



Projects in progress

Potable water reinforcement of Zagora city by brackish water desalination

Capacity : 6 000 m³/d

Cost : 8 Millions €

Progress rate : 65 %

Commissioning date : July 2018



Potable water reinforcement of Laayoune city by seawater desalination

Capacity : 26 000 m³/d

Cost : 35 Millions €

Progress rate : 35 %

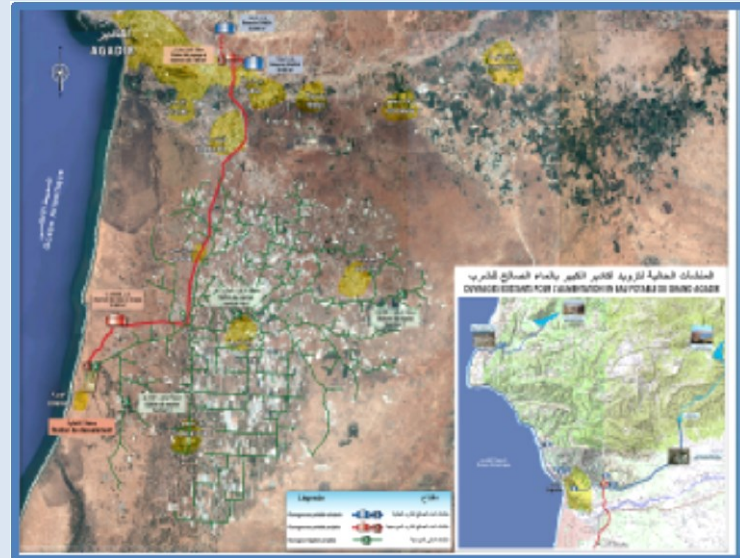
Commissioning date : December 2018



PPP Project

Potable water reinforcement of Agadir by seawater desalination Duration 30 years

- Shared project including irrigation needs for a total capacity of 400.000 m³/d at term.
- A Capacity of 150.000 m³/d expandable to 200.000 m³/d for potable water needs.
- Open intake
- Cost : 150 Millions €.
- Preparations for starting works under progress.
- Works commissioning date: 2020



Sharing roles

Under Moroccan law 54-05 related to delegation of public services

Public Party

- Feasibility studies
- To Mobilize land and infrastructures: adduction pipes and Energy
- Bidding
- negotiating
- Sign Contract
- Off taker
- Contract monitoring: performance indicators
- Public Service

1st BOT CONTRACT:
June 29th 2017



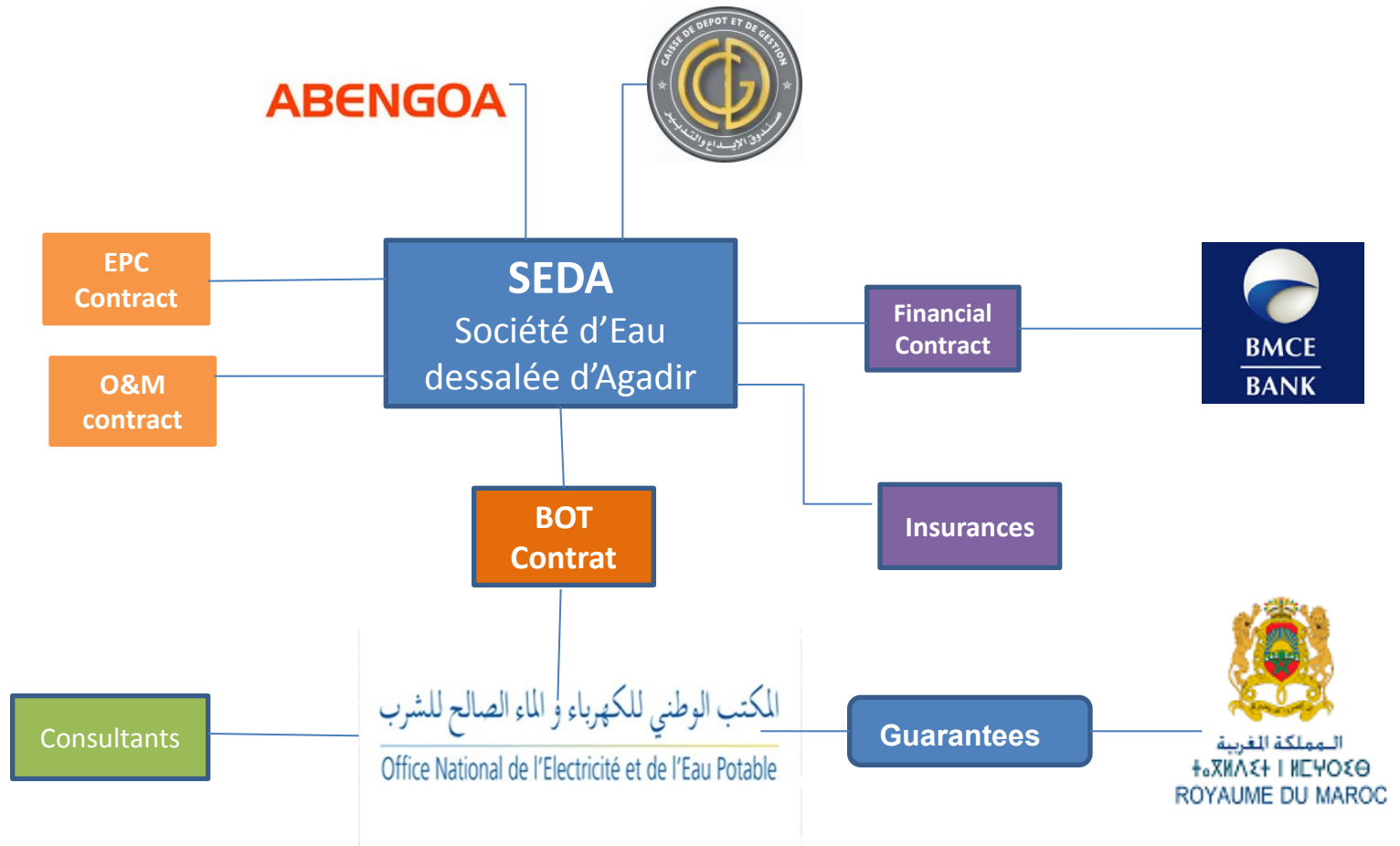
- Partnership for a long term.
- Share responsibilities and risks



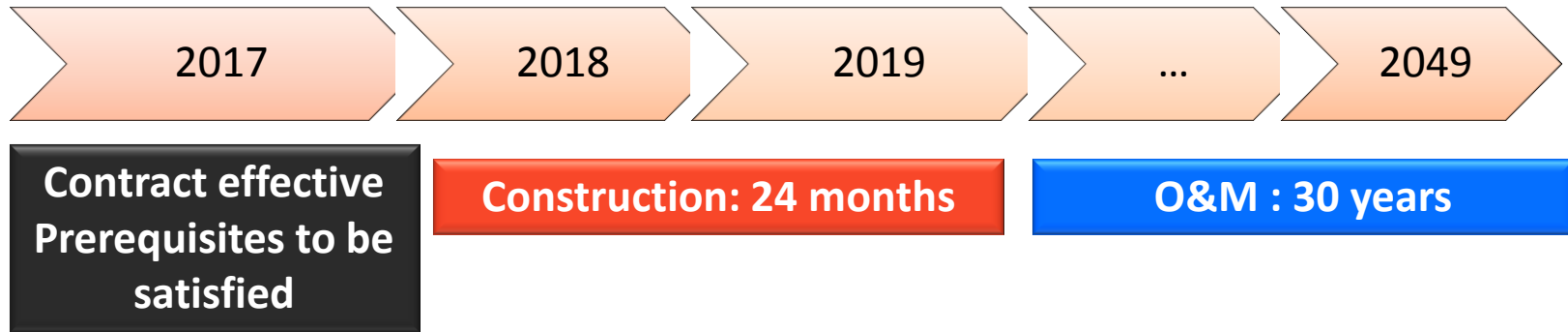
Private Party

- Submit offer
- Negotiating
- Sign Contract
- Financing
- Design
- Built
- O&M
- reporting
- Sell drinking water
- Make a profit
- Transfer

Institutional Scheme



Some details about the BOT contract



Remuneration structure: 4 Components :

- 1.Fixed Remuneration of investment
- 2.Fixed Remuneration of O&M
- 3.Variable Remuneration of O&M
- 4.Remuneration of Renewal

Financial instruments and guarantees :

- Mortgage of the ground
- State's letter of support
- Tripartite Agreement
- Transfer of debts

Key of success

- To launch economic studies for the opportunity of BOT project
- To built a strong and sustainable PPP Contract because of the long term of the Partnership
- International consultancy have a supportive role to play in the 3 aspects: Technical- financial and legal, closely with authority for the main mile stones of the project : biding- negotiating- Construction – commissioning
- Good allocation of risks between 2 parties: regulatory - Design- O&M- respect of calendar– budget- environment- performance indicators... with appropriate risk mitigation : subject of long negotiations
- Secure payment by public party to the private party for the provision of service and use of assets
- Assets reverting to public party ownership at the end of the contract must be in a good manner
- Capacity building and exchange experiences with international community is the school of a strength PPP

CONCLUSION



Gracias
MERCI
ARIGATO
thank you



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