



## Part 7: Electricity Supply Scenarios – How achieve Sustainability?

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 Deutsches Zentrum für Luft- und Raumfahrt e.V.  
in der Helmholtz-Gemeinschaft

Folie 1  
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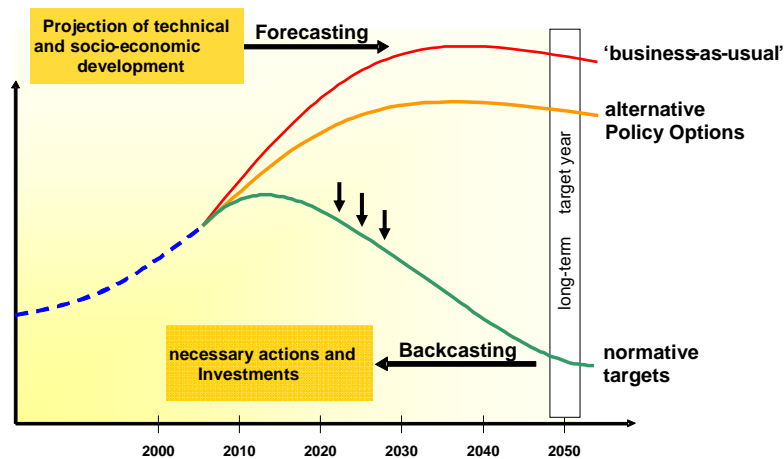


## Scenario Approaches

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## Scenario Methodologies



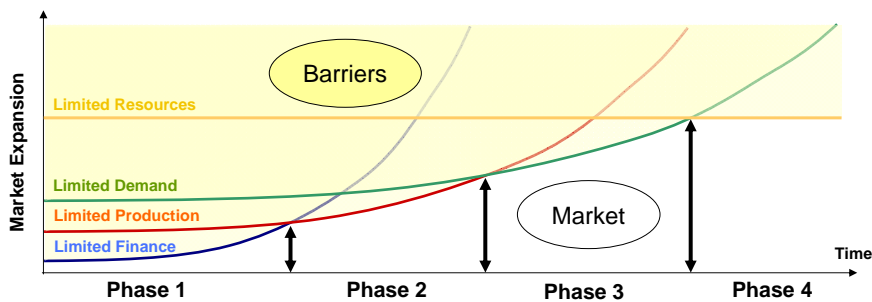
## Finding Renewable Energy Scenarios with the Guard-Rail Principle: Subsequently, different factors limit technology expansion.

Phase 1: Technology cost is high and expansion requires preferential investment

Phase 2: Prices have become competitive but production capacities are limited

Phase 3: Production catches up and the market is defined by demand

Phase 4: As demand grows the availability of resources may become limiting



## Targets for Sustainable Electricity Supply:

- ✓ **Inexpensive**
  - low electricity cost
  - no long term subsidies
  
- ✓ **Secure**
  - diversified and redundant supply
  - power on demand
  - based on inexhaustible resources
  - available or at least visible technology
  - capacities expandable in time
  
- ✓ **Compatible**
  - low pollution
  - climate protection
  - low risks for health and environment
  - fair access

## Example Scenarios

## Required Scenario Information

- Starting Point: Present Situation and Infrastructure
  - Energy Demand Scenario based on Population Prospects, Economic Development and Efficiency Options)
  - Potential Estimates by Technologies and Regions
  - Resource Estimates
  - Cost Estimates by Technologies and Sources
- ↳ Economic Optimisation of Energy Supply considering external Parameters (political instruments, e.g. emission trading, phase out of nuclear power, etc.)

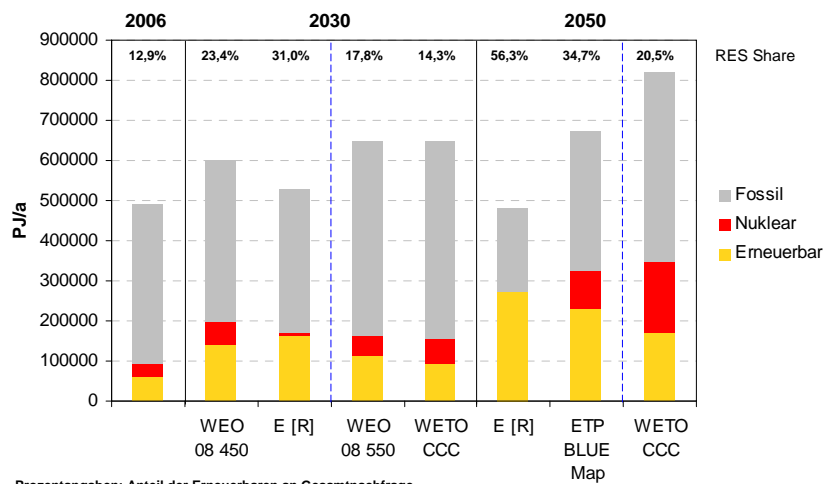
## Global Energy Scenarios

- European Commission - World Energy Technology Outlook (2006):  
Carbon Constraint Case (WETO CCC)
- International Energy Agency - Energy Technology Perspectives (2008):  
BLUE Map Scenario (BLUE Map)
- Greenpeace/EREC - Energy [R]evolution (2008):  
Energy [R]evolution Scenario (E [R])
- International Energy Agency - World Energy Outlook (2008):  
550 Policy Scenario (WEO 550)  
450 Policy Scenario (WEO 450)

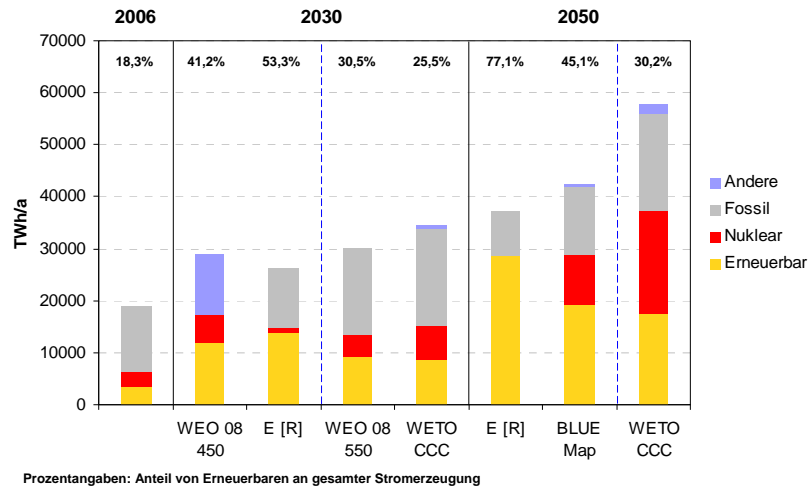
## Scenario Targets

	Maximum Temperature Increase	Maximum CO <sub>2</sub> -Concentration (ppm CO <sub>2</sub> eq.)	Projection Period
WETO CCC	3 °C	550	2050
BLUE Map	2 °C	450	2050
E [R]	2 °C	450	2050
WEO 550	3 °C	550	2030
WEO 450	2 °C	450	2030

## Primary Energy Demand

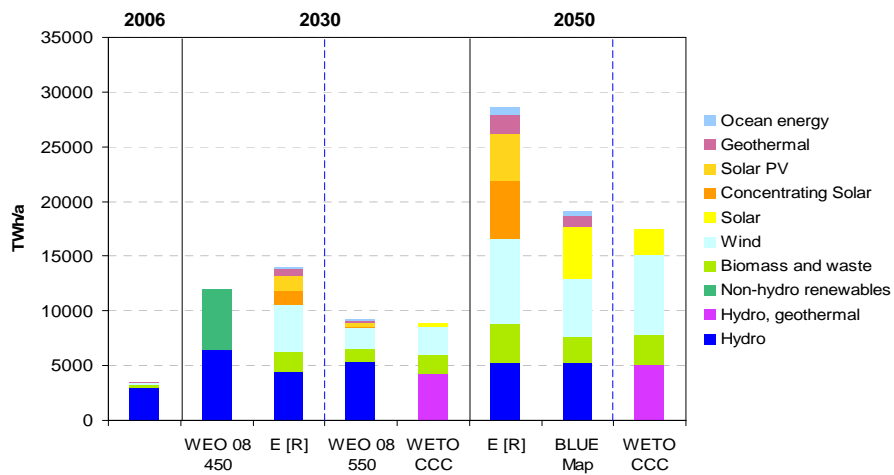


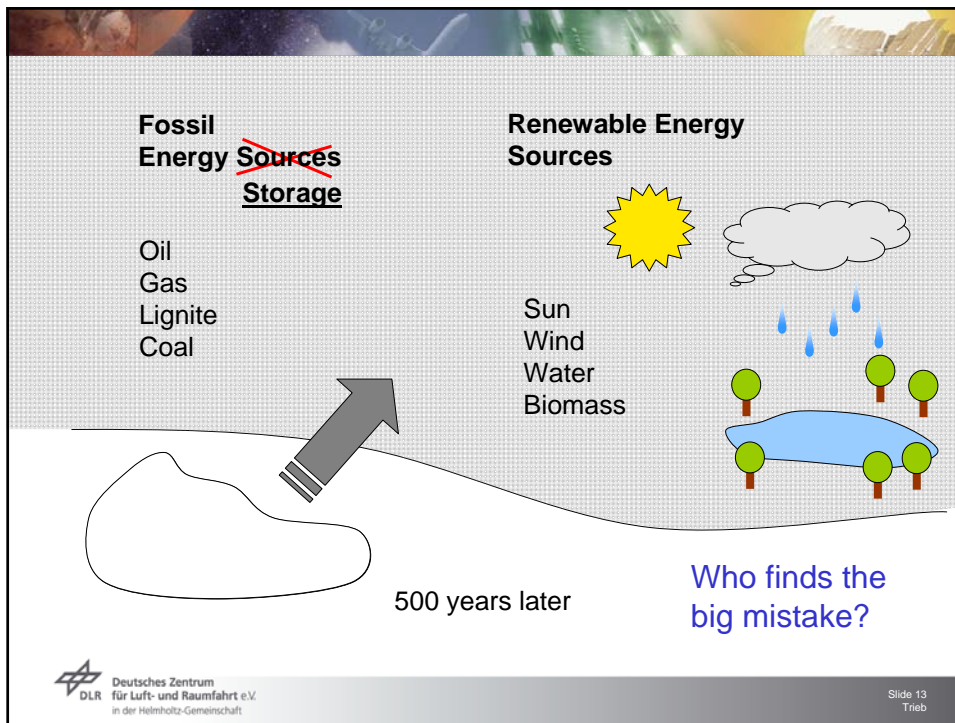
## Electricity Demand



Prozentangaben: Anteil von Erneuerbaren an gesamer Stromerzeugung

## Renewable Electricity Shares

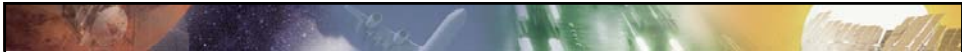




Homo sapien sapiens, the wise wise man,  
is the only species on earth that abstains from  
making use of the world's energy sources and  
instead empties the global energy storage.

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# Time for Discussion ...