Economical and technical feasibility of cross-Mediterranean interconnections
The situation in 2014

Under test
MEDGRID objectives

- To promote and impulse the development of the Mediterranean transmission and interconnection grid through the provision of a *reference grid development plan*.

- To give confidence to his shareholders and to public and private investors that:
  - Opportunities of *profitable power exchanges* between the Mediterranean countries will exist in 2020 – 2025
  - *Technical and technological* challenges can be managed.
  - Adequate *regulatory* and *financing* framework can be recommended
MEDGRID economic analysis

✧ Economic analysis to assess the opportunities of power exchanges between the Mediterranean countries based on:

- Their national energy mixes including renewable energy plans
- The profiles of their demands including their energy efficiency efforts
- Different contrasted scenarios
EU-MENA installed capacity in 2010

EU = 912 GW

MENA = 113 GW

EU 2010: 22% Hydro, 13% RES, 65% Other
MENA 2010: 21% Hydro, 1% RES, 78% Other

Net transfer capacity: 0.7 GW

Sources: ENTSO-e [https://www.entsoe.eu/] et Paving the Way for the MSP [http://www.pavingtheway-msp.eu/]

Workshop « Enabling renewables integration in the Electricity System: The benefits of regional cooperation among Arab countries » Tunis, 16 avril 2014
EU-MENA forecast installed capacity 2020

EU = 1163 GW
MENA = 198 GW

Net transfer capacity: 5 GW

Sources: ENTSO-e [https://www.entsoe.eu/] et Paving the Way for the MSP [http://www.pavingtheway-msp.eu/]

Workshop « Enabling renewables integration in the Electricity System : The benefits of regional cooperation among Arab countries » Tunis, 16 avril 2014
Existing submarine links in the Mediterranean

- **ROMULO**: 2011, 237 km - 400 MW, 1485 m
- **SACOI**: 1967, 385 km - 300 MW, 600 m
- **SAPEI**: 2009, 435 km - 1000 MW, 1640 m
- **GRITA**: 2001, 313 km - 500 MW, 1000 m
- **Morocco – Spain**: 1997 & 2006, 26 km – 2x700 MW, 620 m
Assess the definition and costs of the infrastructures necessary to increase the net transfer capacities of the three main corridors (including national grid reinforcements)
MEDGRID network feasibility studies (2/2)

- Existing or under construction
- On going studies
- Perspective

Workshop « Enabling renewables integration in the Electricity System: The benefits of regional cooperation among Arab countries » Tunis, 16 avril 2014
MEDGRID technological studies

Assess the feasibility and costs of the technologies to be used to implement the Mediterranean grid:

- High voltage alternative current technologies (HVAC)
- High voltage direct current technologies (HVDC)
- Submarine power cable systems for depths up to 2500 meters
The DC circuit-breaker is one of the key components.

The design of future HVDC projects, in particular those promoted by Medgrid, will have to be designed considering their potential future integration in larger DC grids.
Deep water power cable system challenges:

- Technologies for cables and joints at 2500 meters
- Laying and installation of power cables at 2500 meters
- Operation and maintenance
- Risk management at the different steps of such projects
The Mediterranean grid: a future DC grid?

Existing DC links

Planned or under construction DC links

Prospective DC links

Workshop « Enabling renewables integration in the Electricity System: The benefits of regional cooperation among Arab countries » Tunis, 16 avril 2014
MEDGRID regulatory studies

- Recommend evolutions in the national and international regulations to allow the exchanges of power between the Mediterranean countries:
Thank you for your attention.

www.medgrid-psm.com