

The background image shows a landscape with several wind turbines silhouetted against a bright, low sun on the horizon. The sky is a mix of orange, yellow, and blue. In the foreground, there is a field of green plants with small yellow flowers.

# **Global Sustainable Energy: Current trends and Future Prospects**

Hashem AL-ghaili  
**Jacobs University Bremen**

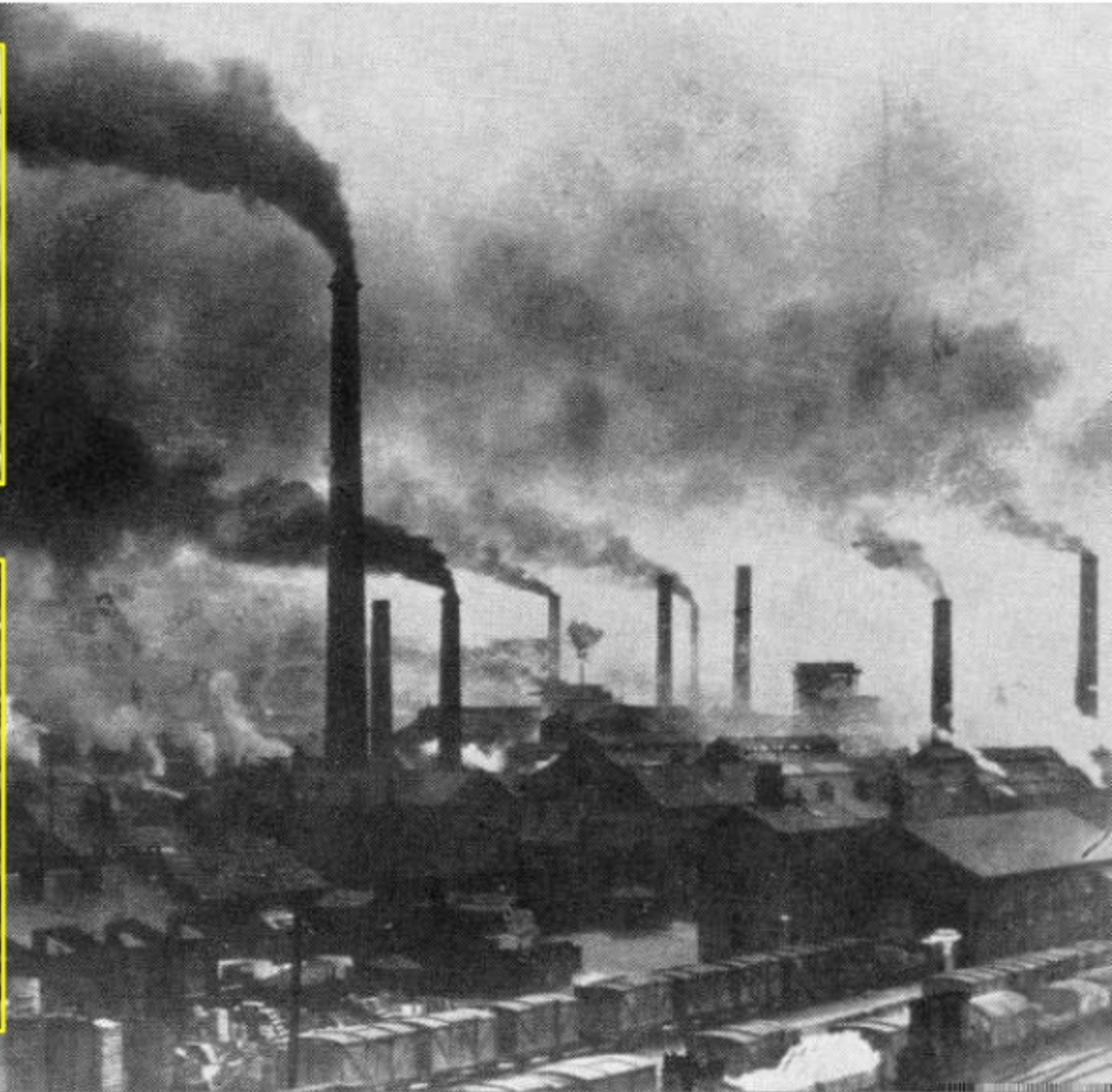
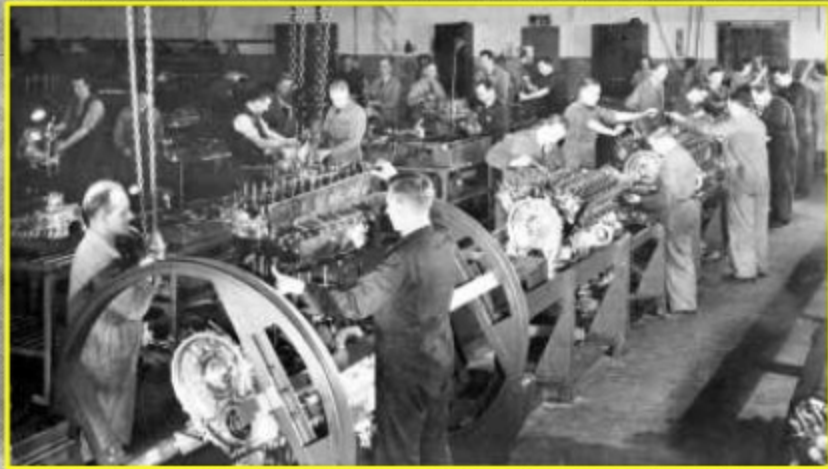
# *Exploiting natural resources*



400,000-year-old shelter from Terra Amata, France



# *Industrial revolution 1700*

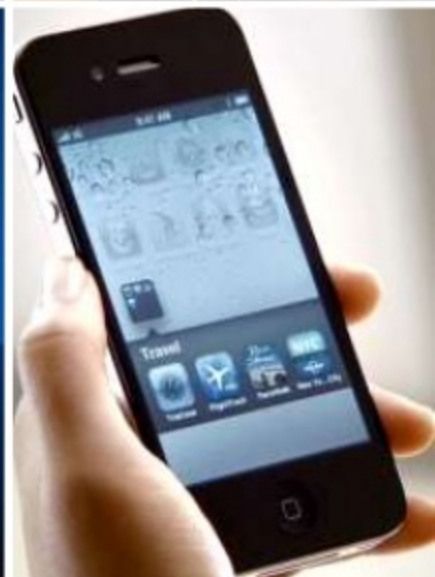


# *Technological explosion*

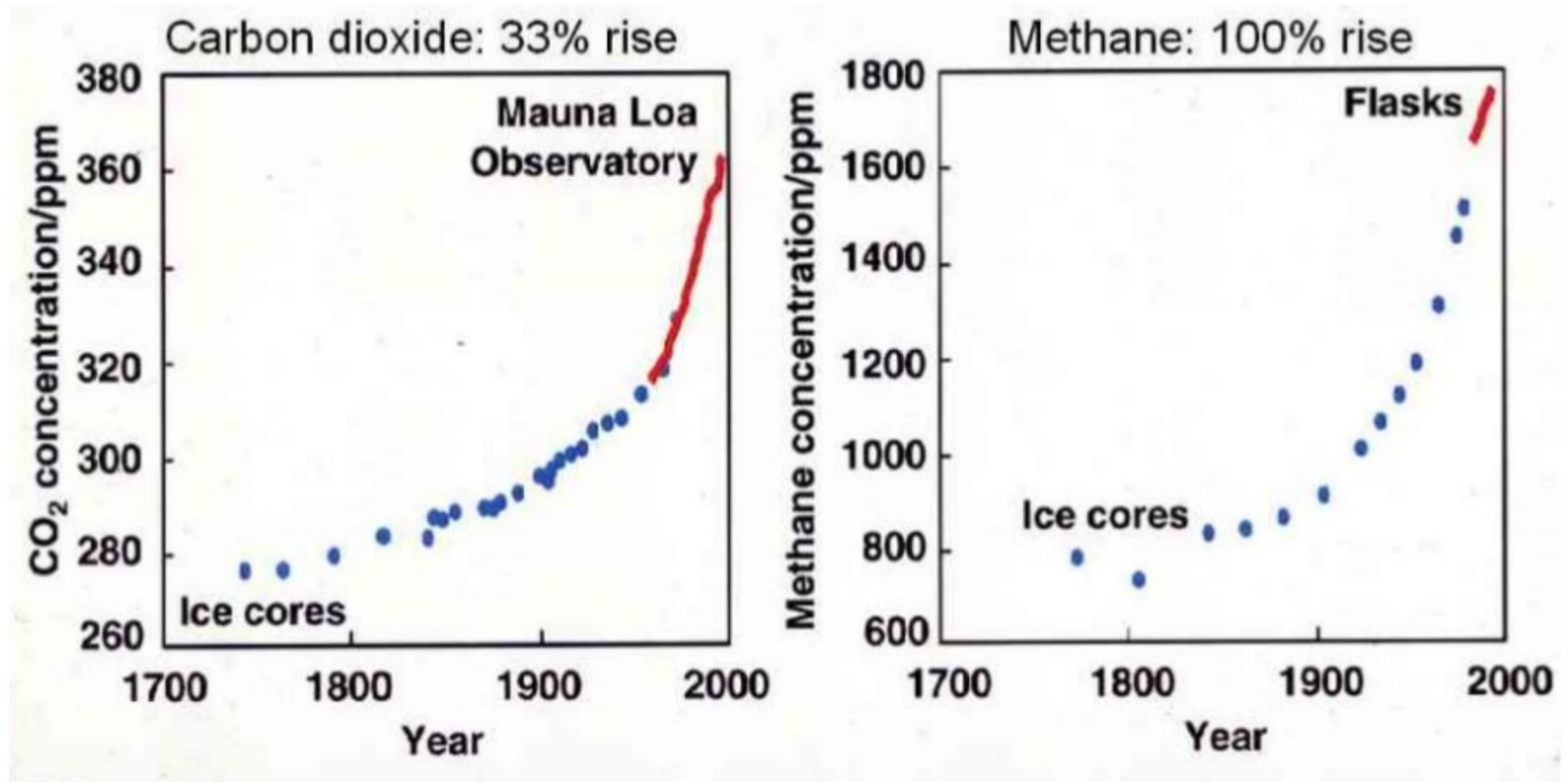




# *Current technological revolution*



# *The impact of industrial revolution on our climate*



By the year 2100, carbon dioxide concentrations will rise to 600 - 700 parts per million.



# *Switching towards clean energy*



# *General overview*



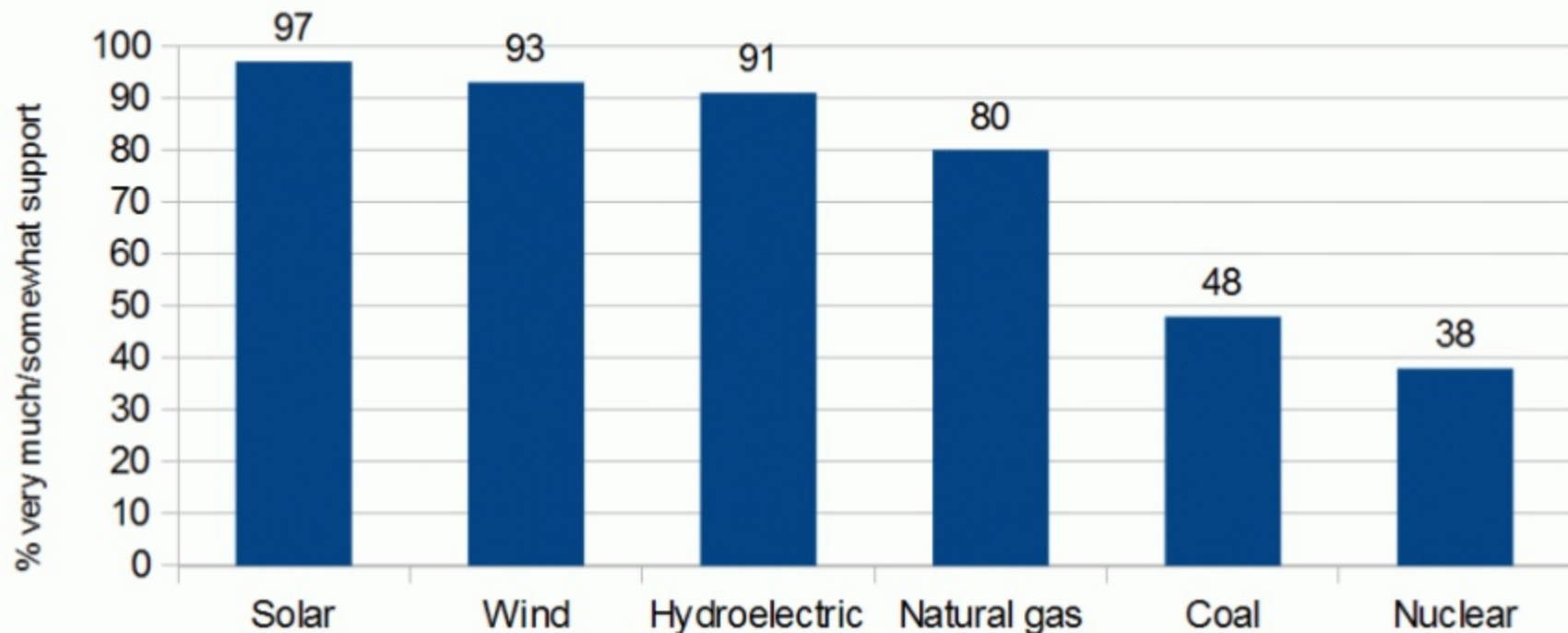


# *Switching towards clean energy*



# Global public support for energy sources

"Please indicate whether you strongly support, somewhat support, somewhat oppose, or strongly oppose each way of producing energy"

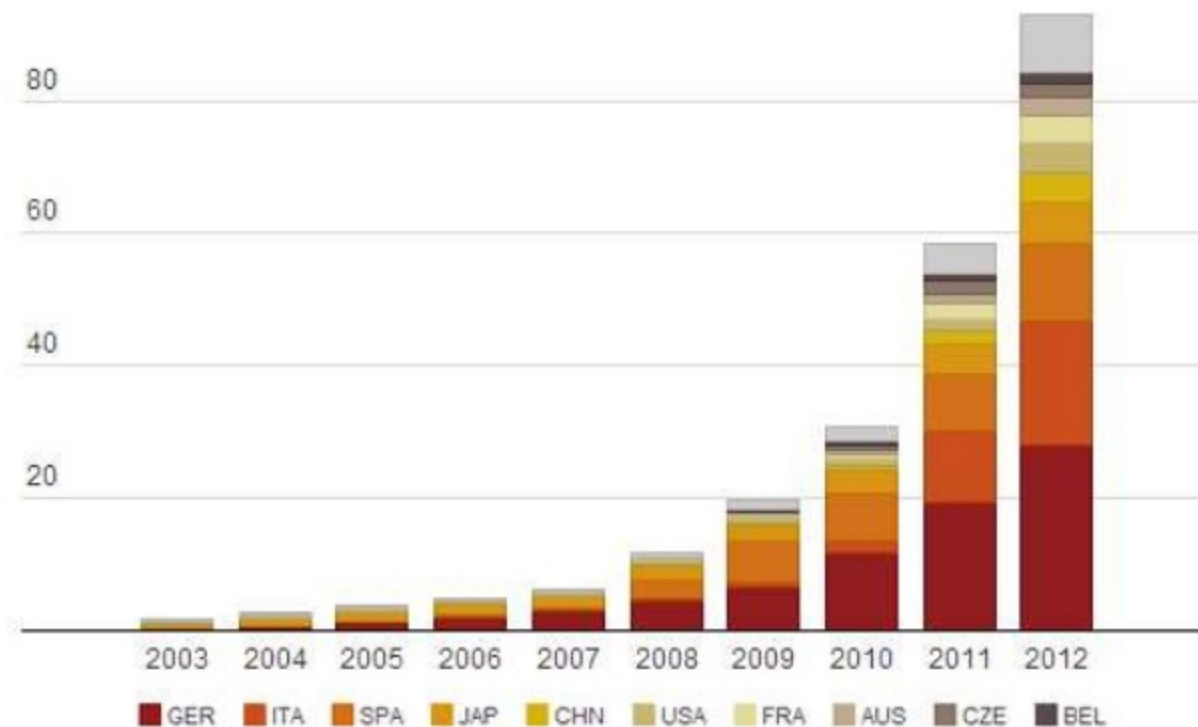


Source: Ipsos, May 2011



# *Global status with solar power*

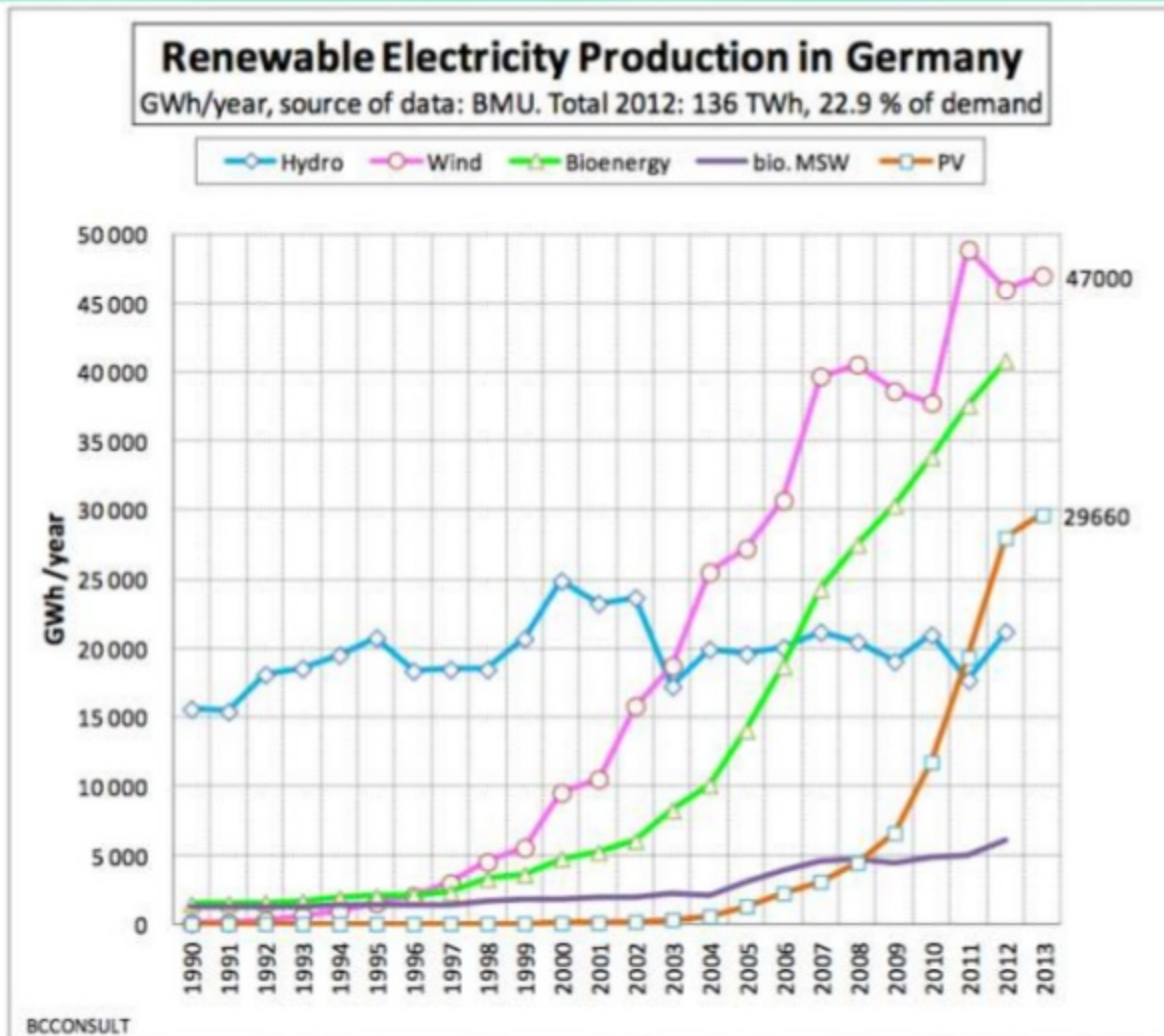
Global Solar Generation: 2003-2012 (TWh)



Source: BP Energy Outlook 2012

shrinkthatfootprint.com

# Status of Germany



Germany has a goal of producing 100% of electricity from renewable sources by 2050.



# *Status of Germany with solar power*

June 6<sup>th</sup> (1pm and 2pm)

June 9<sup>th</sup> (National holiday)

24.24 GWh of electricity

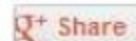
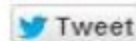


A worker at a solar farm in Frankfurt (Oder) Photo: DPA

## Germany produces half of energy with solar

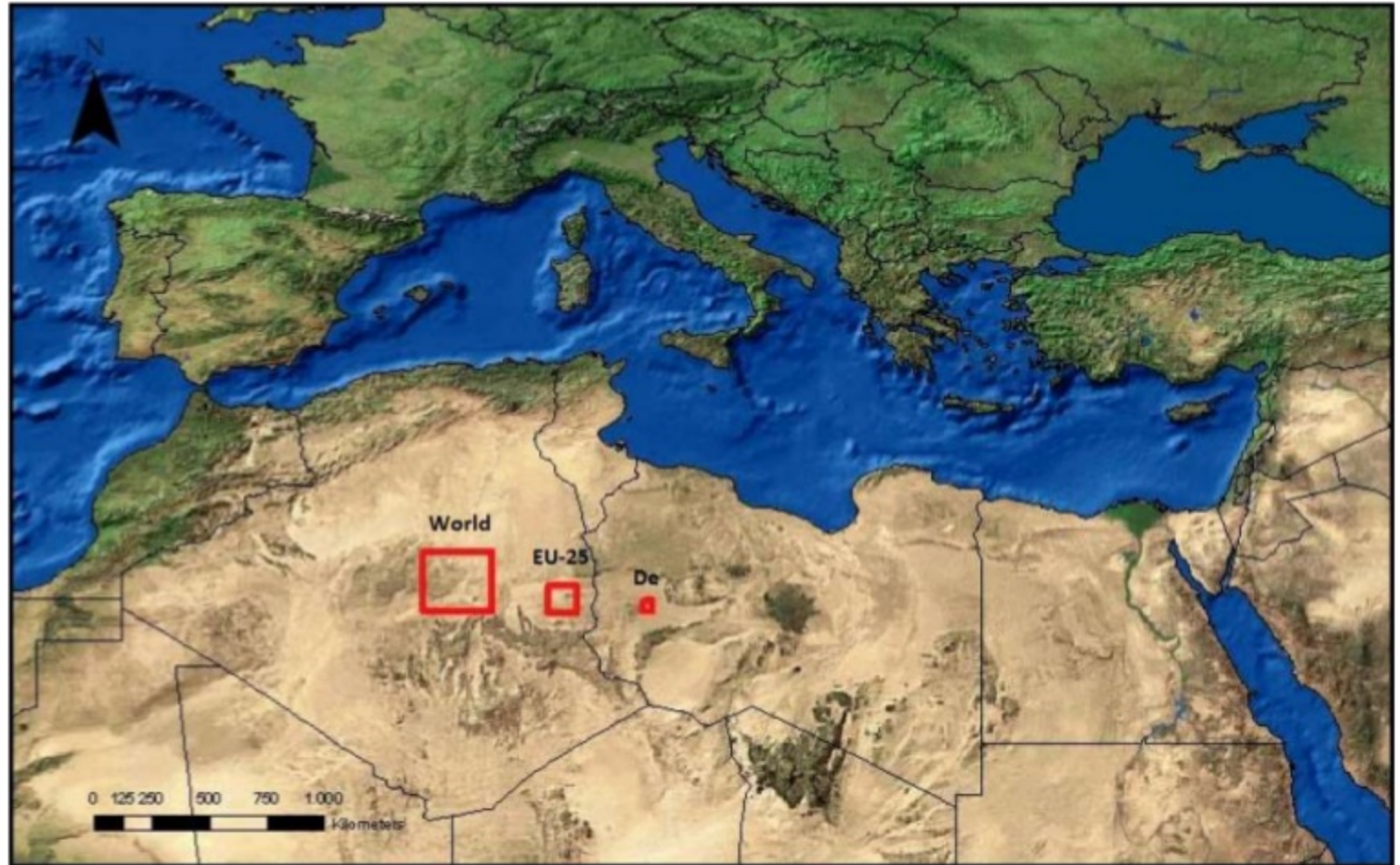
Published: 19 Jun 2014 14:54 GMT+02:00

Updated: 19 Jun 2014 14:54 GMT+02:00



**Germany produced a record 50 percent of its electricity needs through solar panel at the start of June, breaking a huge milestone on its march to renewable energy.**

# *The potential of solar power*



Europe (EU-25)  
Germany (De)

Total surface area required to fuel the world with solar power

Data provided by the German Aerospace Centre (DLR)



# *The potential of solar energy in reducing CO<sub>2</sub> emissions*

**California, United States**



Ivanpah Solar Power Facility  
Capacity: 354 MWh  
CO<sub>2</sub> Reduction: 400,000 tons

**Arizona, United States**



The Agua Caliente Solar Project  
Capacity: 290 MWh  
CO<sub>2</sub> Reduction: 324,000 tons

**Sanlúcar la Mayor, Spain**



Solnova Solar Power Station  
Capacity: 200 MWh  
CO<sub>2</sub> Reduction: 185,000 tons

**Neemuch, India**



Welspun Solar MP Project  
Capacity: 150 MWh  
CO<sub>2</sub> Reduction: 216,372 tons

**Abu Dhabi, UAE**



Shams Solar Power Station  
Capacity: 100 MWh  
CO<sub>2</sub> Reduction: 175,000 tons

**California, United States**



Genesis Solar Energy Project  
Capacity: 250 MWh  
CO<sub>2</sub> Reduction: 393,000 tons



# *Ivanpah Solar Power Facility, U.S.*



- **Ivanpah Solar Power Facility**
- **Location: California, United States**
- **Commission date: Feb, 2014**
- **Capacity: 354 megawatts (MWh)**
- **Generates power for 140,000 homes**

**The Ivanpah installation reduces carbon dioxide emissions by over 400,000 tons annually.**



# *Canal Solar Power Project, India*





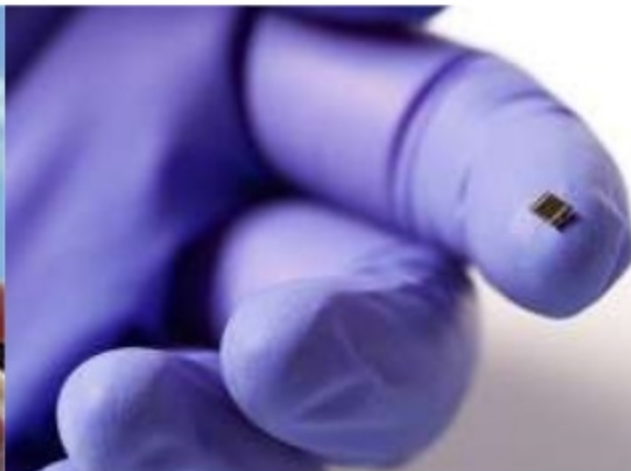
# *A touch of innovation*





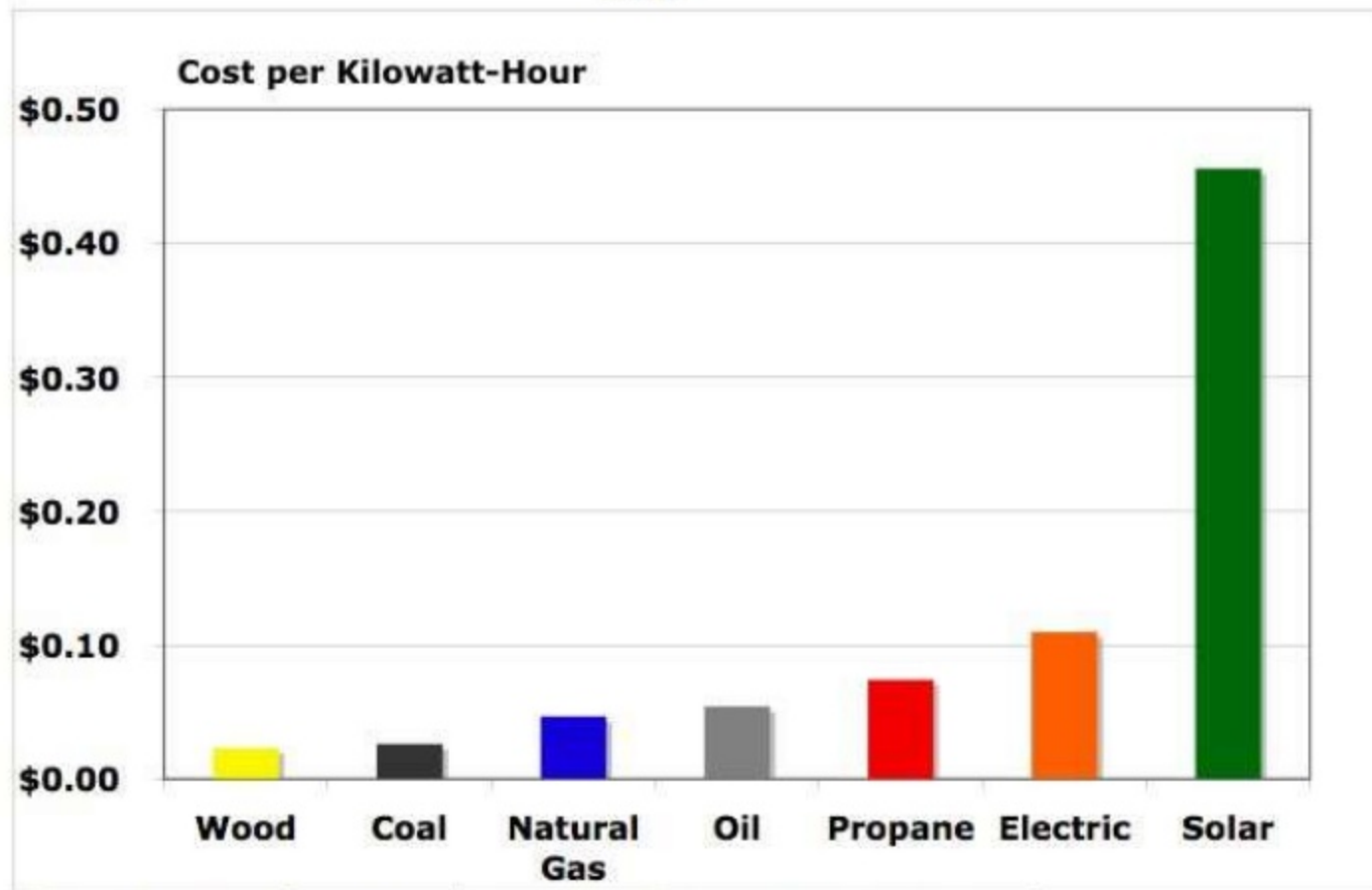
# *Solar energy trends over the past 3 years*

- More efficient.
- Minimized environmental risks.
- Cheaper.
- Smaller.
- Flexible.
- Transparent.



# *Cost problem*

## Energy Costs



Source: Energy Information Administration, Green Econometrics research