THE SECOND
MIDDLE EAST AND NORTH AFRICA
RENEWABLE ENERGY
CONFERENCE
AMMAN, MAY, 9-11, 2005
UNDER THE PATRONAGE OF HRH
PRINCE EL HASSAN BIN TALAL

MENAREC 2

المؤتمر الإقليمي الثاني للطاقة المتجددة
لدول الشرق الأوسط وشمال أفريقيا
عمان ٩-١١ أيار ٢٠٠٥
تحت رعاية سمو الأمير الحسن بن طلال
رئيس المجلس الأعلى للعلوم والتكنولوجيا

Renewable Energy Partnership for Europe - Middle East - North Africa

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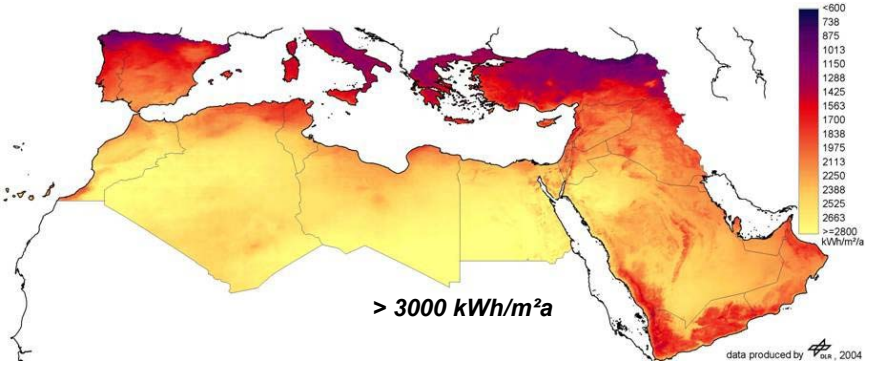
NOKRASCHY ENGINEERING
Mechanical Vibrations and Infrasound under Control
Solar Power for Sustainable and Everlasting Energy

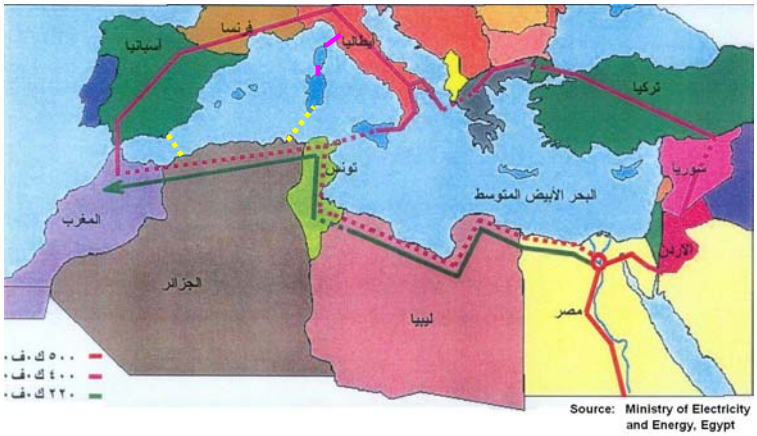
Direct Normal Irradiation in the MENA Region



Transmediterranean Renewable Energy Co-operation, TREC is:

- a network of devoted scientists from Europe, North Africa and the Middle East.
- Working to create a real Partnership.
- TREC does not only point out problems.
- It offers a strategy to solve fossil fuel scarcity, realise prosperity, security of energy supply and safety of peoples.
- Through an energy and technology exchange pool around the Mediterranean.

The Partnership needs a Structure



Transmission lines around the Mediterranean are almost complete.
Beside compensating peaks, clean energy can be transported to Europe.

Two new connections are planned: Algeria-Spain and Algeria-Corsica

Let us imagine a practical case:

- Taking advantage of CDM certificates to compensate power generation from coal in Europe.
- A European company establishes together with a company from MENA a Low Cost Solar Power Station in a MENA country.
- Solar-Hybrid concept is preferred to ensure supply on demand.
- The solar electricity share of at least 20% will be transmitted to Europe (Transmission costs 2 ct/kWh) while the conventional share will be consumed in the MENA country.
- Beside electricity, desalted water will be produced from the waste heat of the power station, thus boosting the economies.
- Electricity may be used to produce clean Hydrogen

A framework shall govern such a co-operation

General Ideas for the Framework

- Renewable energy shall be produced where it is most economical. For example in MENA countries
  - Wind 10 m/s (gulf of Suez and Atlas mountains)
  - Sun 3000 kWh/m²/y (nearly all over the Sahara)
- Agreements between country groups or bilateral agreements are suitable to reach the goal.
- Mutual benefit is aimed in this co-operation.
- At the start phase strong support from the European country to the MENA country will accelerate the development.
- Clean electricity and Hydrogen from MENA shall cover a reasonable share of Europe´s consumption.

What can the MENA-country do?

- Offer free land and infrastructure.
- Buy the conventional electricity share (for example at 2.5 ct/kWh depend. on fuel price)
- Buy the desalted water produced from waste heat (for example at 50 ct/m³)
- Guarantee by law capital security.
- Free from taxes for the first 10 years.

What can the European country do?

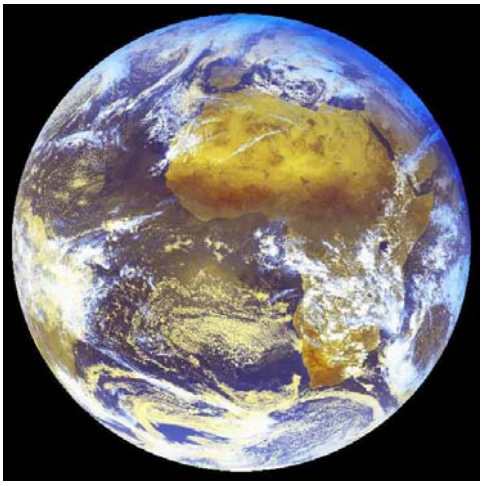
1. Set a quota for clean electricity, which is increased each year by 1% points over the actual value for each electricity producer. This is compatible with the target of 20% in 2020.
2. Extend support to clean electricity and clean Hydrogen for supplies from outside the country.
3. Set incentive prices for clean electricity import over the price of local electricity production, assumed now 4 ct/kWh:
   - for example 8 ct/kWh for solar electricity
   - for example 4 ct/kWh for wind electricity

   To cover the costs of production and transmission.
4. The incentive price is valid only for the clean share of a hybrid system.
5. The incentive price is guaranteed for 10 years.
6. After 10 years it is reduced by 10% points each year.

What are the „Win-objectives“?

- ***Europe wins:***
  - Clean and cheaper electricity and Hydrogen.
  - Employment due to machinery export.
  - Investing instead of burning fossil fuel.
- ***MENA wins:***
  - Water.
  - Sells electricity and Hydrogen for a reasonable price.
  - Social and economic development.
- ***Environment wins:***
  - Less CO_2 emission.
  - This system encourages developing low cost equipment and extending solar share to 100% using heat storage.

Thanking you for your attention



Source:
MeteoSat
EUMETSAT

This picture shows how sunny is MENA