Part 7: Electricity Supply Scenarios – How achieve Sustainability?

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Scenario Approaches
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


International Energy Agency - Energy Technology Perspectives (2008): BLUE Map Scenario (BLUE Map)


  550 Policy Scenario (WEO 550)
  450 Policy Scenario (WEO 450)
### Scenario Targets

<table>
<thead>
<tr>
<th></th>
<th>Maximum Temperature Increase</th>
<th>Maximum CO₂-Concentration (ppm CO₂ eq.)</th>
<th>Projection Period</th>
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<tbody>
<tr>
<td>WETO CCC</td>
<td>3 °C</td>
<td>550</td>
<td>2050</td>
</tr>
<tr>
<td>BLUE Map</td>
<td>2 °C</td>
<td>450</td>
<td>2050</td>
</tr>
<tr>
<td>E [R]</td>
<td>2 °C</td>
<td>450</td>
<td>2050</td>
</tr>
<tr>
<td>WEO 550</td>
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<tr>
<td>WEO 450</td>
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<td>2030</td>
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</table>

### Primary Energy Demand

#### RES Share
- **Fossil**
- **Nuklear**
- **Erneuerbar**

<table>
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<th></th>
<th>2006</th>
<th>2030</th>
<th>2050</th>
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<td>WEO 08 450</td>
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<td>31.0%</td>
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<td>WETO 08 550</td>
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<td>56.3%</td>
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<tr>
<td>WETO CCC</td>
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<td>34.7%</td>
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<td>ETP BLUE Map</td>
<td>23.4%</td>
<td>31.0%</td>
<td>26.5%</td>
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</table>

Prozentangaben: Anteil der Erneuerbaren an Gesamtnachfrage
**Electricity Demand**

![Electricity Demand Chart]

Prozentangaben: Anteil von Erneuerbaren an gesamter Stromerzeugung

**Renewable Electricity Shares**

![Renewable Electricity Shares Chart]
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.
Time for Discussion …