Desertec

Powering Europe though the Sahara
Agenda

- Background and Key Players
- Europe Investing for Green Power
- Focusing on Morocco
- Modeling Morocco
- Outcome
Background and Key Players
Background and Key Players

Founded in 2009, by public figures, private individuals, politicians and scientists from North Africa, the Middle East and Europe

How the use of renewable energy in deserts and arid regions could lead to the positive further development of global society

DESERTEC Foundation and a group of 12 European companies led by Munich Re founded an industrial initiative called Dii (Desertec Industrial Initiative) GmbH in Munich

As of December 2013, Dii consists of 19 shareholders and 17 associate partners from countries of North Africa, the Middle East and Europe

Sources: Dii 2050 Desert Power, Fraunhofer ISI
Demonstrates that the abundance of sun and wind in the EUMENA region would enable the creation of a joint power network that will entail more than 90 percent renewables

38 countries analyzed in this study include the EU27, Norway and Switzerland, Turkey, Syria, Jordan, Saudi Arabia, Egypt, Libya and the three Maghreb countries Tunisia, Algeria and Morocco

A total of 1087TWh is exported from MENA to Europe. The net power trade balance from MENA to Europe is 1064TWh per year of exports. These net exports from MENA to Europe amount to 19% of European demand and 46% of MENA domestic demand.

### Economic benefits of system integration | Climate Benefits | Implication on country levels | Socio-economic effects

- **An integrated EUMENA power system allows Europe to meet its CO2 reduction targets of 95% in the power sector more effectively**

- **Europe saves a total of €33bn. annually, or €30 per MWh of power imported from MENA**
Key EU Countries

- Historically 70% of EU-MENA trade
  - Germany
  - France
  - Spain
  - Italy

- Incentives
  - Environmental
  - Business/Economic

Source: UnctadStat
Incentives

• Environmental
  • Commitment to reduce gas emissions to 8% below 1990 levels between 2008 and 2012
  • Global warming should be kept below 2°C pre-industrial times

• Business
  • Germany
    • Manufacturing CSP: Solar thermal power technology leader
    • Cheap source of energy

  • France
    • Nuclear energy leader

• Spain & Italy
  • Transmission lines
  • Spain has own solar
Focusing on Morocco
Morocco is the best connecting point between Africa and Europe
Morocco is one of the best places to develop new energy

- Geographically advantageous
- Sufficient acreage of desert (sunshine)
- Limited Reserve of coal and natural gas therefore heavy reliance on import
- Rapid growing energy consumption rate
- Government’s priority to develop renewable energy industry
Risks and Opportunities for Morocco

• Opportunities
  ▪ Energy Independence
  ▪ A promising new industry-energy export

• Risks
  ▪ Political Risks (Expropriation etc.)
  ▪ Financial Risks
Modeling Morocco
Assumptions & Results

- Focusing on *exported* concentrated solar power (CSP) in Morocco
- 12.5% cost of capital (Cam’s model)
  - Low risks: currency, commercial international partners
  - High risks: expropriation
- 2% of Desertec capex (€7.9 bn)
  - 3,196MW (64% of total installed capacity)
  - 1.25% O&M costs
  - 20 year term
  - 50% net capacity factor
  - PPA: €0.064kWh
  - No carbon credits

- Results
  - 8.3% IRR…
  - But -€1.9bn NPV
Outcome
Recent Changes in Desertec and Dii

Desert solar power partners Desertec Foundation and Dii split up
Relationship breaks down between the two main advocates of a European energy revolution driven by desert solar power

Germany's Bosch pulling out of Desertec renewable energy project

Siemens withdraws from Desertec

Siemens has said it will pull out of Desertec by the end of December. Media is also examining Bosch’s exit from the desert power project.
Desertec Europe failed, new focus on North Africa

- NA economic growth
- Spain transmission congestion
- Energy security
- European economic slow down
- Death of carbon credits and some subsidies
- Bosch & Siemens abandoned the project
  - First Solar and others still involved