

Dii – Desertec Industrial Initiative

Enabling the DESERTEC Concept



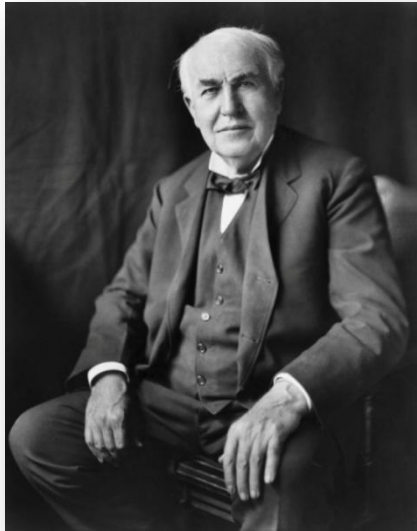
Bringing the Desertec concept into reality:

Solar- and Wind Energy from the Deserts in North Africa and the Middle East

Paul van Son (CEO Dii GmbH)

17. Handelsblatt Jahrestagung Energiewirtschaft 2010

Solar power has been recognized ahead of time

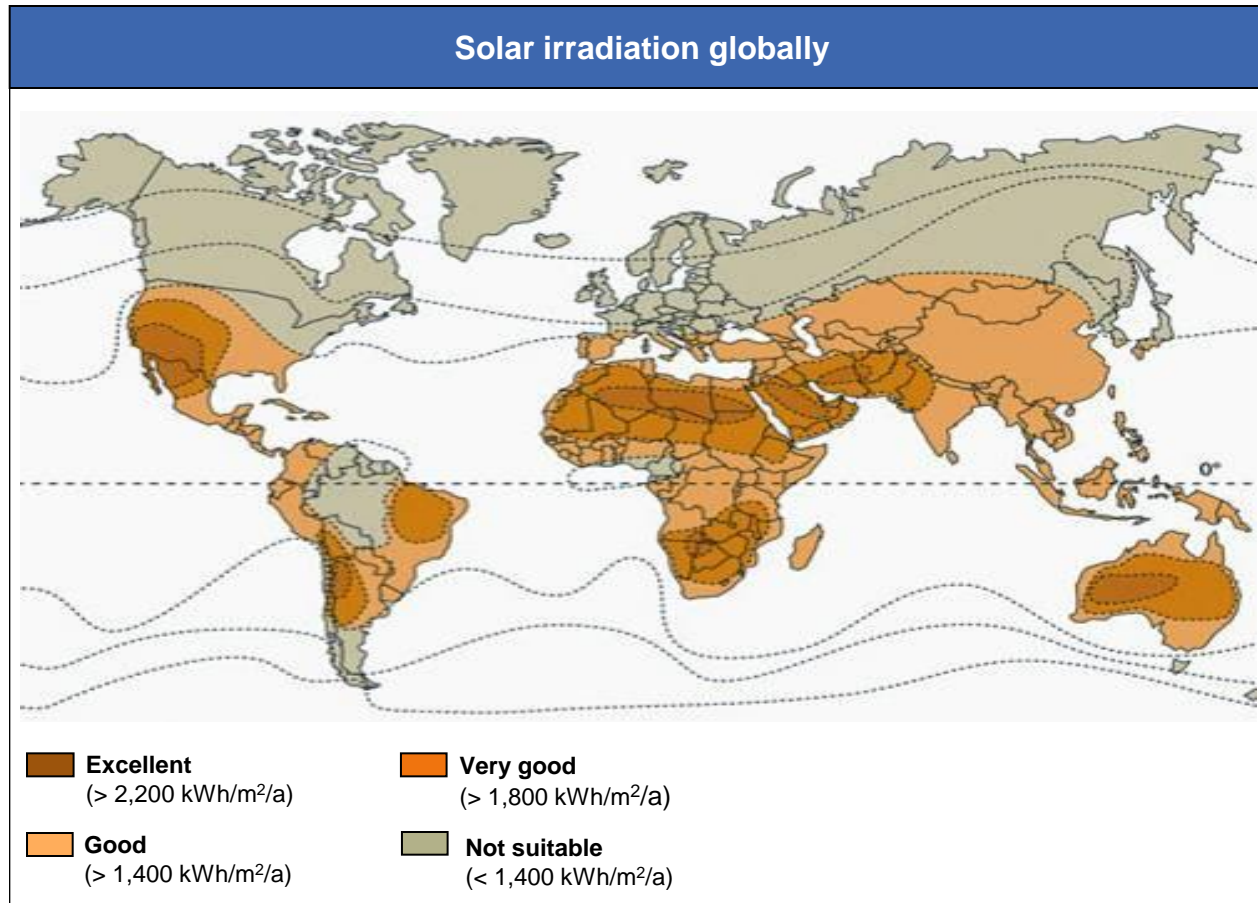


***„ I'd put my money on the sun and solar energy.
What a source of power!
I hope we don't have to wait 'til oil and coal run out
before we tackle that.“***

Thomas Alva Edison, 1847-1931



The deserts of the earth offer excellent irradiation conditions for large scale solar power generation



Source: Solar Millenium, iset, DWD, BMU, Solaraccess, BUND Naturschutz

The DESERTEC Concept in general



- Make use of renewable, mainly solar, energy from the deserts, the biggest energy resource available on earth
- More than 90 % of the world's population are living in areas that are less than 3,000 km away from deserts and thus could be supplied with solar power
- Holistic approach
 - Integration of renewable energy and transmission grids
 - Socio-economic developments
 - Extensions to water supply, growing biomass etc.
- The DESERTEC concept supports EU and MENA government initiatives on energy and climate protection (such as Mediterranean Solar Plan)

Dii consortium: to enable Desertec implementation in the MENA region



- Consortium of 12 companies and the DESERTEC Foundation on 30/10/2009
- Started with German, Spanish and Algerian shareholders. Additional shareholders and associated partners are being acquired in MENA countries and Europe.
- Mission – Long term objective:
 - Cover a substantial part of the MENA electricity demand and 15% of the European demand by 2050
- Create acceptance and conditions enabling investments
 - Connecting cultures and people
 - Creating a regulatory framework
 - Enabling feasible investments



ABENGOA SOLAR



Deutsche Bank



HSB NORDBANK



VORWEG GEHEN



SIEMENS

Main objectives of Dii until 2012



Focus areas of Dii within the next **three years**:

Regulatory and legislative environment	Creating acceptance and willingness in MENA and EU. Analysis and negotiation of a favorable legal and regulatory framework
Roll-out plan	Over all long-term strategy until 2050. Investment and financing guidance
Concrete reference projects	Origination of early reference projects in order to demonstrate the feasibility of the concept
Additional studies	E.g: Survey on availability of primary energy, technology survey, market analysis (new investors)

Dii – Key technologies to be considered



Power generation from sun and wind

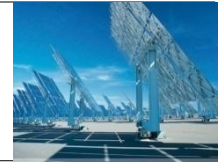
CSP Concentrating Solar Power

- Concentration of sunlight by mirrors and transformation into heat
- Power generation by steam turbines
- Heat storage enables base load capability



PV Photovoltaic Power

- Direct conversion of sunlight to electric energy (photoelectric effect)
- Large fields with trackers aligned to sunlight
- No storage facilities, but sharp learning curve!



Wind Power

- On- and offshore wind farms
- Less space needed, but higher power volatility
- Desert capabilities



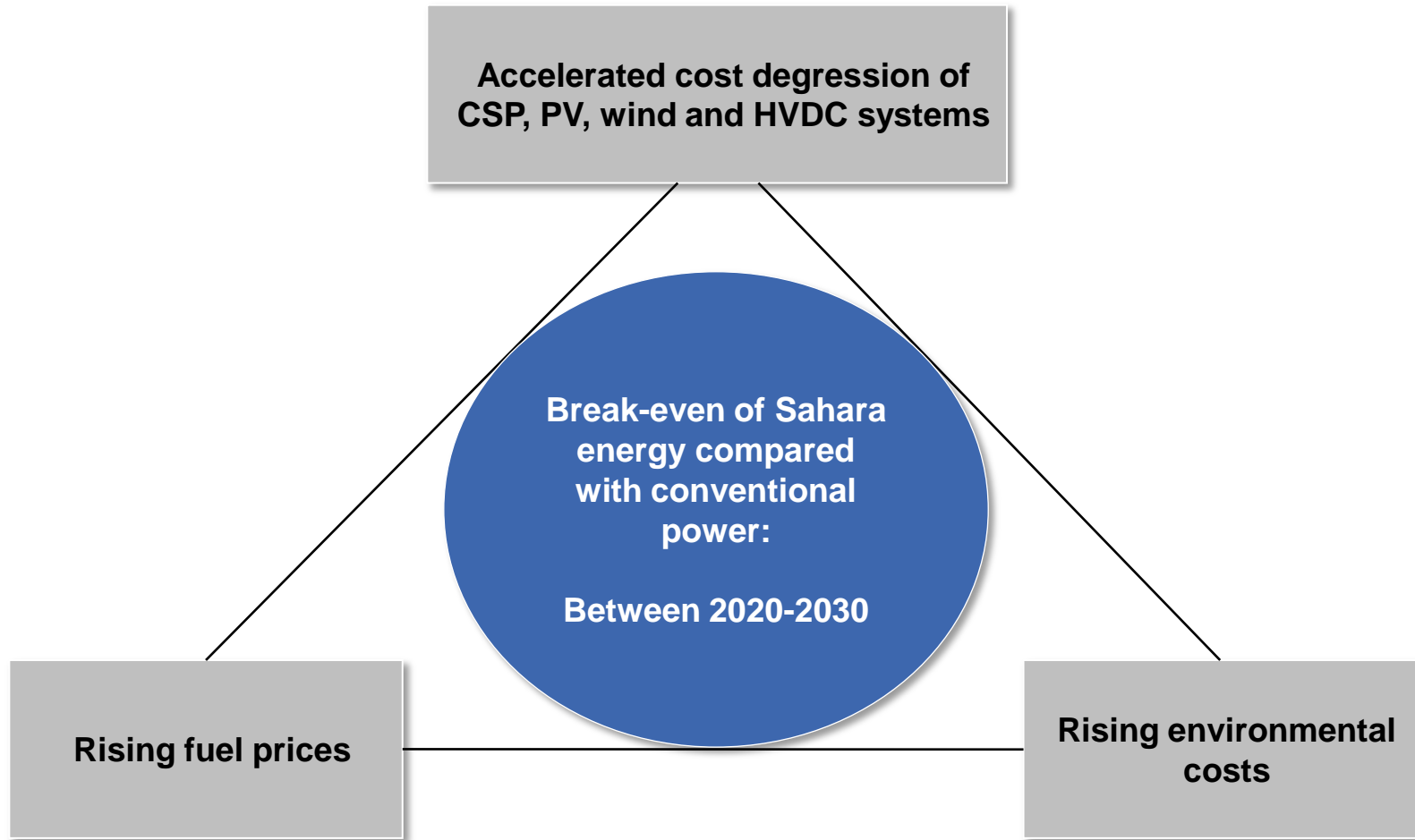
Long Distance Power transmission by High Voltage Direct Current (HVDC)

HVDC High Voltage Direct Current

- Power transmission over large distances
- Selected reinforcement of existing transmission grids
- Design for EUMENA supergrid



Desert energy will economically trump conventional energy



Proposals for a Mediterranean ring connecting MENA to European production and demand sites



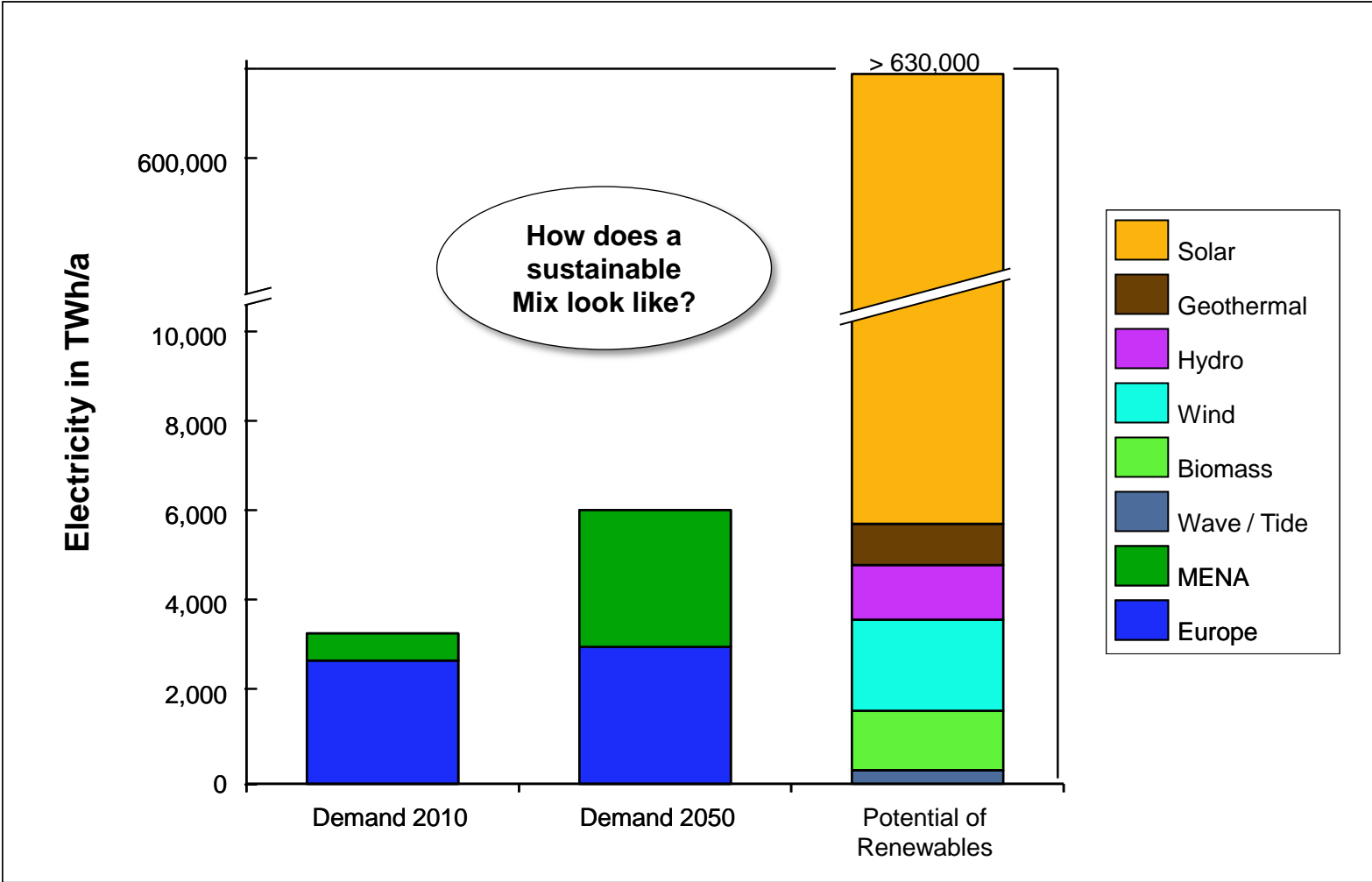
Source: Euro-Mediterranean Energy Fourm

Proposals for a Sahara Energy grid connection to the European production and demand sites



- Vision: Providing North Africa, the Middle East and Europe (MENA) with a sustainable supply of renewable energy by the year 2050
- Developed by the Club of Rome's TREC Initiative (Trans-mediterranean Renewable Energy Cooperation)

Dii's contribution to a feasible and sustainable Mix in MENA and Europe



Source: German Aerospace Center (DLR)



It is all about connecting people