

Country Report Germany

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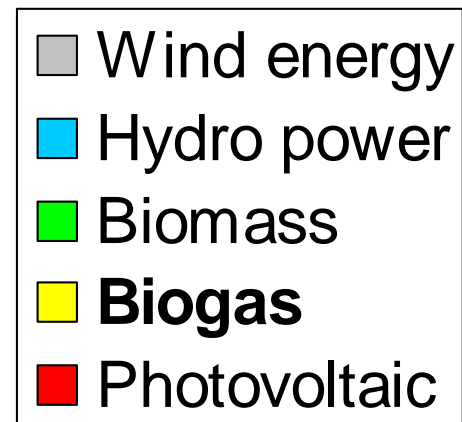
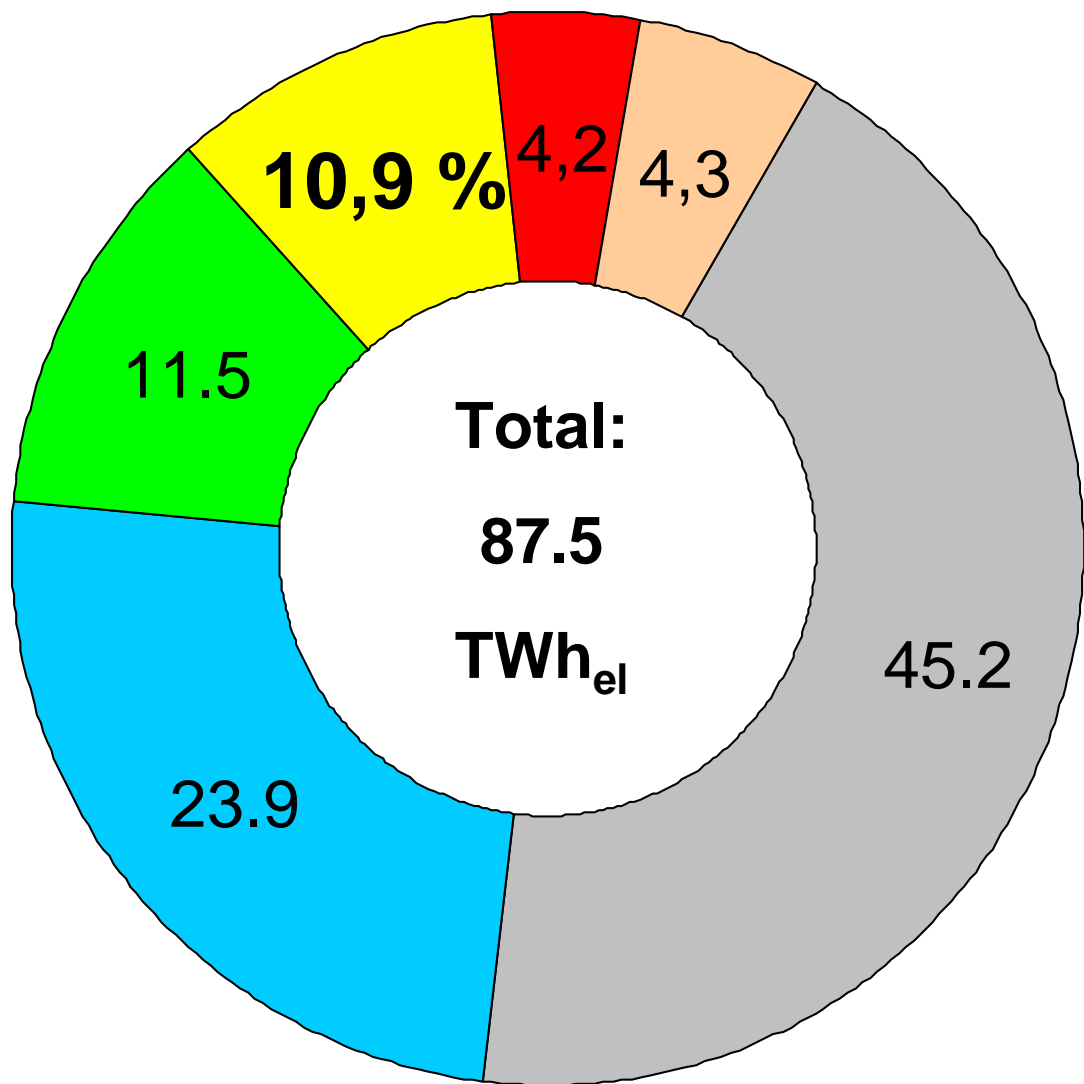
Bundesforschungsinstitut für Ländlichen Raum, Wald und Fischerei



- **Renewable Energy situation in Germany**
- **New Renewable Energy Act (EEG 2009)**
- **Outlook for 2009**

- Today around 4,000 biogas plants with a total electric capacity of 1,400 MW are in operation.
- Only around 300 biogas plants were built in 2008. Increased costs for energy crops and waiting for the new *Renewable Energy Act* has stopped the biogas boom.
- Gas upgrading and injection into the gas grid increased. 16 upgrading plants are in operation and 20 plants are planned or in construction.
- A first virtual combined renewable power station has been tested successfully (25 plants: wind power, biogas, solar energy, hydro power).

Renewable Energy situation in Germany (2007)

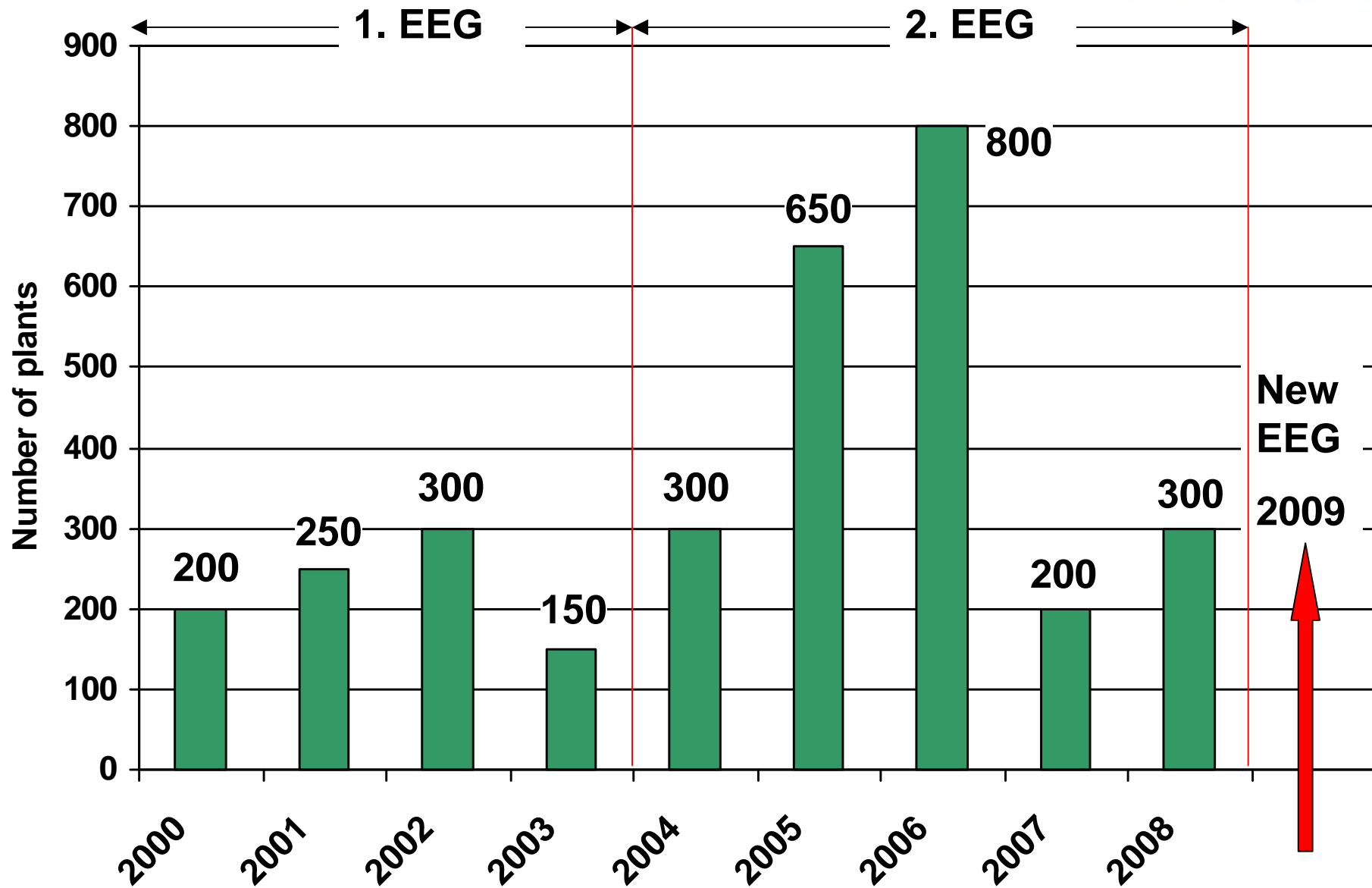


**Share on electricity
consumption:**

14,2 %

(Biogas: 1,5 %)

Number of new biogas plants per year



Aim of the amendment is:

- **To increase the share of renewable electricity production to 30 % in 2020 (14.3 % in 2007).**
- **To increase the share of renewable heat production to 14 % in 2020 (6 % in 2006).**
- **To fulfill the CO₂-reduction program.**
- **Supporting the development and introduction of new technologies for renewable energy production.**
- **To avoid environmental and climate pollution from animal manure .**

Electric power [kW]	Basic compensation [€Cent/kWh _{el}]	Biomass bonus [€Cent/kWh _{el}]	Degression [%]
≤ 150	11.67 (10.67) ¹⁾	7.0 (6.0)	1.0 (1.5)
≤ 500	9.18 (9.18)	7.0 (6.0)	1.0 (1.5)
≤ 5,000	8.25 (8.25)	4.0 (4.0)	1.0 (1.5)

1) Dates in brackets EEG 2004

- The biomass bonus is only paid for new „BlmSch“-plants (> 10t/d), if the residual storage tank is gas tight covered.
- Specific crops by-products can be treated together with energy crops and manure (renewable biomass), but the bonus is only paid for the share of renewable biomass.

The biomass bonus is paid for the utilization of the following substrates:

- **Grass from pasture and meadow**
- **Forage crops inclusive total cereals, oil crops, legumes**
- **Grain, tuber, beets, fruits, vegetables, potato tops, beet tops**
- **Non-treated drug crops and spice crops**
- **Plant mass from landscape preservation**
- **Faeces, urine and fodder residues from productive livestock and horses**

The following by-products can be treated in combination with renewable biomass without loss of the biomass bonus:

- **Brewer's grains**
- **Stillage from grains and potato**
- **Glycerol from plant oil treatment**
- **Potato fruit water**
- **Potato pulp**
- **Potato peels**
- **Rape cake**
- **Rape extraction cake**
- **Sugar beet chips**

Bonus for special substrates and heat utilization

Electric power [kW]	Manure bonus [€Cent/kWh _{el}]	Landscape preservation bonus [€Cent/kWh _{el}]	Heat bonus [€Cent/kWh _{el}]
≤ 150	4.0	2.0	3.0
≤ 500	1.0	2.0	3.0
≤ 5,000	-	-	3.0

- The manure bonus is paid if at least 30 % of manure is used for biogas production (Mean value for 500kW: 1,98 €Cent/kWh).
- In addition to the biomass bonus a 2 €Cent/kWh-bonus is paid if biomass from landscape preservation is used.
- The heat bonus is only paid for specific heat utilization techniques which are shown in a positive-list.

Manure requirement for biomass bonus (30%)



	150 kW	500 kW	Electricity production [%]
Manure [t FM]	1,530	4,900	5
Maize [t FM]	3,570	11,425	95
Mixture [t FM]	5,100	16,325	100

Necessary animal husbandry

Type of animal	Manure [t/(animal*a)]	No. animals 150 kW	No. animals 500 kW
Milk cows	25	61	196
Fattened pigs	2	765	2,450

The heat bonus is paid for the following heat utilization:

- **Heating or cooling of low energy buildings (< 200 kWh/(m²*a) including hot water supply**
- **Heat injection into a heat net of at least 400 m length with heat losses lower than 25 %**
- **Application of process heat in industry**
- **Production of wood pellets for fuel application**
- **Heating of stables for pigs and poultry.**

Technology bonus

Electric power [kW]	Tech-bonus [€Cent/kWh _{el}]
≤ 150 kW	2,0
≤ 500 kW	2,0
≤ 5 MW	2,0

Electricity production by:

- Fuel cells
- Gas turbines
- Organic-Rankine- Plants (ORC)
- Stirling engines

Gas capacity ¹⁾ [Nm ³ /h]	Tech-bonus [€Cent/kWh _{el}]
≤ 350	2,0
≤ 700	1,0

1) Upgraded raw gas

- Upgrading of biogas to natural gas quality
- Methane losses ≤ 0,5 %
- Electricity consumption ≤ 0,5 kWh/m³ raw gas

- **A new biogas boom is expected due to the higher compensation for the produced electricity (maximum 27 €Cent/kWh_{el}).**
- **Many small biogas plants with a capacity of < 200 kW_{el} will be built.**
- **For gas-injection biogas plants with a capacity between 250 and 5,000 m³/h biomethane will be built.**
- **The share of manure for biogas production increases due to the manure bonus.**

- **More intercropping crops and biomass from grassland is used for biogas production.**
- **Dry-fermentation processes will be used for biomass from landscape preservation (bonus: 2 €Cent/kWh_{el}).**
- **The interest for treating biowastes in agricultural biogas plants is low due to the strong guidelines of the biowaste ordinance.**
- **For a more efficient gas utilization micro-gas-grids find increased application.**
- **Several plants have started the production of organic fertilizer pellets from digestate.**

**Many thanks for your
attention!**

