Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Renewable Energies in the German Energy System – Promotion and Development of Renewable and Geothermal Energy

Uwe Büsgen

BMU, KI III 1, Division Renewable Energy
Deputy Head of Division

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Outline of the Presentation

I. Renewable Energy in Germany Today
II. Possible Future of the Energy System in Germany
III. Promotion of Renewable Energies in Germany
IV. Geothermal Energy in Germany
V. Conclusions

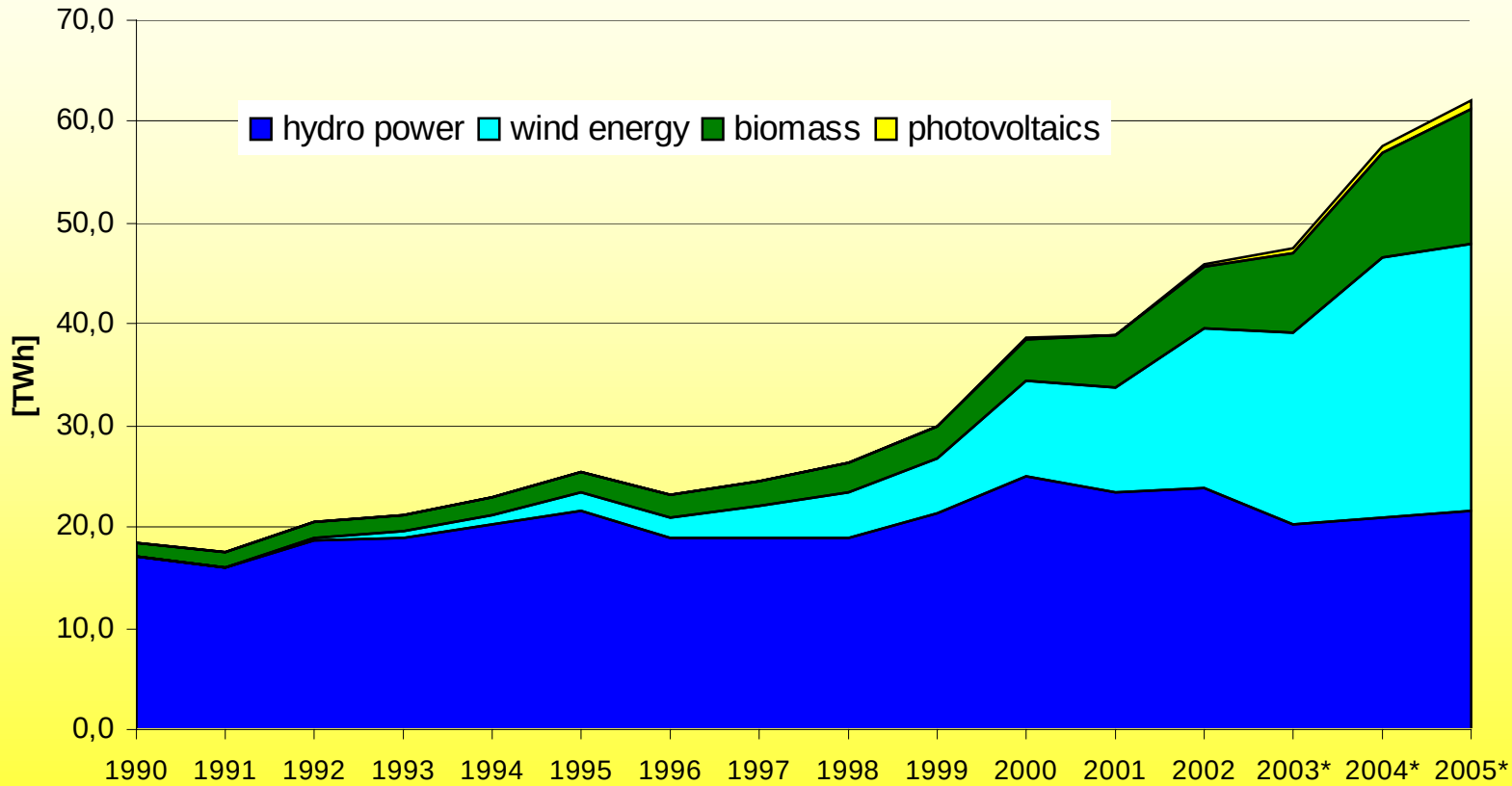
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Achievements and Targets
- Share of Renewable Energies -

Year in %	1998	2005	2010	2020	2050
Primary Energy	2.1	4.6	>4.2	>10	~ 50
Electricity	4.7	10.2	>12.5	>20	-
Fuels	0.14	3.6	6.75	12,5	-

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Electricity Generation from Renewable Energies in Germany

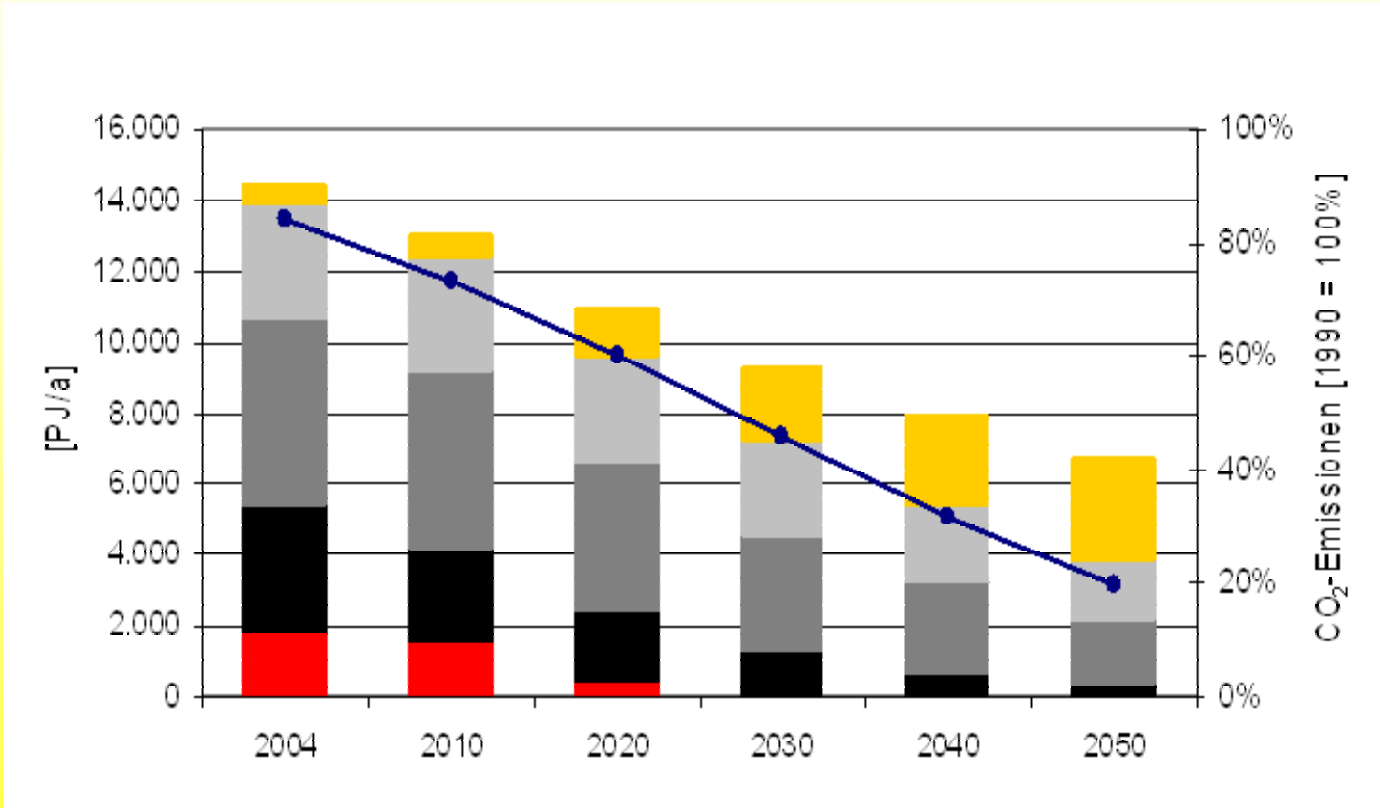


A possible future for our energy supply:

- causing 80 % less CO_2-emissions, and
- doing without nuclear energy

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Primary Energy Scenario to 2050, Germany



Source: DLR, ifeu, WI 2004

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Promotion of Renewable Energy in Germany

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Renewable Energy Policy in Germany

- Renewable Energy Sources Act (EEG)
- Market Incentive Programme
  - > *Grants and loans / new regulation planned*
- Bio-fuels
  - > *Tax reduction/quota obligation*
- Research and Development

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Main Features of the EEG (I)

- Priority grid access for RE installations
- 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 in general 20 years

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Main Features of the EEG (II)

- All different types of RE are considered and differentiated by source and size of the plant
- Annual decrease of the tariff due to technical development (degression)
- Investors are individuals (e.g. farmer), private communities, professional investors, federal republic or states

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Feed-In Tariffs according to the EEG

	Tariffs for installations built in 2006 **(Cent/kWh)** (paid for 20 years where not otherwise indicated)	*Degression* **(%/a)**
Large Hydropower (5-150MW)	**3.62 – 7.51** (paid for 15 years)	**1.0**
Small Hydropower (< 5MW)	**6.65 - 9.67** (paid for 30 years)	**---**
Biomass (< 20MW)	**3.78 – 21.16**	**1.5**
Geothermal Energy (< 20MW)	**7.16 - 15.00**	**1.0** (beginning in 2010)
Wind energy (onshore)	**5.28 / 8.36** (first x years / remaining years) (x depends on the quality of the site)	**2.0**
Wind energy (offshore)	**6.19 / 9.10** (first x years / remaining years) (x depends on the quality of the site)	**2.0** (beginning in 2008)
Photovoltaics	**40.60 - 56.80**	**5.0**

Degression: The tariff is in general constant for commissioned installations, but depends on the year of the initial operation. The later an RE-installations is commissioned, the lower the tariff.

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Geothermal Energy in Germany

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Geothermal Projects in Germany

- **Neustadt-Glewe, 0.23 MW_e, 3 MW_{th}, in power since 2003**
- **Unterhaching, 3.36 MW_e, 28 MW_{th}, startup 2007**
- **Landau, 3.8 MW_e, 3-5.5 MW_{th}, startup 2007**
- **Bruchsal, 0.5 MW_e, 4 MW_{th}, (startup 2007)**
- **four additional projects with startup 2008**

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Main objectives of R&D in the field of RE

- **Reducing the cost of RE**
  - conversion efficiency
  - production processes
- **Durability of systems and components**
- **Research on new and innovative solutions for RE**

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Geothermal Energy Demonstration Projects

- **For the production or electricity and heat from geothermal energy out of different geothermal formations**

- **Relevant locations:**
  - Molassebecken
  - Oberrheingraben
  - Norddeutsches Becken (Groß Schönebeck)

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

R&D Targets in Geothermal Energy

- **Reduction of geological risk related to geothermal operations through better geological information**
- **Optimization of the stimulation technology**
- **Incrasing of the availability of water pumps for the extraction of complicated chemical waters with high flow rates and temperatures up to 200°C**

Conclusions

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Achievements in Germany by 2005

- Share of renewable energies in power supply: about 10.2 % [1998: 4.7%]
- 170,000 jobs in renewable energy industries
- € 16 Billion turnover
- 83 Mio. tons of CO_2-reduction
- 38 Mio. tons of CO_2-reduction due to EEG (2004: 34 Mio. tons)

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

The Future of Geothermal Energy in Germany

- We are in the beginning of a promising long time development
- With the EEG a very sophisticated instrument to promote geothermal energy exists
- A stable political and economical situation exists
- More R&D and demonstration projects are necessary

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Thank you for your attention!

For more information, please visit:

www.bmu.de

www.erneuerbare-energien.de

www.feed-in-cooperation.org