


MED-EMIP
Euro-Mediterranean
Energy Market Integration Project

gtz
Germany

France

NEEDS
Lebanon

Belgium

 This project is funded by the European Union

MED-EMIP

Euro - Mediterranean Energy Market Integration Project

Solar Electricity for Regional Consumption or Export: Which way to lean?

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“The contents of this publication are the sole responsibility of the author and can in no way be taken to reflect the views of the European Union”.


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MED-EMIP


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We support all colors of energy in the region such as solar, wind, hydro, coal, oil shale, gas and energy efficiency.




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MED-EMIP

Euro - Mediterranean Energy Market Integration Project

Support for the enhanced integration and
the improved security of the
Euro-Mediterranean energy market



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Natural Gas Facts and Figures 2008

Well price in MENA region \$1 - \$3 per Million BTU

Henry Hub USA gas price \$5 - \$8 per Million BTU

Gas from Russia to Europe \$13 per Million BTU
equivalent to \$370 /per 1000 m³ (2008)

1 ft³ natural gas = 1000 BTU and 1000 ft³ = 28 m³

1 normal cubic meter gas = GCV 39 MJ = 10.8 kWh

Explanations

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Second Strategic Energy Review (Quote)**13 November 2008**

“A Mediterranean energy ring now needs to be completed, linking Europe with the Southern Mediterranean through electricity and gas interconnections. In particular the Ring is essential to develop the region's vast solar and wind energy potential.”

(http://ec.europa.eu/energy/strategies/2008/2008_11_ser2_en.htm)



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**Present MED-EMIP Task: To prepare the
MEDRING-Update report that forms the basis
for the next communication in 2010**

“No later than 2010 the Commission will put forward a Communication on the Mediterranean Ring outlining a plan for completing the missing links, including key projects important for diversifying the EU's external energy supplies in further away regions, such as the future links from Iraq, the Middle East and Sub-Saharan Africa”



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First Public Reactions of 2009

“This policy will only unnecessarily extent the EU-27 energy dependency from the MENA region into the next century”

“The EU-27 States can generate enough solar electricity on their own soil and do not need to import solar electricity from the MENA Region

“ The countries of the MENA region should produce solar electricity for home consumption under a sustainable energy supply policy and not export it...”



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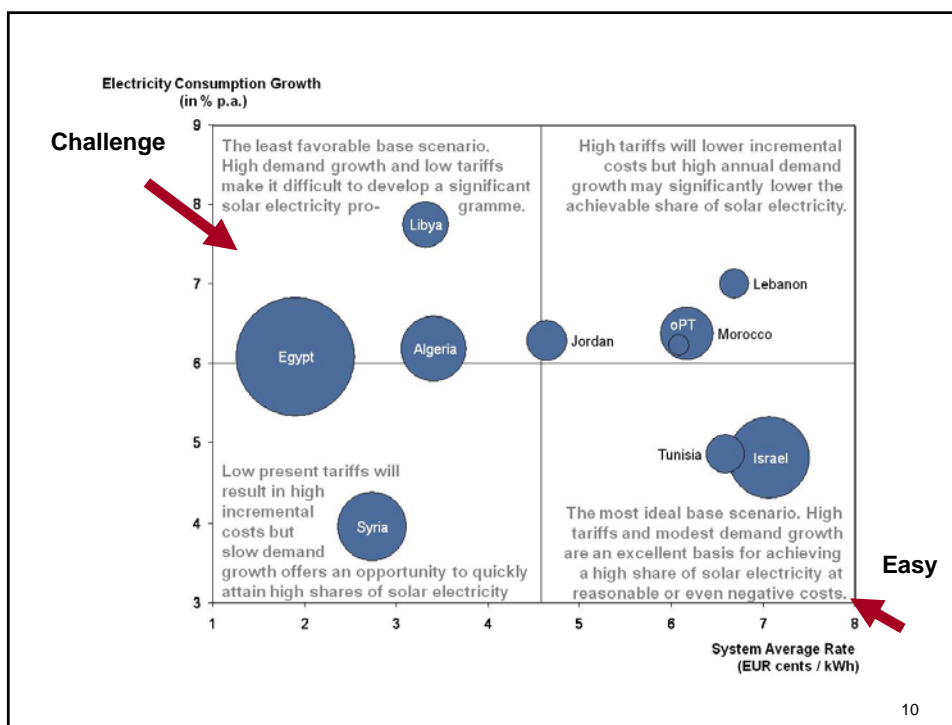
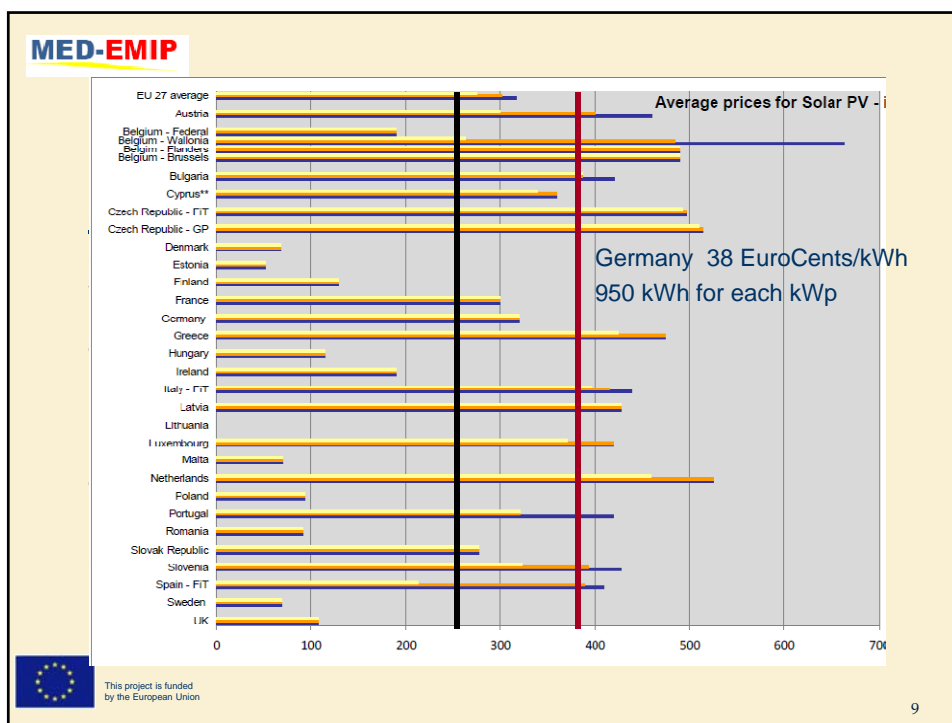
Energy dependency of the EU-27. (% of extra EU import, Ref: EuroStat 2008)

Country	% Gas	% Oil
Russia + Norway	64	50
Algeria	17	3
Libya	3	9
Egypt	3	0
Qatar	2	0
Saudi Arabia	0	9
Iran	0	7
Sum	25	28



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Variables and Constants

Technology Assumptions

- A. Technology mix selection¹
- B. Plant load factors¹
- C. Technology cost per MW installed in 2008¹
- D. O&M costs²
- E. Technology cost decrease²
- F. Technical life of installations²

Economic Statistics

- G. 2008 total electricity consumption²
- H. 2008 system average rate (SAR)²
- I. Annual electricity consumption growth²
- J. Average annual exchange rates²

Financials / Business Model

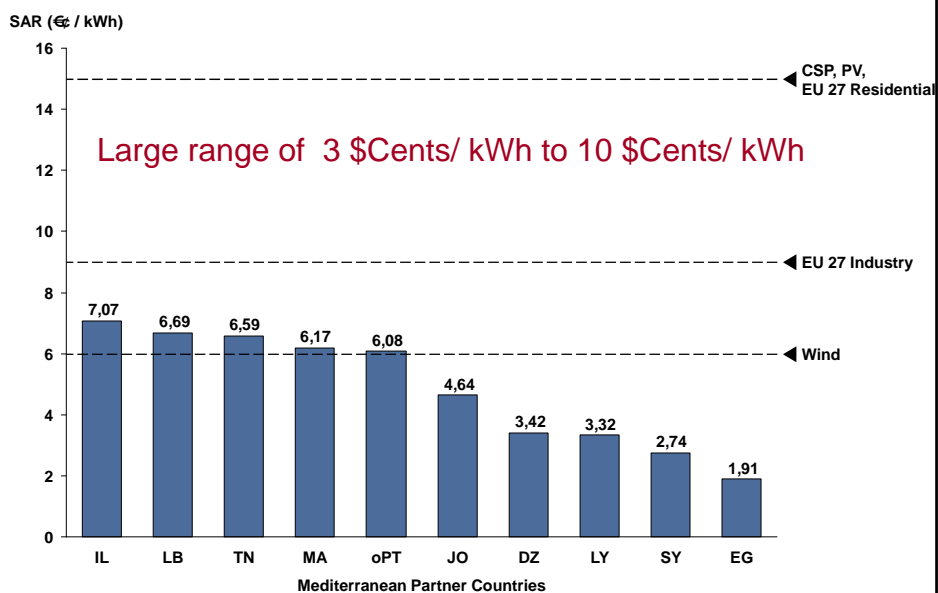
- K. Annual interest rate on loan portion¹
- L. Expected FIRR on equity¹
- M. Share of equity financing²
- N. Book life of power plant²

Policy Decisions

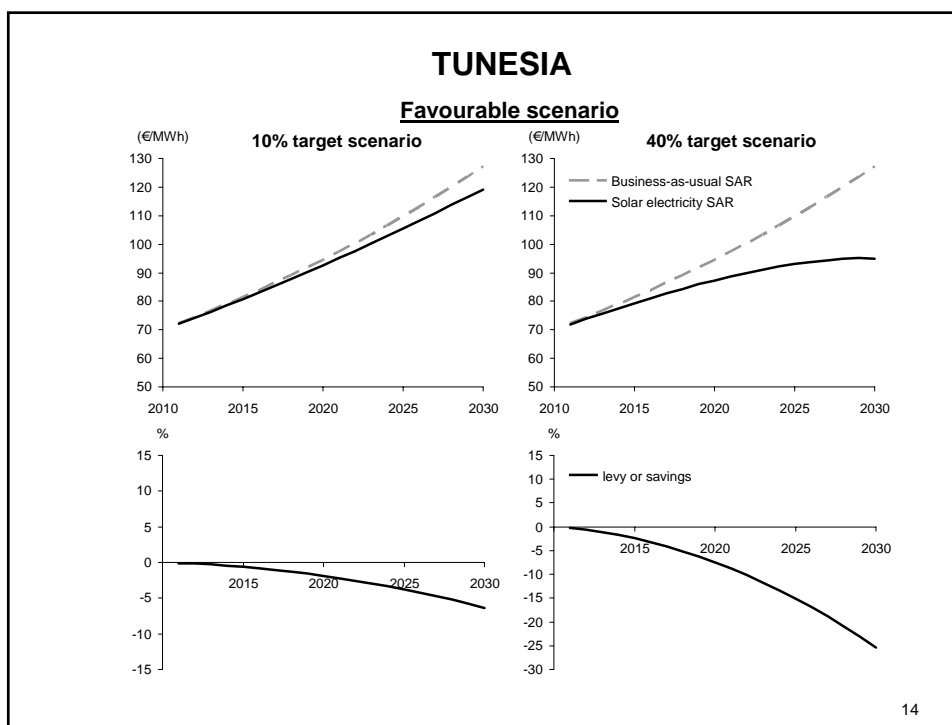
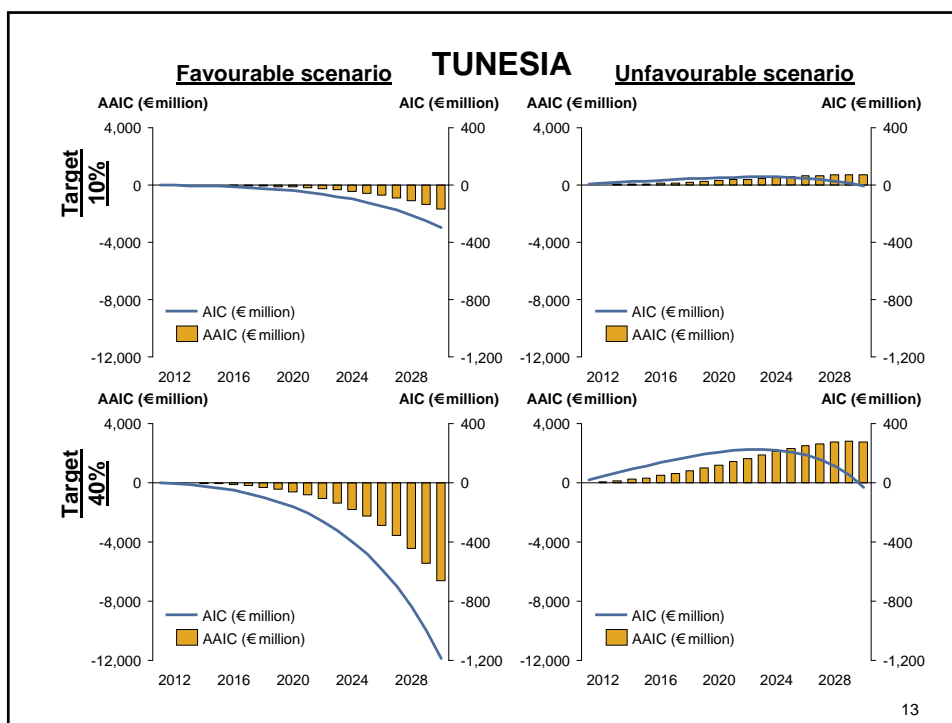
- O. Share of solar electricity in 2030¹
- P. Annual increase of system average rate for fossil fuel based electricity²

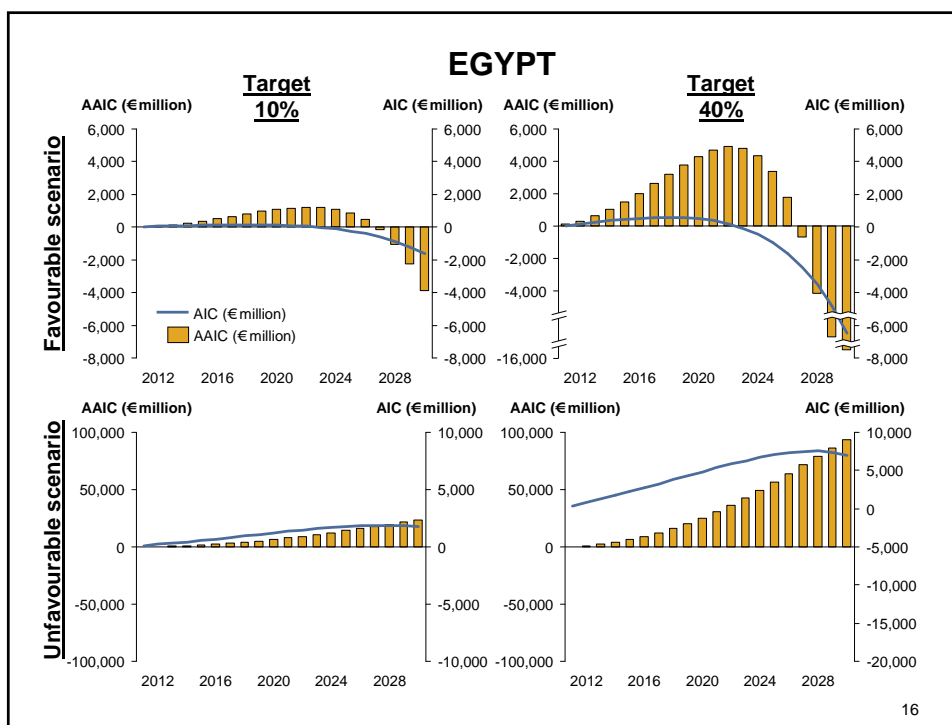
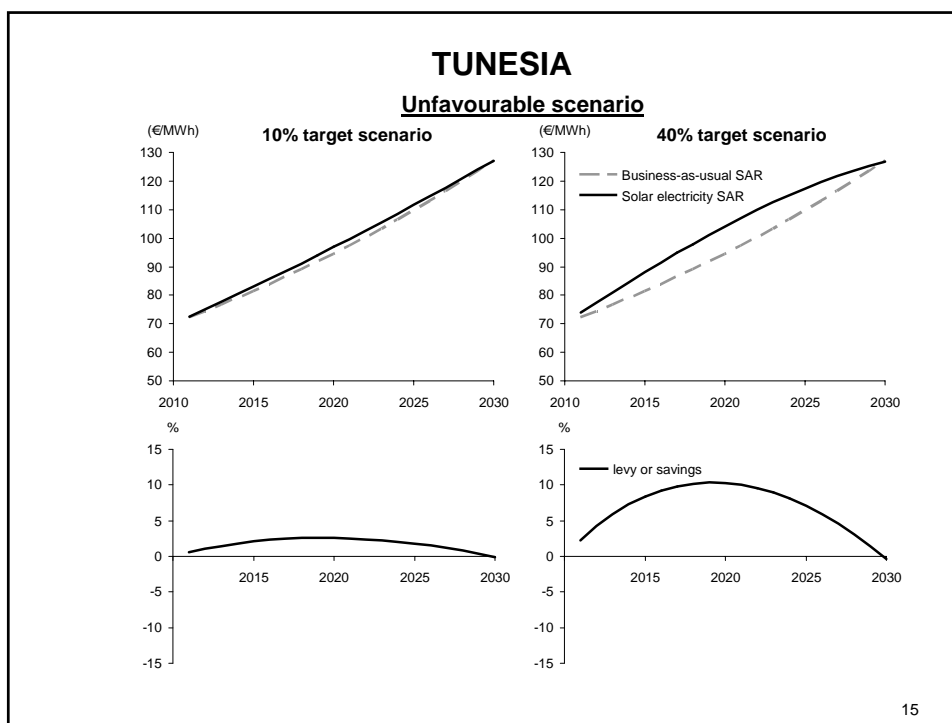
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System Average Rates (2008)



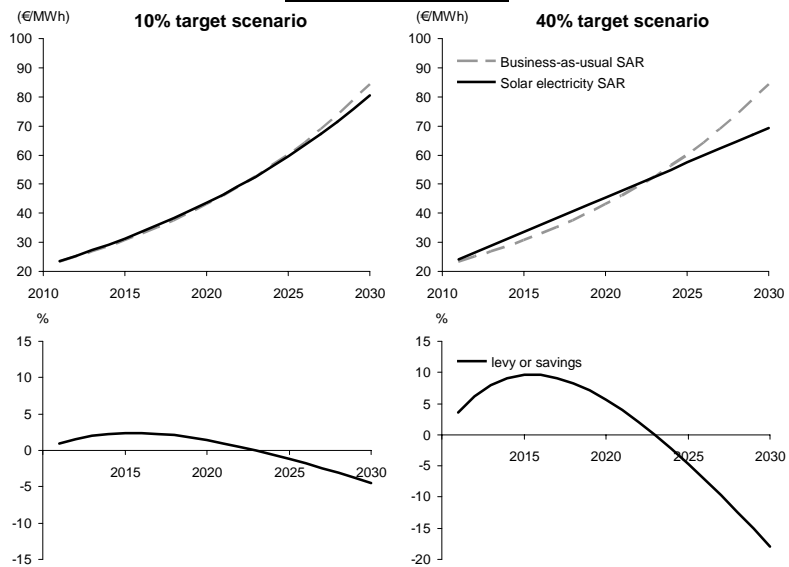
Note: Assumed US\$-EUR exchange rate: 1.4





EGYPT

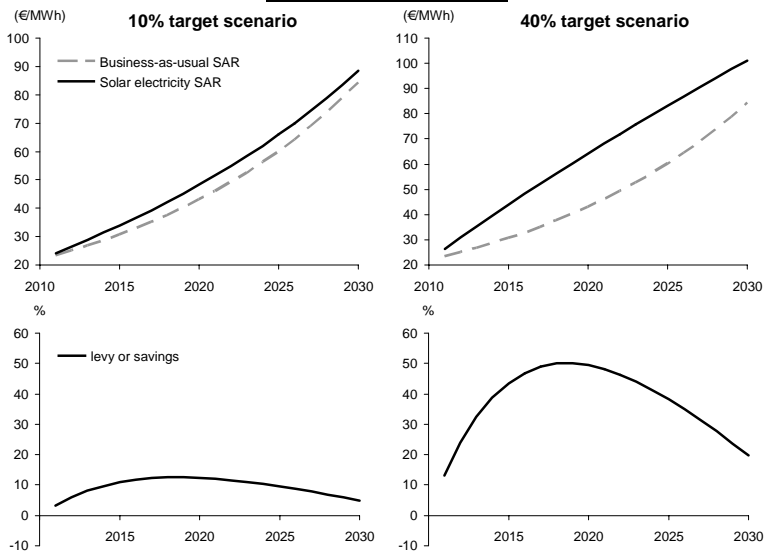
Favourable scenario



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EGYPT

Unfavourable scenario



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Key-Issue # 2

Is it technically feasible to run submarine power transmission lines across the Mediterranean Sea ?

YES, but best from Algeria, Morocco, Tunisia and Libya! Egypt is uncertain.

...and at what approximate wheeling costs ?

Costs will be around 1- 2 \$Cents/kWh

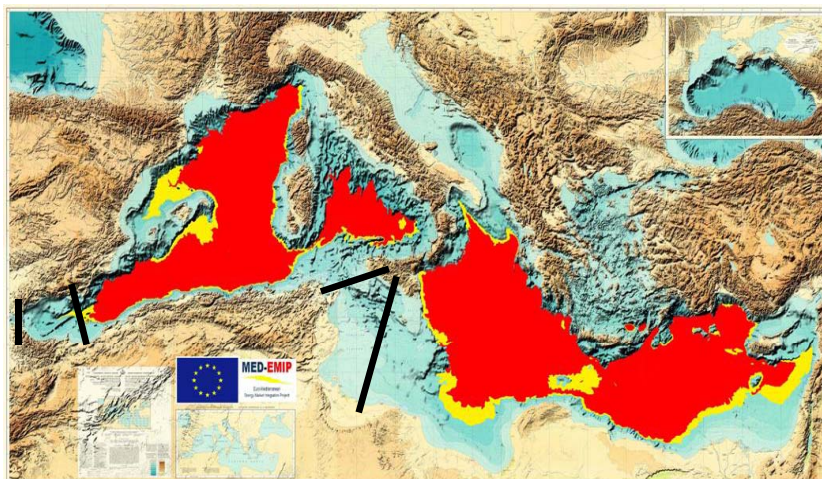


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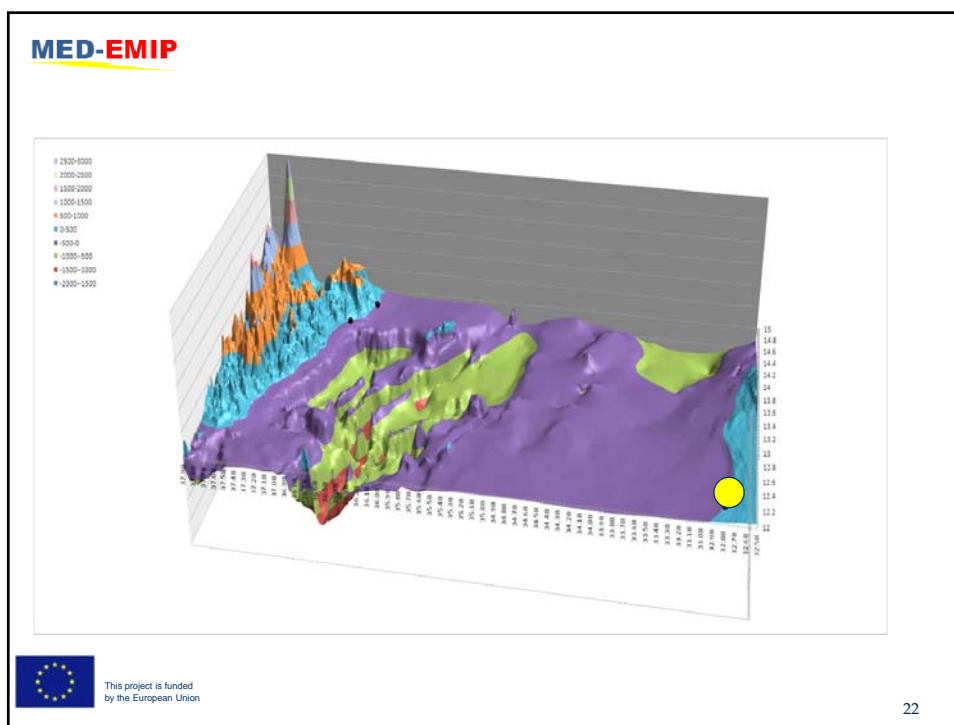
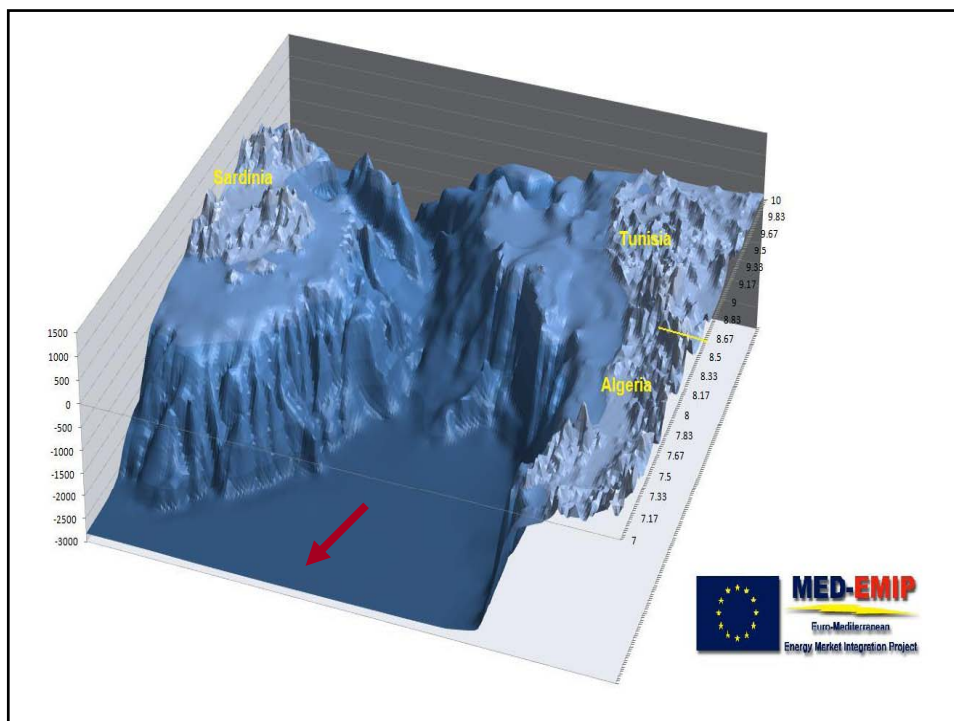
Technically feasible corridors

Red areas are deeper than 2000 m,



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Sending electricity around the Mediterranean Basin may not be the best option



There are difficulties to achieve 100% AC synchronization and dedicated HVDC lines may be necessary as well



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Key-Issue # 3

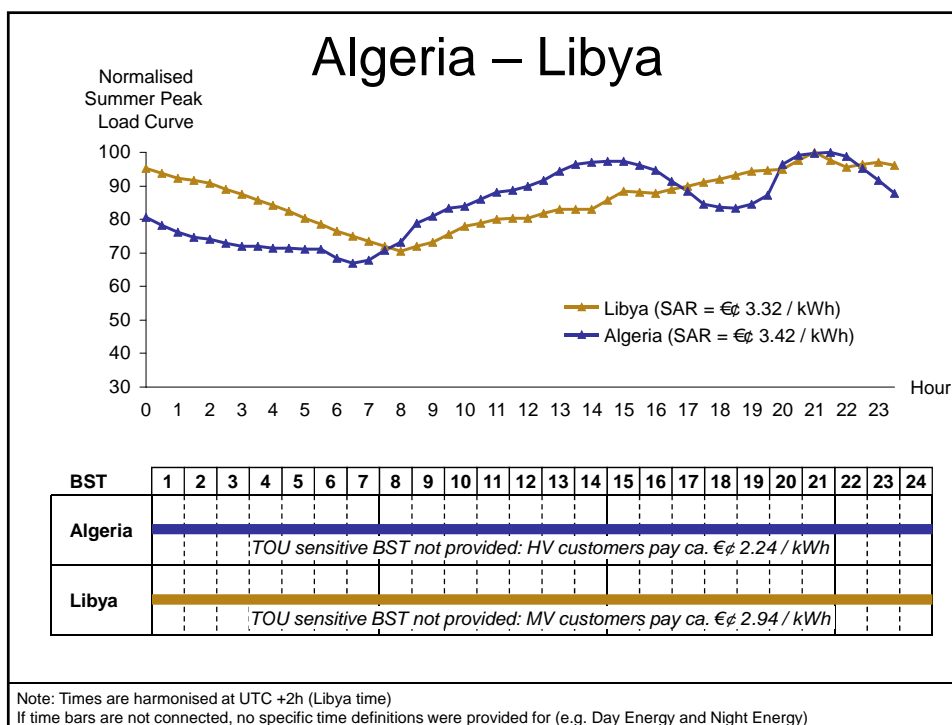
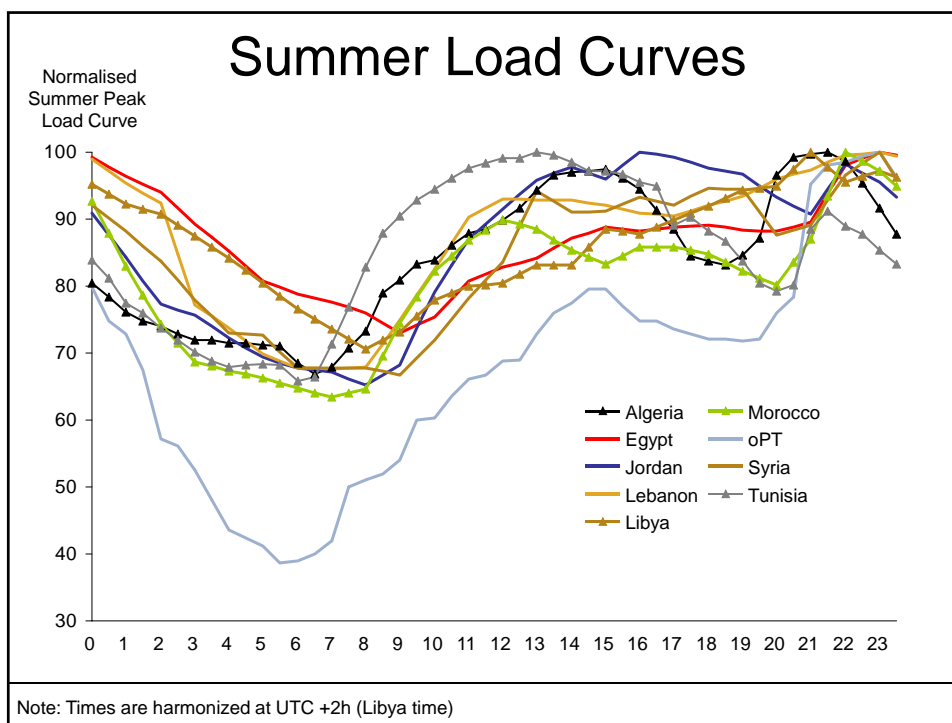
Are there commercially attractive scenarios for interstate import and export of electricity for the region. ?

Yes in terms of security of supply and increased opportunities to reduce own supply costs for some countries



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The unpleasant news

All countries except for two have moved in the last 4 years into low to very low **operational** reserve margins because of fast increasing demand and too little capacity addition.

There is little electricity to exchange or to export and it would be also appropriate to invest in demand side management strategies.

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**“Everything should be made
as simple as possible, but
not simpler”**

(ALBERT EINSTEIN)

THE END



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