BETTER: EU-North Africa Case Study
The Role of Concentrating Solar Power

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**BETTER:** “Bringing Europe and Third countries closer Together through renewable Energies”

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**Objective:**

Assess, through case studies, stakeholders involvement and integrated analysis to what extent cooperation with third countries (Art. 9 of the RES Directive) can help Europe achieve its RES targets in 2020 and beyond, through RES imports and by triggering the deployment of RES electricity projects in North Africa, Balkans and Turkey.

**PARTNERS:**

CIEMAT, DLR, ECN, JR, TU-WIEN, OME, NTUA, UNDP, PIK
3.2: Prospects for RES-E expansion in North Africa

3.3: Prospects for RES-E exports from North Africa to Europe
Expected Results

1) Evaluation through **case studies and integrated analysis** of the impacts associated to the implementation of the cooperation mechanisms.

2) **Action plan to foster RES energy** production, transfer and use in the EU and third countries through cooperation mechanisms.

3) **Policy recommendations**.

4) Set of **practical guidelines** in order to foster and promote the active involvement of private sector in the deployment of mutually beneficial RES-E projects using the cooperation mechanism.

5) Establishment of a solid and productive **stakeholder network between EU and 3rd countries** as well as relevant existing initiatives to foster RES cooperation and knowledge transfer.

6) Generation of knowledge and **dissemination material** to advocate in favour of EU cooperation mechanisms as well as RES deployment.
WP 3.2.: Prospects for RES-E expansion in NA

Background

MED-CSP Study 2005:
Electricity supply in the Middle East & North Africa

Firm Capacity!
WP 3.2: Prospects for RES-E expansion in North Africa
ReMix-MENA cost optimization model for capacity expansion

- Example: Case study for Jordan
- Jordan’s situation:
  - Strongly increasing electricity demand
  - High dependency on fossil fuel imports
  - Peak- and upper mid-merit load by expensive H.F.O. and L.F.O.

![Graph showing installed capacity growth and share on total electricity supply from 2012 to 2022 for different energy sources.]

Source: Fichter (DLR) 2012, ReMix-MENA optimization tool
Business case NA
Strongly required firm and flexible renewable power capacity

- CSP competitive in the peak and upper-mid merit segment in the short-term.
- CSP providing strongly required firm and flexible power capacity.
- Very limited availability of electricity storage and of other flexible and firm RES-E.
- PV and wind power as cheap “fuel saver”
- In the medium-term CSP competitive in mid-merit and base load segment.
- CSP in long-term as back-bone of electricity supply.

Source: Fichter (DLR) 2012, ReMix-MENA optimization tool
WP 3.3.: Prospects for RES-E exports from NA to Europe

Background:

TRANS-CSP Study 2006:
Electricity Supply in Europe

CO₂ Reduction!
WP 3.3: Prospects for RES-E exports from NA to Europe

Why CSP imports from North Africa and not from Southern Europe?
Higher CSP availability in MENA $\rightarrow$ flexible renewable power

Comparison:
CSP with Solar Multiple 4 at different sites

MENA:
- More sunny days
- Lower Latitude
$\rightarrow$ lower seasonal variation of electricity yield
Business case EU
Flexible renewable power

Case study Germany 2050
The role of variable and flexible renewable power sources in a 90% renewable electricity scenario for the year 2050 for Germany.

Installed Capacities:
Photovoltaics: 45 GW
Wind Onshore: 40 GW
Wind Offshore: 27 GW
Runoff Hydropower: 6 GW
Import CSP: 16 GW
Import Hydro: 4 GW
Geothermal: 4 GW
Biomass: 9 GW
Biomass Waste: 4 GW
Natural Gas: 63 GW

50% var. RE
40% flex. RE
10% flex. Fuel
Business case EU

The TRANS-CSP / DESERTEC Concept – flexible solar power plus 33 additional energy corridors with firm capacity for Europe in 2050

Flexible solar power import to Germany starting 2022 with 12 ct/kWh (5% WACC, 40 a)

Role of CSP: firm capacity for power, desalination & export

**Business case NA**
energy, water, food, labor and income for a growing population in desert regions

**Business case EU**
flexible renewable energy for Europe

(artist view created with Google Earth)
BETTER focal points for large RES-E shares in EU and NA (preliminary):

1. **Limit RES-E variability:**
   1. tap flexible RES-E to provide firm capacity and other grid management functions
   2. develop and secure all available flexibility and backup options

2. **Limit RES-E cost by increasing investment security:**
   1. establish national RES-E administrations and adequate RES-E tariffs
   2. provide internationally insured power purchase agreements and further risk mitigation measures specifically adapted to the RES-E sources to be tapped

3. **Limit RES-E impacts:**
   1. ensure public participation through consultation and cooperative banks
   2. enforce thorough environmental and socio-economic impact assessment

4. **Establish reliable political framework:**
   1. pursue consensus within Europe and Third Countries about future RES-E role
   2. establish transparent, stable, fair and predictable framework for RES-E
Thank you for your attention!

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