



EURO-MEDITERRANEAN RENDEZ-VOUS on ENERGY

EU - Union for the Mediterranean
An energy hub in the Mediterranean for the security of supply
of EU and South and East Mediterranean Countries

European Parliament, 6th January 2015



- 1. Why are the Mediterranean interconnections an opportunity?**
- 2. Alternatives to interconnect the Mediterranean region**
- 3. PORTUGAL-MOROCCO interconnection**

1 – Why are the Mediterranean interconnections an opportunity?

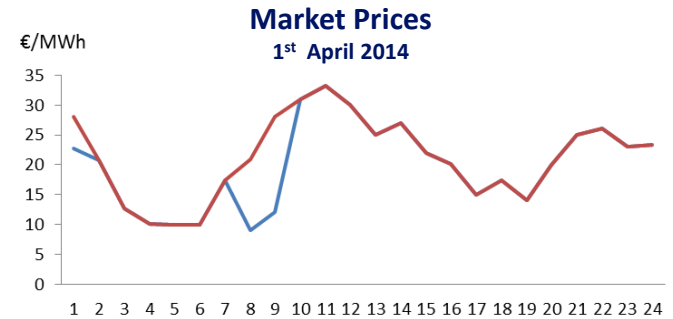
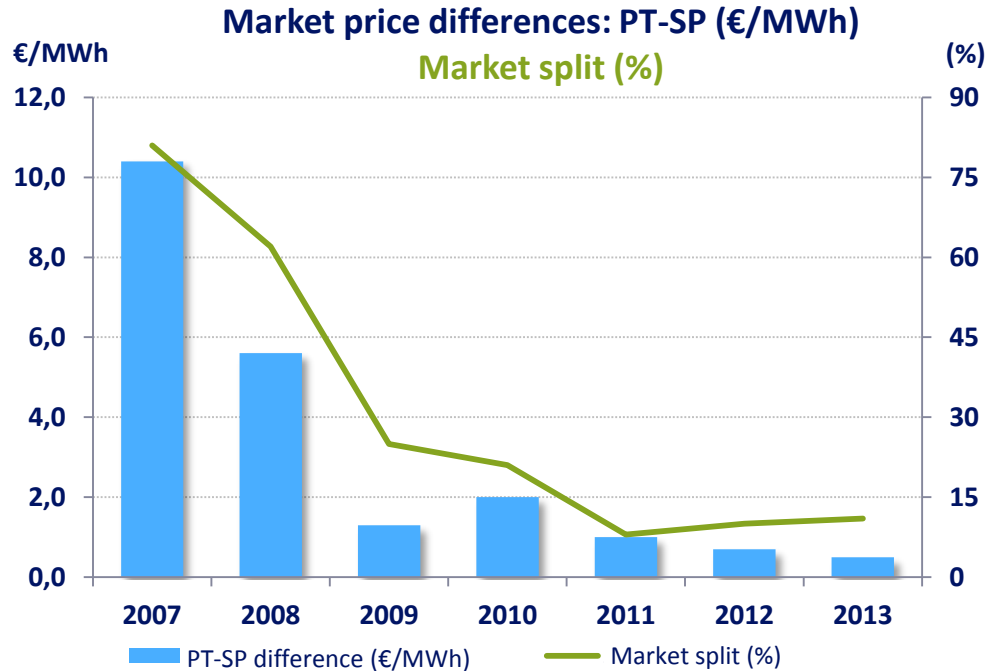
- Regional complementarities
 - Increase in **Security of supply**
 - Deeper **Renewables integration**
 - **Trade opportunities** and better use of resources
- Electricity market
 - long term regional integration



1 – Why are the Mediterranean interconnections an opportunity?

MIBEL experience

COMPETITIVENESS



The increase of the Net Transfer Capacity allows expressive reduction on the Spanish and Portuguese electricity market prices differences

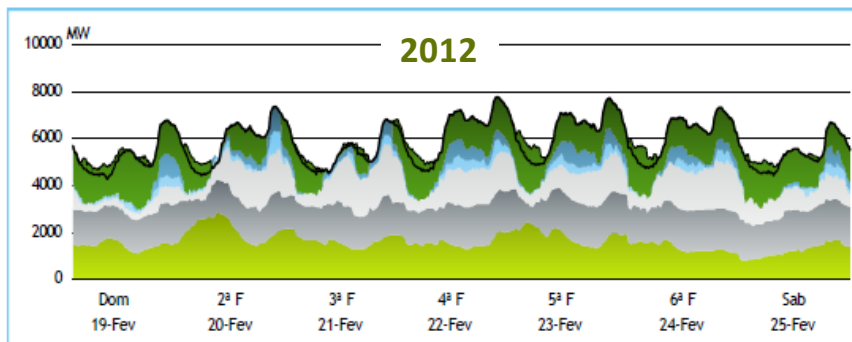
1 – Why are the Mediterranean interconnections an opportunity?

Iberian Peninsula experience

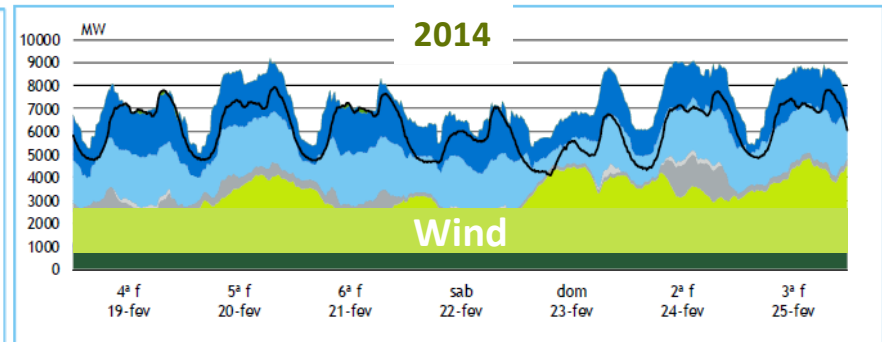
SUSTAINABILITY

What are the environmental consequences if Portugal was an isolated system?
(Without interconnection with Spain – simulation for 2015)

- Between 2% to 11% Wind spillage depending on hydro and wind conditions
- Δ of CO2 emissions - 53 kt and 315 kt (or more)
- Operating costs Increase around 7% (on average conditions)



205 GWh importing balance
105 GWh Wind

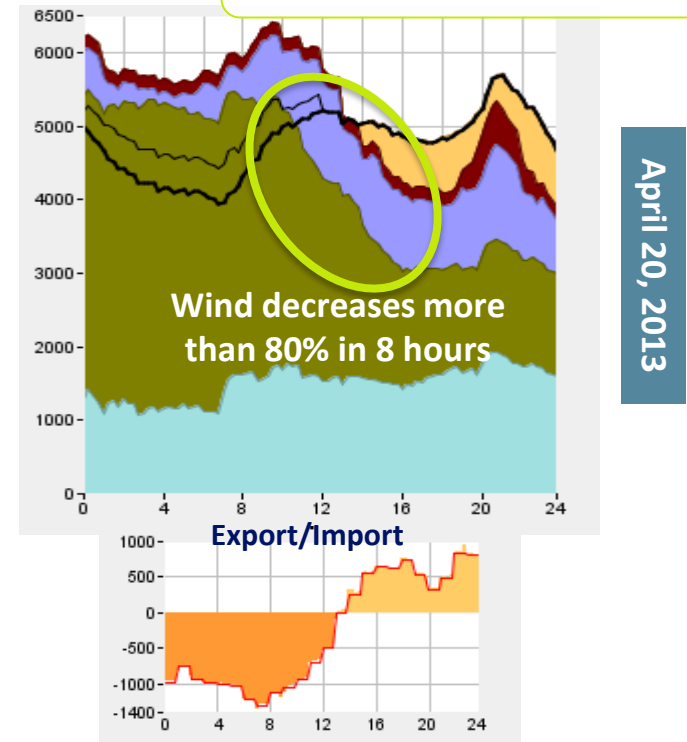
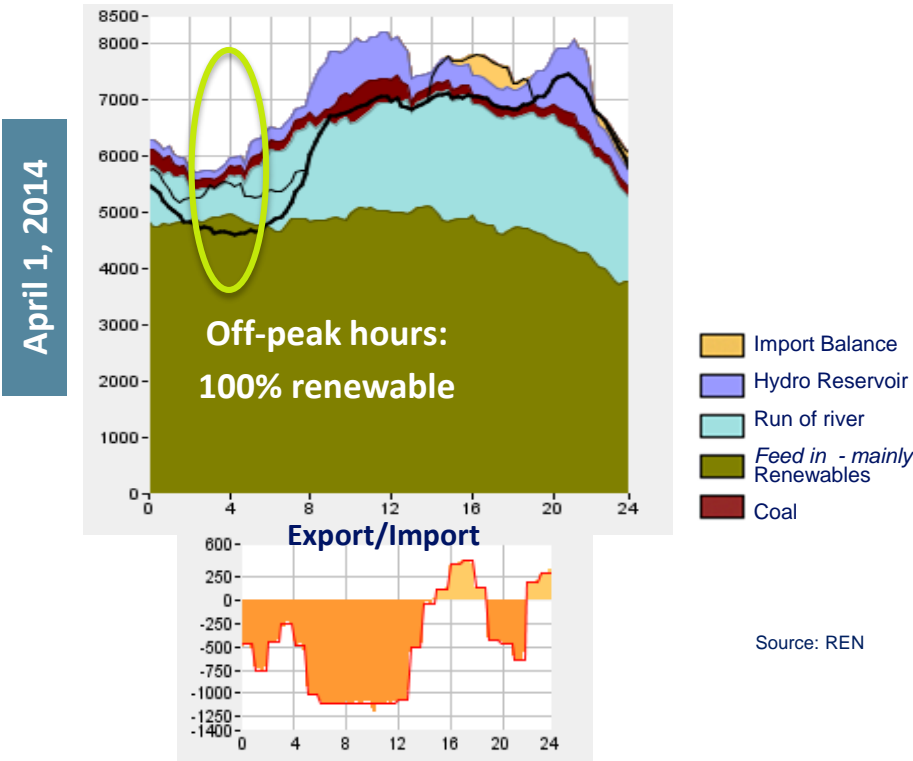


180 GWh exporter balance
308 GWh wind

1 – Why are the Mediterranean interconnections an opportunity?

RES: benefits of using interconnections

SECURITY OF SUPPLY



Interconnections increase system security under RES 100% load ratio paradigm and quick generation reductions

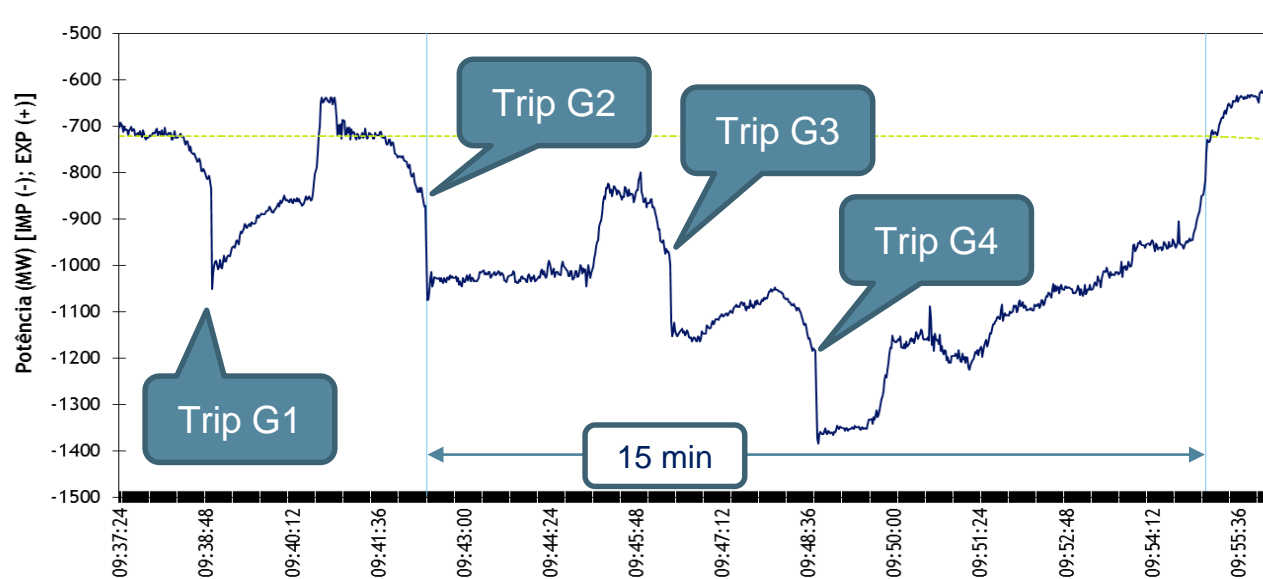
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Iberian Peninsula experience

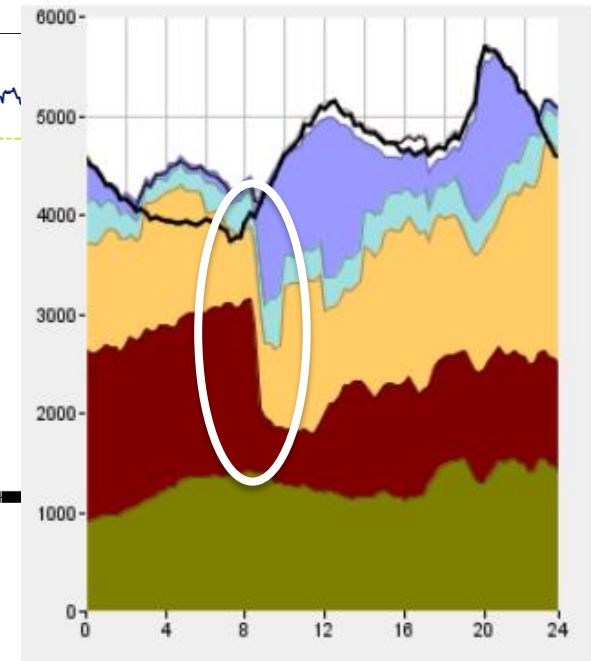
SECURITY OF SUPPLY

21 September 2014

Cascading trip of 4 main generators | Sines Thermal Power Plant



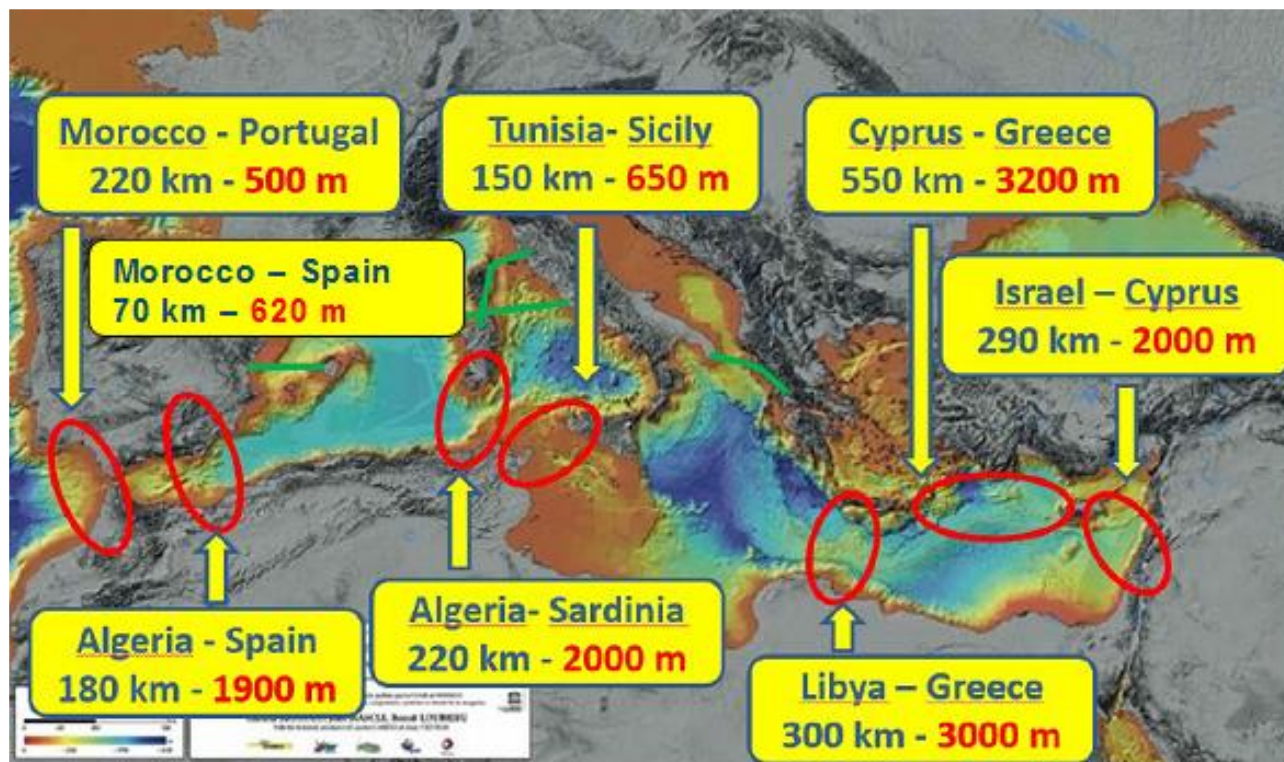
TOTAL INTERCONNECTION DEVIATION = 722 MW



- Import Balance
- Hydro Reservoir
- Run of river
- Feed In - mainly Renewables
- Coal
- Natural Gas

Interconnections and hydro units with storage promote adequate means for system operation under stress

2 – Alternatives to interconnect the Mediterranean region

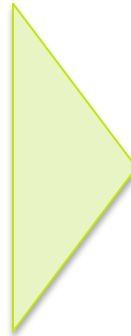


Interconnections on the West Mediterranean region benefit from the lower sea depth (in particularly PT-MO link with depth < 500m)

3 – The first PORTUGAL-MOROCCO interconnection

HVDC link PT-MO

- ✓ Additional 1000-900 MW of NTC
- ✓ Economic savings: 150 M€/Year
- ✓ Overall “pay back” of 4-5 years
- ✓ Total investment costs: 618-735 M€
- ✓ New interconnection axis



TECHNICAL/GENERAL BENEFITS

- | Strong benefits for Consumers and other stakeholders
- | More flexibility, increased security of supply and competitiveness
- | PT-MO link provides optimum security for single failures due to the geographical diversification
- | minimum environmental impact along with the lowest sea depth

3 –PORTUGAL-MOROCCO interconnection

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TECHNICAL/GENERAL BENEFITS

- | **Cumulative benefits for possible coexistence of the two links (PT-MO and SP-MO)**
- | **Stronger integration of two peripheral electrical systems (PT and MO) and regions**



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