



Dr. Peter Terwiesch, Head of Region Central Europe, Hannover, April 23, 2012

# Managing Europe's energy transition

## DC grids enable renewables at scale

# Political framework in Europe

## Energy policy – ambitious plan to integrate renewables

Combat climate change

**Europe – EU Energy Directive**  
**Horizon: 2020**

**Germany – National energy concept**  
**Energy transition – Horizon: 2050**

Limited resources of fossil fuels

**20%** more energy efficiency

**0%** nuclear

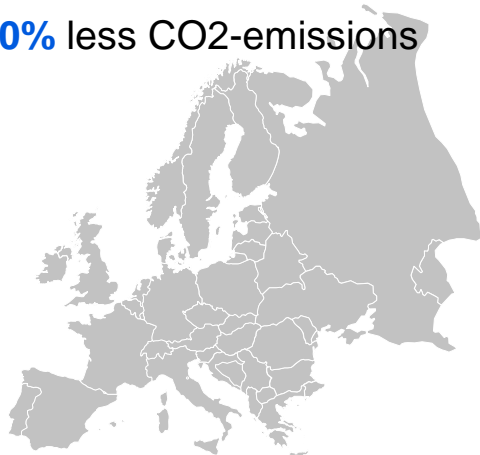
**20%** renewables

**80%** renewables

Growing energy demand

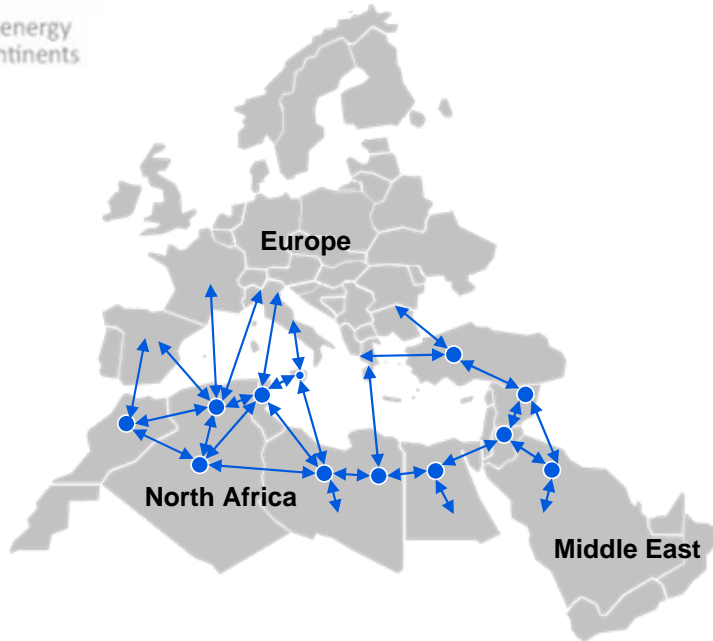
**20%** less CO<sub>2</sub>-emissions

**80%** less CO<sub>2</sub>-emissions



# Desertec

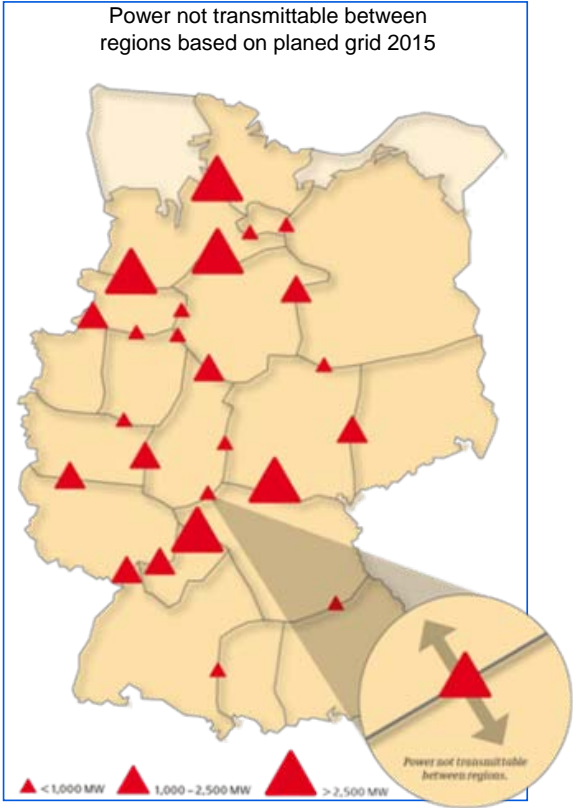
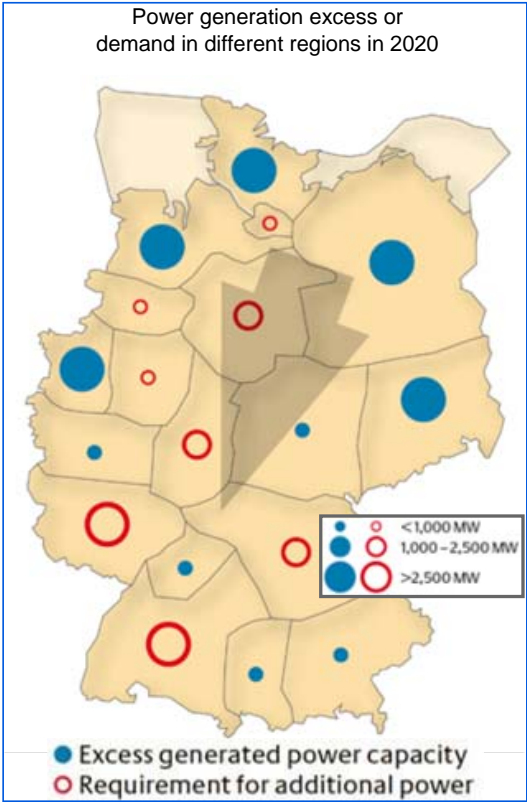
## „Desert Power Perspectives“



- Dii will announce „Desert Power Perspectives“ (DPP) in June 2012
- Key Facts DPP:
  - By 2050 renewable energies from the MENA region (Middle East and North Africa) will cover
    - 100% of the local energy need
    - >20% of the energy need in Europe
- Power markets can be connected across the Mediterranean
- DPP 2050 includes recommendations for:
  - Feasible interconnections
  - Regulatory framework
  - Financing

# „Energiewende“ in Germany

## dena II: Power generation and transmission constraints 2020



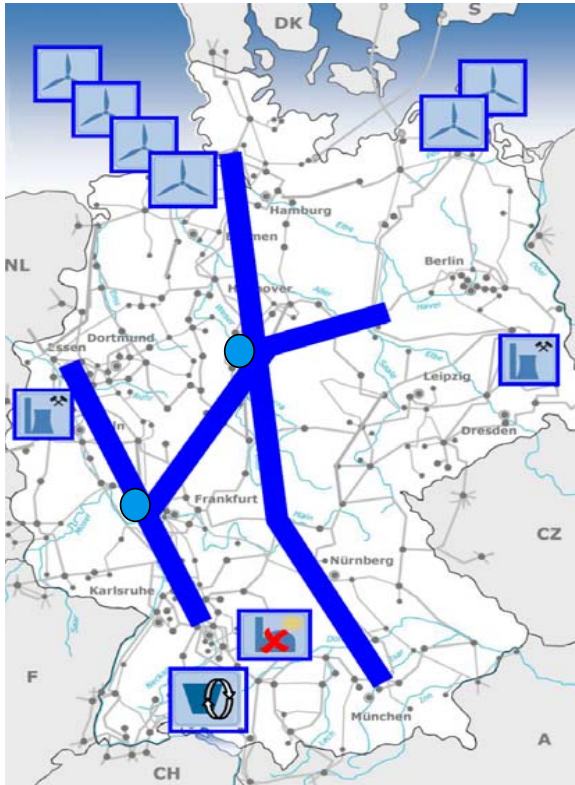
# Overlay HVDC grid in Germany

## Identification of possible routes (Vision of 4 TSO's)

Source:

Neumaier, Kaendler, Gartmair, Berger:  
Structural considerations for future pilot routes of overlay links in Germany.

9th CIGRE/CIRED-information session, Regensburg, 05-Oct-2011



- More than 20 Billion EUR investment identified until 2020 by the dena II study equivalent to more than 3.600 km of new transmission lines
- National Grid Development Plan under preparation by the 4 German TSO's to further coordinate the investment
- Draft with specific project and technology decisions for approval by German regulator of the National Grid Development Plan ready in June 2012, final release in October 2012

**Regulatory framework must support overall objectives**



# BorWin1 – the world's most remote offshore wind park

## Connecting offshore wind parks in Germany

Customer:  
Tennet



### Customer need

- 200 km long subsea and underground power connection
- Robust grid connection

### ABB solution

- Turnkey 400 MW HVDC Light system
- Full grid code compliance

### Customer benefits

- Environmentally friendly power transport
- Reduce CO2 emissions by nearly 1.5 million tons per year by replacing fossil-fuel generation
- Supports wind power development in Germany

# DoIWin2 – ABB's largest power transmission order

## Connecting offshore wind parks in Germany

Customer:  
Tennet

Year of  
commissioning:  
2015

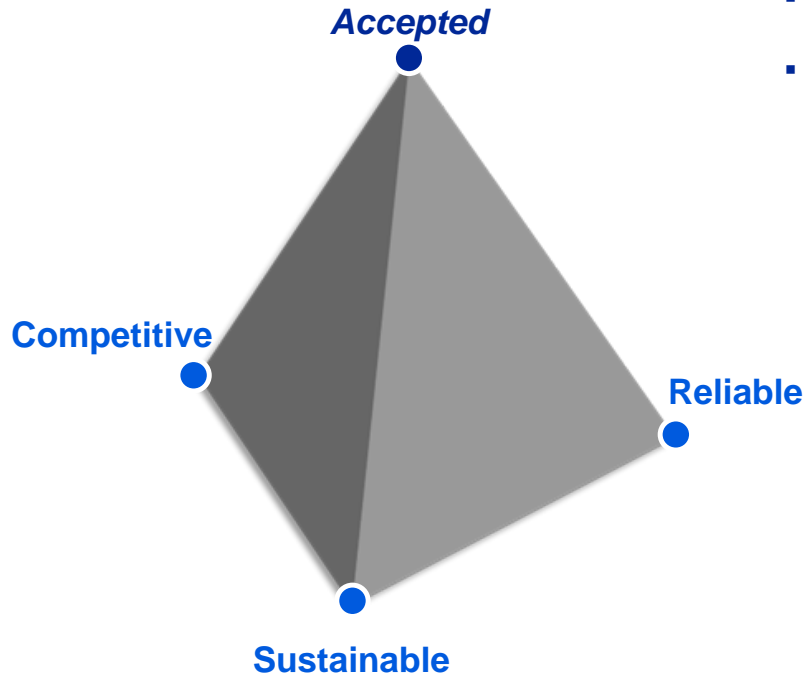


- 1 billion US Dollar order volume
- HVDC Light technology
  - Capacity: 900 MW at 320 kV
- Cable route length
  - DC submarine cable: 2 x 45 km
  - DC underground cable: 2 x 90 km
- Main reason for choosing HVDC Light:
  - Long distance transmission with minimal power losses and negligible environmental impact

# Holistic approach in our energy policy required

## Public acceptance is key

Energy related objectives



Challenge:

- Add a fourth element to the triangle
- Key to a successful energy transition:
  - **Public acceptance in our societies**



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