The way forward
Policy and Development of Renewable Energies in Germany

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Key factors for the future:
EU > 30% / 20% / 20% by 2020

- Climate change:
  limit temperature increase to 2°C:
  >-30% GHG emissions (at least -20% GHG)
- Energy security: reduce import dependence
- Competitiveness: innovative industries
  > 20% Renewable Energy (2005: 6.5 %)
  > Saving 20% of EU’s energy consumption
Primary Energy Consumption (2006)

Structure of Primary Energy Consumption 2005
Total 14,238 PJ

- Renewable 766 PJ (5.3%)
- Minerals 101 PJ (0.7%)
- Biofuel 101 PJ (0.7%)
- Heat 101 PJ (0.7%)
- Electricity 347 PJ (2.4%)


Electricity generation (2005)

- Renewables 26% (10%)
- Mineral oil 25% (11%)
- Natural gas 22% (2%)
- Lignite 13.0%
- Hard coal 10.9%
- Nuclear 12.6%
- Other and electricity import/export -0.3%
Objectives for Energy Policy

- **Energy Efficiency**
  - Efficient use of fossil energy (gas power plants, CHP)
  - Less losses (Grid)
  - More efficient devices
  - Isolation, transport

- **Renewable Energies**
  - Electricity
  - Heat
  - Transport

- **Energy Saving**

German Targets for RE

- **Primary energy supply**
  - 2010: 4.2 % (2000: 2.1%; 2006: 5.3%)
  - 2020: 16.0 % and up to 50% by 2050

- **Electricity**
  - 2010: 12.5 % (2000: 6.2%; 2006: 11.8%)
  - 2020: 27.0 %

- **Bio fuels**
  - 2010: 6.75 % (2000: 0.3%; 2006: 4.7%)
  - 2020: 12.5%

- **Heating/Cooling**
  - 2020: 14.0% (2000: 3.9%; 2006: 5.9%)
Instruments in Germany

- Renewable Energy Sources Act (EEG)  
  > *Feed-in guarantee*
- Market Incentive Programme  
  > *Grants and loans*
- Bio fuels  
  > *Blending obligation/ Quota system*
- Research and Development

How does the EEG work (I)?

- Priority access for RE to the power grid
- Priority transmission and distribution
- Obligation of grid operators to purchase the electricity produced from RE
- Fixed price ("tariff") for every kilowatt hour produced from RE for 20 years
How does the EEG work (II)?

- Equalisation of additional costs for electricity from RE between all grid operators and electricity suppliers
- All different types of RE are considered and tariffs are differentiated by source and size of the plant
- Annual decrease due to technical development (degression)
### Feed-in tariffs (2006)

<table>
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<tr>
<th>Energy Source</th>
<th>2006 Cent/kWh</th>
<th>Degression</th>
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<tbody>
<tr>
<td>Hydropower</td>
<td>6.65 - 9.67</td>
<td>0%</td>
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<tr>
<td>Biomass (≤20 MW)</td>
<td>8.15 – 17.16</td>
<td>1.5%</td>
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<tr>
<td>Geothermal Energy (≤20MW)</td>
<td>7.16 – 15.00</td>
<td>1.0%</td>
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<tr>
<td>Wind energy (onshore)</td>
<td>5.28 - 8.36</td>
<td>2.0%</td>
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<tr>
<td>Wind energy (offshore)</td>
<td>6.19 - 9.10</td>
<td>2.0%</td>
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<tr>
<td>Solar energy</td>
<td>40.60 – 56.80</td>
<td>5% - 6.5%</td>
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Sources: BMU. www.erneuerbare-energien.de, Stand: September 2006

### Electricity Generation from RE

- **Hydropower**
- **Wind energy**
- **Biomass**
- **Photovoltaics**
- **Geothermal energy**

![Electricity Generation from RE chart](chart)

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Cost for the Promotion of RE just 3%

Share of costs for one kilowatt hour (18 Ct)

- Production, transport and marketing of electricity: 60%
- VAT: 14%
- EEG: 3%
- Electricity tax (Ecological Tax Reform): 11%
- Concession levy: 10%
- CHP Act: 2%

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RE Heat Promotion: The Market Incentive Program (MAP)

Supports of 2000-2006:
- Investment volumes of the promoted measures: 6,5 Billion €

Balance of 2006:
- conveyances: about 160 Mio. €
- Investment volumes: about 1,6 Billion €

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Heat supply from RE

![Graph showing heat supply from renewable energy sources from 1998 to 2006.](image)

Outlook 2007

- Program volume 213 Mio. €
- New promotion starting from middle of January 2007
- Innovation bonus for new technologies to the cooling and process heat
- Efficiency bonus planned for 2008
Biofuels: Fiscal regulations

- Until 31.7.2006 all biofuels were exempted from energy taxation
- High value of energy tax exemption:
  - tax rate on diesel fuel: 47 Ct/l
  - tax rate gasoline: 65 Ct/l
- Driver for change of support system were tax expenditure losses
- System change from 1.1.2007 from price regulation (by tax exemption) to quantity regulation (by quota system)


Sources: BMU, „Renewable energy sources in figures – national and international developments“. May 2006. Internet: www.erneuerbare-energien.de
Quota on biofuels

- Quota system starts 1.1.2007
- Based on energy content
- Sub-quotas remain valid also after 2009
- Current share is more than doubled until 2015:

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<tbody>
<tr>
<td>Diesel fuel</td>
<td>4.4%</td>
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<tr>
<td>Gasoline</td>
<td>1.2%</td>
<td>2.0%</td>
<td>2.8%</td>
<td>3.6%</td>
<td>3.6%</td>
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<tr>
<td>Total quota</td>
<td>6.25%</td>
<td>6.75%</td>
<td>7.0%</td>
<td>7.25%</td>
<td>7.5%</td>
<td>7.75%</td>
<td>8.0%</td>
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Avoided Emissions from renewable energy sources: 97 Mio. t in 2006

- Strom: 67.1 Mio. t
- Wärme: 20.7 Mio. t
- Kraftstoffe: 8.7 Mio. t

Total: rd. 97 Mio. t, dav. rd. 44 Mio. t durch das EEG

Quellen: BMU nach Arbeitsgruppe Erneuerbare Energien - Statistik (AGEE-Stat); Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg (ZSW); Fraunhofer Institut für System- und Innovationsforschung Karlsruhe (ISI); Öko-Institut Darmstadt

vorläufige Angaben, Februar 2007
Employment effects (2006)


Total turnover with renewable energy sources in 2006

- Wind energy: €5,640 m; 26%
- Biomass: €8,130 m; 38%
- Solar energy: €5,940 m; 28%
- Hydropower: €1,270 m; 6%
- Geothermal energy: €580 m; 3%
Achievements of the EEG

- Share of RE in power production: about 11.8 % in 2006 [1998: 4.7%]
- 214,000 jobs in RE industries (2006)
- 1.6 € per month/household (2005)
Expected Development

Development of RE in primary energy consumption and CO₂-emission by 2050

Global Scenario
up to 2050

Thank you for your attention!