

Dott. Matteo Codazzi Milano, 30.10.2017

Renewable Energy Development in the Mediterranean Region

Renewable Energy Investments In The Mediterranean And Beyond





CESI has a solid track record in RES integration, interconnection planning and system studies in the Region...

Enel Green Power -Morocco

Maximum penetration of RES

Study for connection of WF in the southern grid of Morocco

SONELGAZ - Algeria Interconnection study of the Adrar-In Salah network

GRTN/Terna - ALGERIA Feasibility study for an HVDC between Algeria and

RES4MED / SONELGAZ -**Algeria** Max RES penetration in Algeria in 2020 and 2030

Tunur – **Tunisia**

Large size power corridor Tunisia-Europe to export power generated with CSP

technology

The Royal Hashemite Court - Jordan

Integration of RES

NEPCO - Jordan

Study for the reinforcement of a power transmission corridor "Green Corridor" to enable a massive RES deployment

Egyptian Electricity Holding Company - Egypt Development of master plan for the transmission network

ITALGEN - Egypt

Wind Farm Impact on the Network

ELMED - Tunisia Enel Green Power - Tunisia

Cost-benefit analysis for HVDC between Italy and Tunisia

Maximum penetration of **RES**

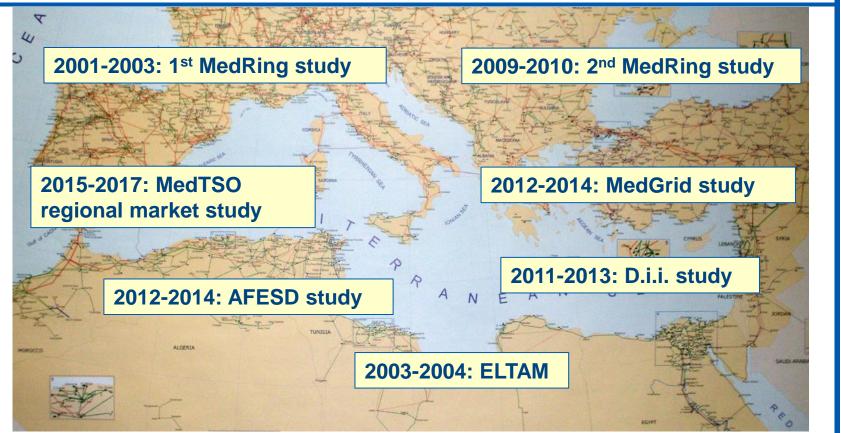
GECOL - Libya

Defence Plan and Design of a Special Protection Scheme REAOL - Libya

Connection of WF in the transmission grid



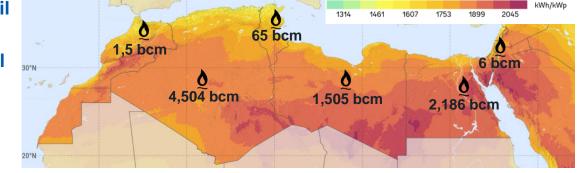
...and carried out extensive bilateral and multilateral system studies assessing the existing and future power system

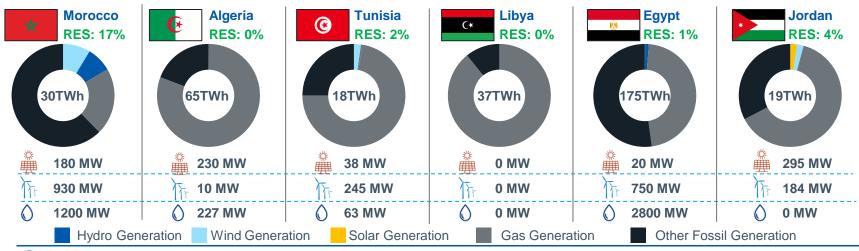




The Region is extremely rich in natural resources but still lays behind in electricity mix decarbonization

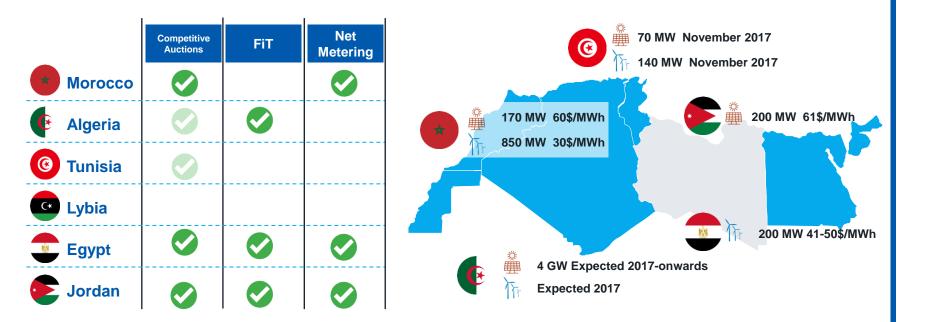
- Uneven distribution of NG & oil resources
- Huge Wind and Solar Potential (IRENA estimates ca.200.000 TWh/year)
- Still lagging behind in RES **generation** deployment







RES support policies are progressively shifting toward competitive auctions attracting investments in new capacity

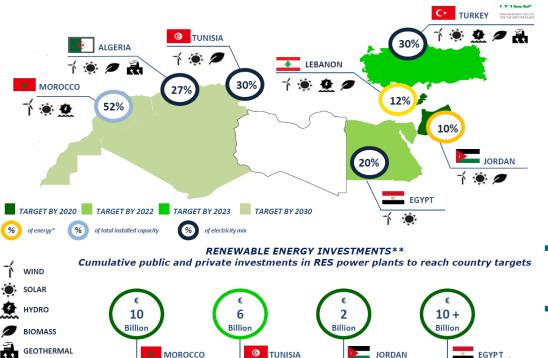


Remarkable drop in the LCOE of new solar and wind power plants

CFSI

Source: Irena

RES Development Plans in the Region are highly ambitious and require strong T&D development to mantain adequacy



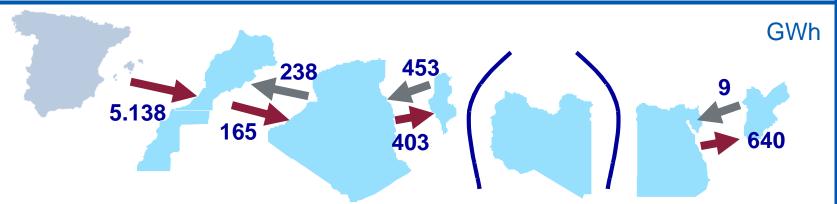
RES penetration Targets in North Africa		
Country	Penetration rate	Target year
Morocco	42%	2020
Algeria	40%	2030
Tunisia	30%	2030
Libya	10%	2025
Egypt	20%	2022
Jordan	10%	2020

- Integration of RES requires strong T&D development
- Need for a clear and stable regulatory framework to support financing in RES power plants

Source: RES4MED



VRES balancing and financial sustainability of investments strictly depend on the creation of a competitive power market



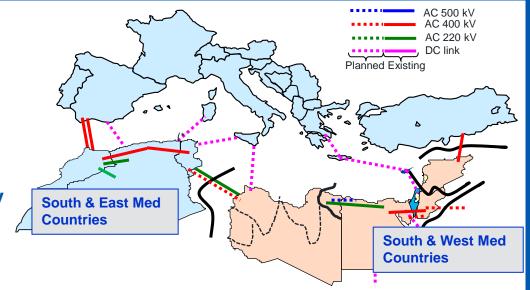
- **Long term commercial agreements** (as Egypt Jordan) to guarantee investments in electrical infrastructure untill proper spot market is enstablished
- **Exploit the existing interconnections** to ballance RES variability
- RES ballancing and gas flexiblity drive creation of a unified regional power market
- Additional transmission capacity will be needed to comply with ambitious future goals



Electrical integration is a key priority to face the fast demand growth and foster the implementation of RES

Two synchronous power pools:

- ENTSO-E, Turkey, Maghreb
- Mashrek
- 13 cross-border electricity interconnections are currently active in the North African countries and more are under consideration



- Estimated investments in HV lines and interconnectors (33,000 km) by 2025: ≈30 b€ (MEDTSO)
- Potential exchanges within the interconnected Arab system: 125 TWh in 2030
- Benefits from optimisation of NG and G&T assets: 35 bUS\$ by 2030 (AFESD)



Looking forward: RES development as a key driver to electrify Sahara

- CESI and Sonelgaz O.S. together in a major interconnection Project
- Interconnecting an isolated area in the South of Algeria with the National Grid
- RES potential is fully exploited as electricity flows from South to North (ca.1,5 GW)

First step toward the sustainable electrification of isolated communities in Sahara

