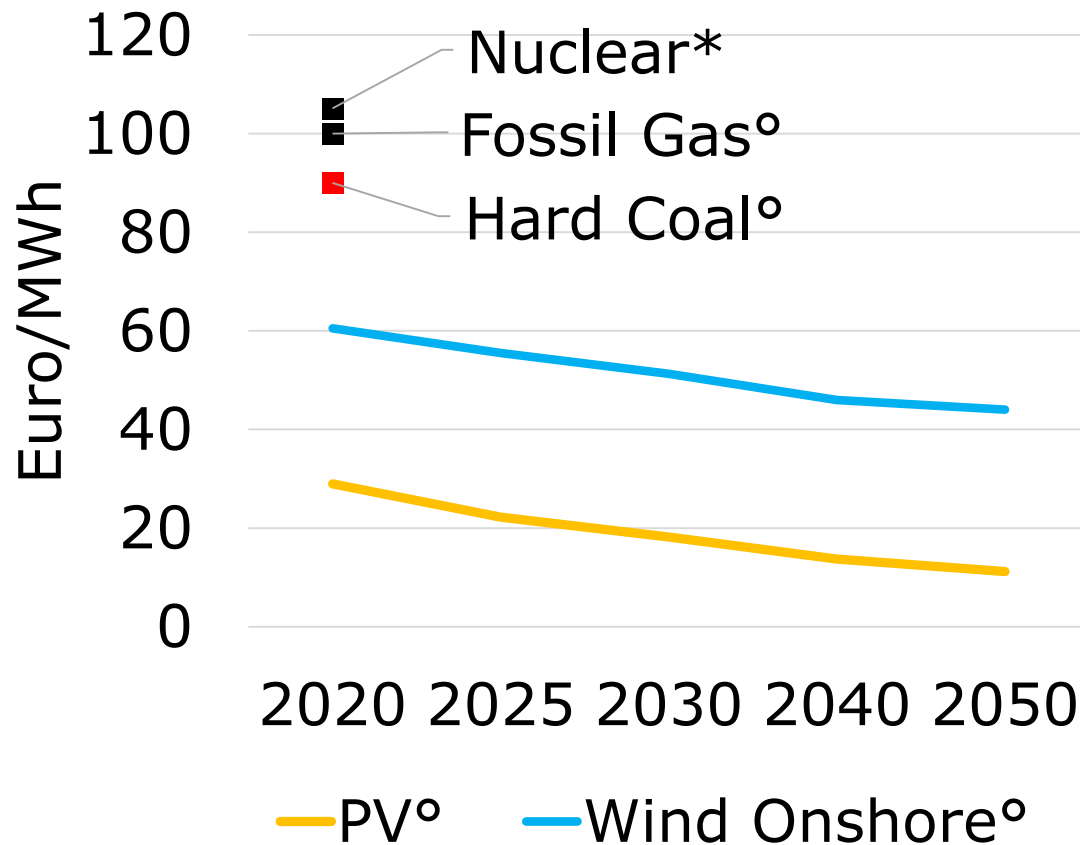


***100% Renewables are Possible
on a Global level and Cheaper
than Fossil and Nuclear Energy***

Bangkok, 7th October 2019

Hans-Josef Fell
President of the Energy Watch Group
Member of the German Parliament 1998-2013

LCoE of Wind and Solar PV fairly below of Nuclear/Fossil Energy: Gap likely to increase



- PV 33%
 - Wind Onshore 66%
- of the costs of
hard coal electricity

*e.g. GB Hinkley Point C °Germany (South)

New Study

First Ever Hourly Simulation of Global Energy System Across All Sectors

100% Renewables are cheaper than current energy system



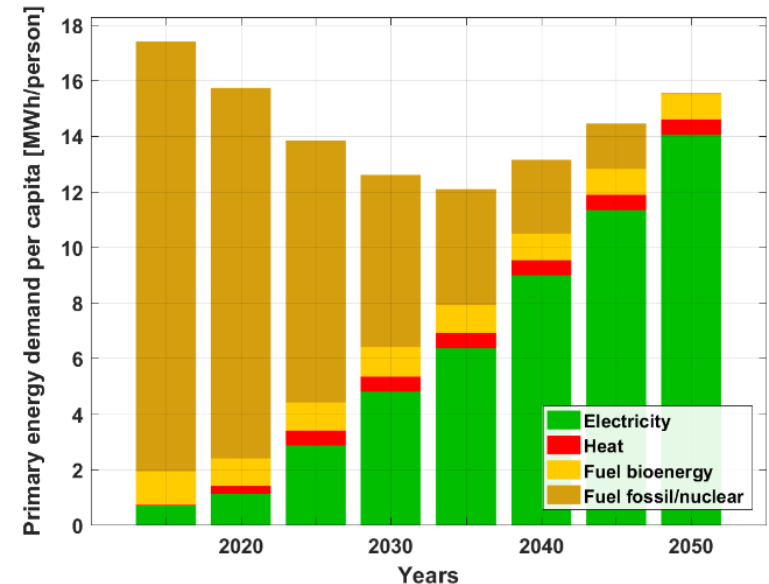
Global Overview



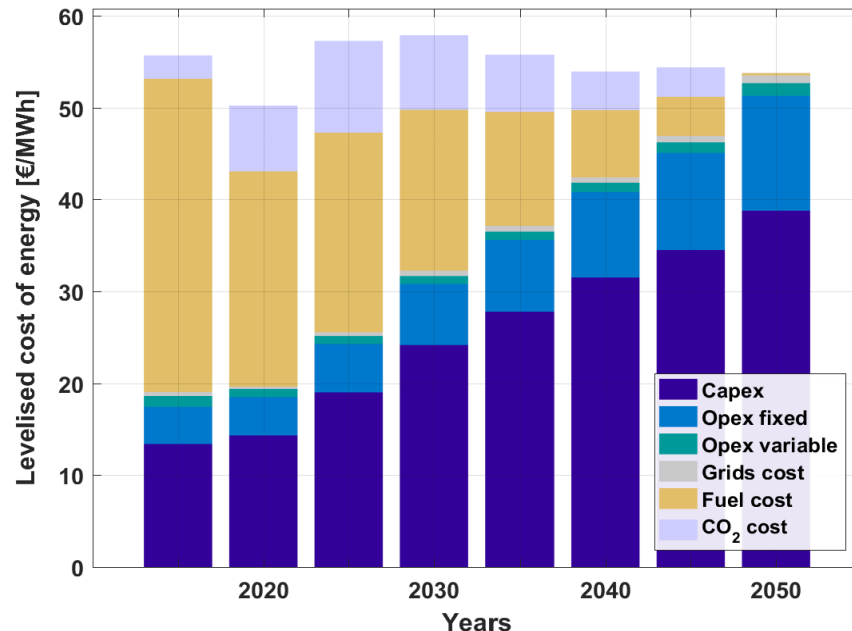
- World is structured in 9 major regions, which are further divided to 145 subregions
- Some sub-regions represent more than one country, others parts of a larger country
- The sub-regions are interconnected by power lines within the same country
- The results shown are for the Power, Heat, Transport, Desalination sectors
- Energy transition scenario is carried out in full hourly resolution in all energy sectors
- In total 106 different technologies are applied

Long-term Energy Demand

- Final energy demand grows by 1% per year, while energy services grow faster
- Renewable Electricity will make out 90% of global energy demand by 2050
- World population grows from 7.2 billion (2015) to 9.7 billion (2050)
- Substitution of inefficient combustion processes by electric solutions wherever possible
- Processes of 2015 for energy services in 2050 would double primary energy demand
- Fossil fuels are practically substituted by renewable electricity (mainly solar PV, wind)

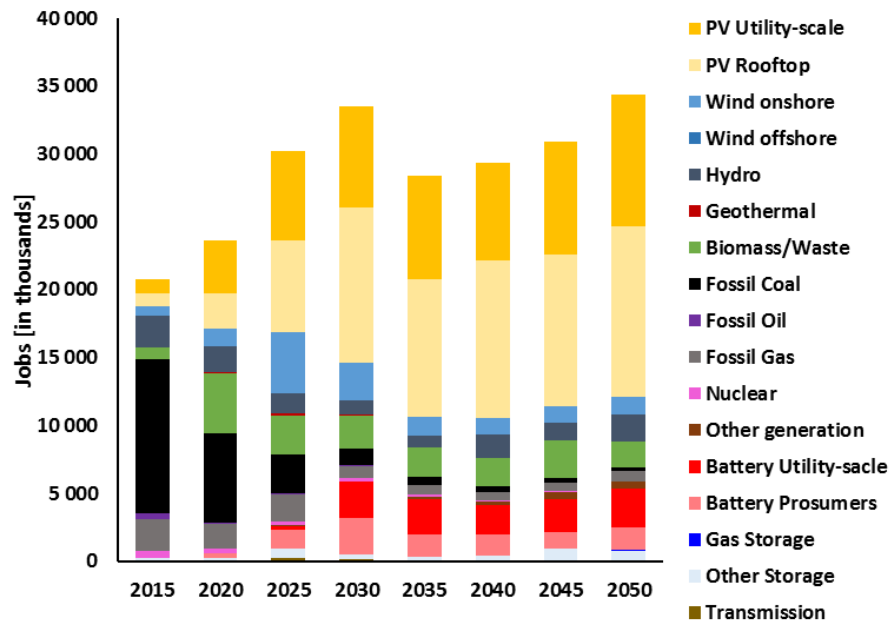


Energy System Costs



- **LCoE decline from 54 €/MWh (2015) to 53 €/MWh (2050)**
- **Fuel costs diminish through the transition period, while capital expenditures dominate**
- **Costs are well spread across a range of technologies; major investments for:**
 - solar PV,
 - wind energy,
 - batteries,
 - heat pumps and
 - synthetic fuel conversion
- **The cumulative investment costs are about 67,200 b€**

Jobs Prospects – Power Sector



- **Total direct energy jobs are set to increase from about 20 million in 2015 to around 35 million by 2050**
- **Loss of coal and other fossil fuel related jobs are more than compensated**
- **Solar PV emerges as the prime job creator with over 22 million jobs by 2050**
- **Operation and maintenance jobs continue to grow through the transition period and become the major job segment by 2050 with 50% of total jobs**

Policy Recommendations

- **Feed-in-tariffs crucial until 40 MW (GET-FiT)**
- **Auctions only for utility-scale projects**
- **Abolish fossil and nuclear subsidies**
- **Carbon, methane, radioactivity tax**
- **Research, education & campaigning**
- **Reducing licensing obstacles**

Not successful:

- **Certificate systems**
- **Emission trading**

***Thank you very much for
your attention!***

www.hans-josef-fell.de

www.energywatchgroup.org