

# The German Market Promotion Initiatives for Renewable Energies

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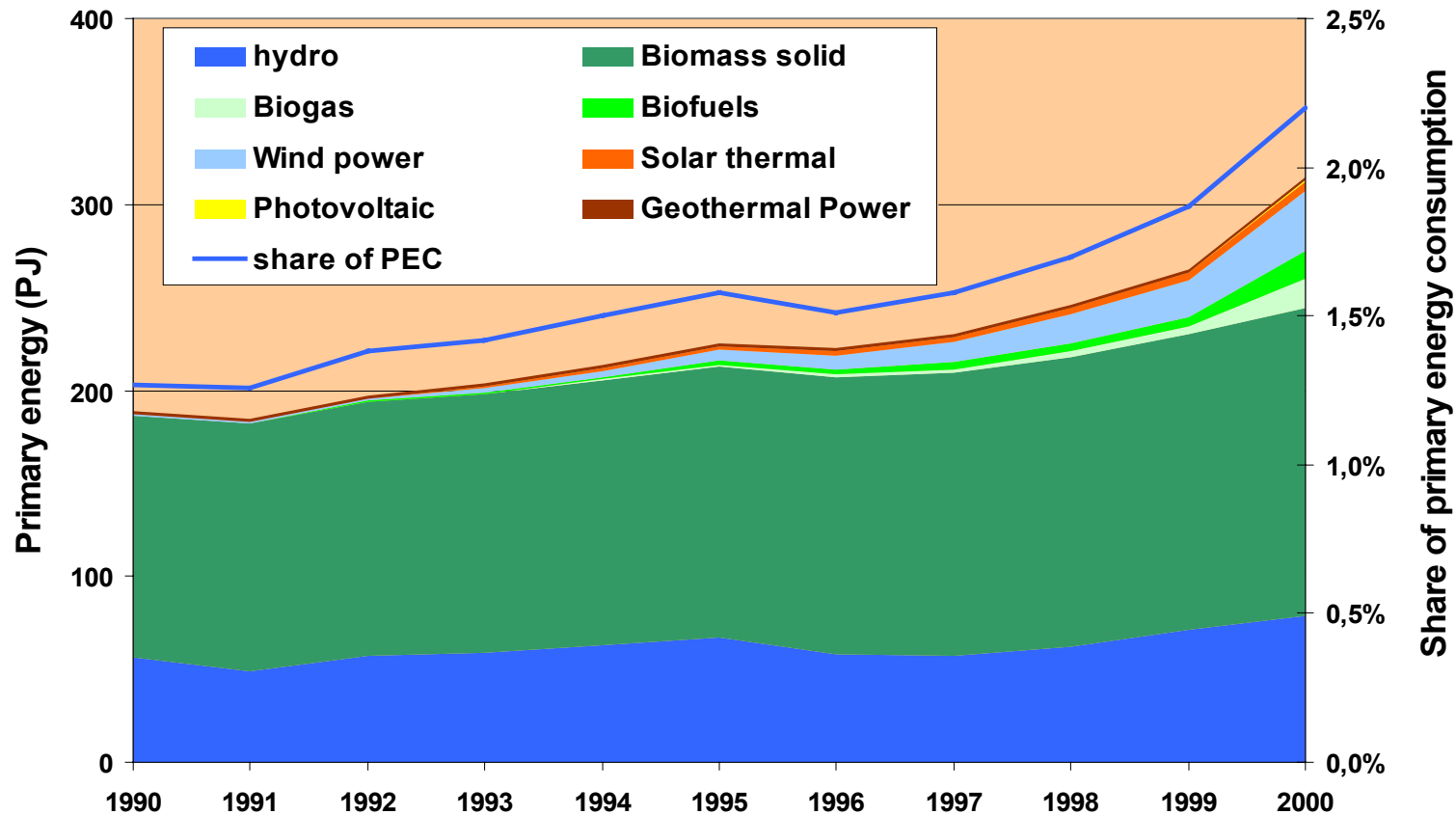
President

German Renewable Energy Association

(Bundesverband Erneuerbare Energie e.V.)

***BEE***

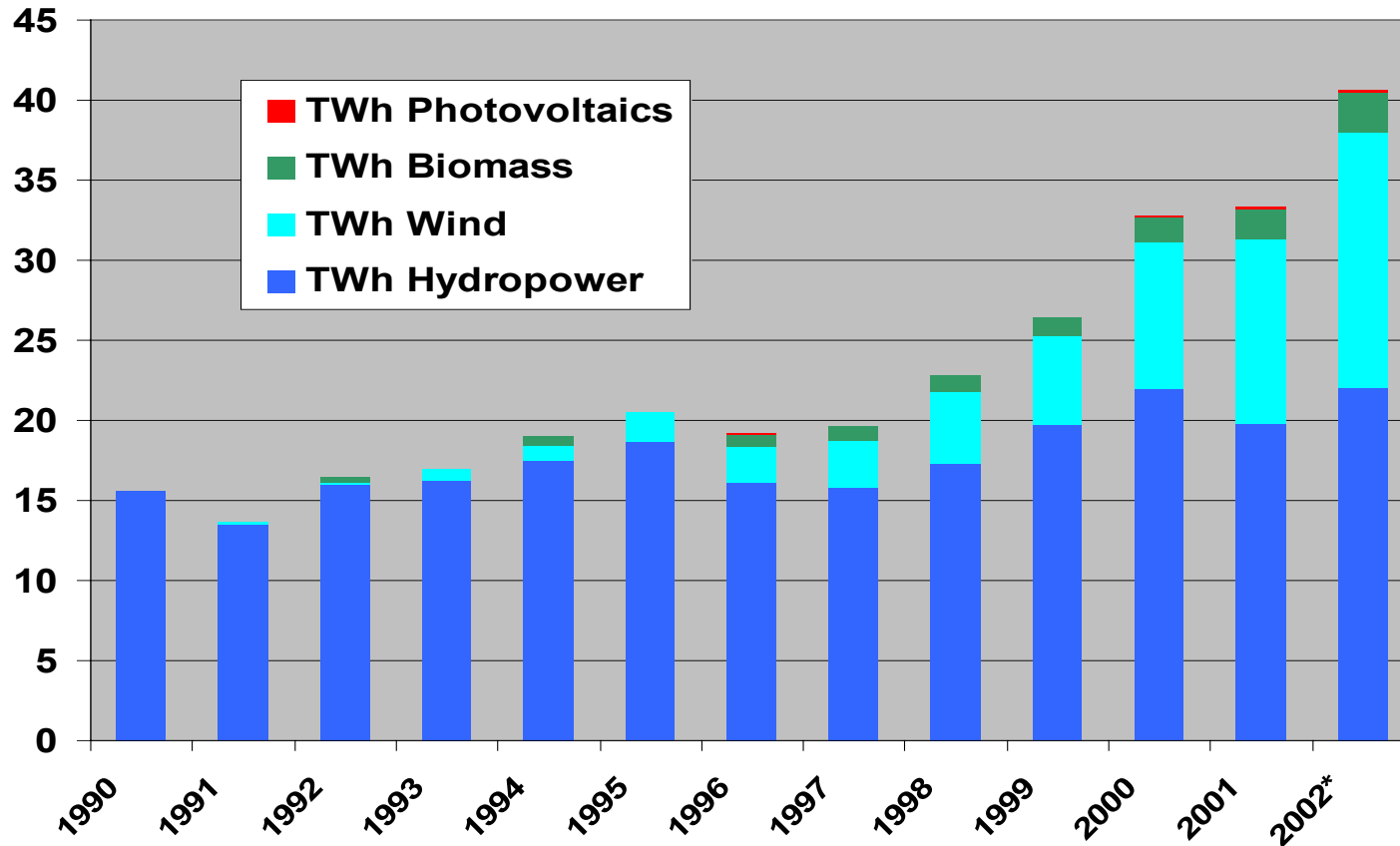
# Renewable energy - market development



Development of renewable energy and share of the primary energy consumption in Germany.  
 Quelle: F. Staiß, Jahrbuch Erneuerbare Energie 2001

# Development of renewable electricity

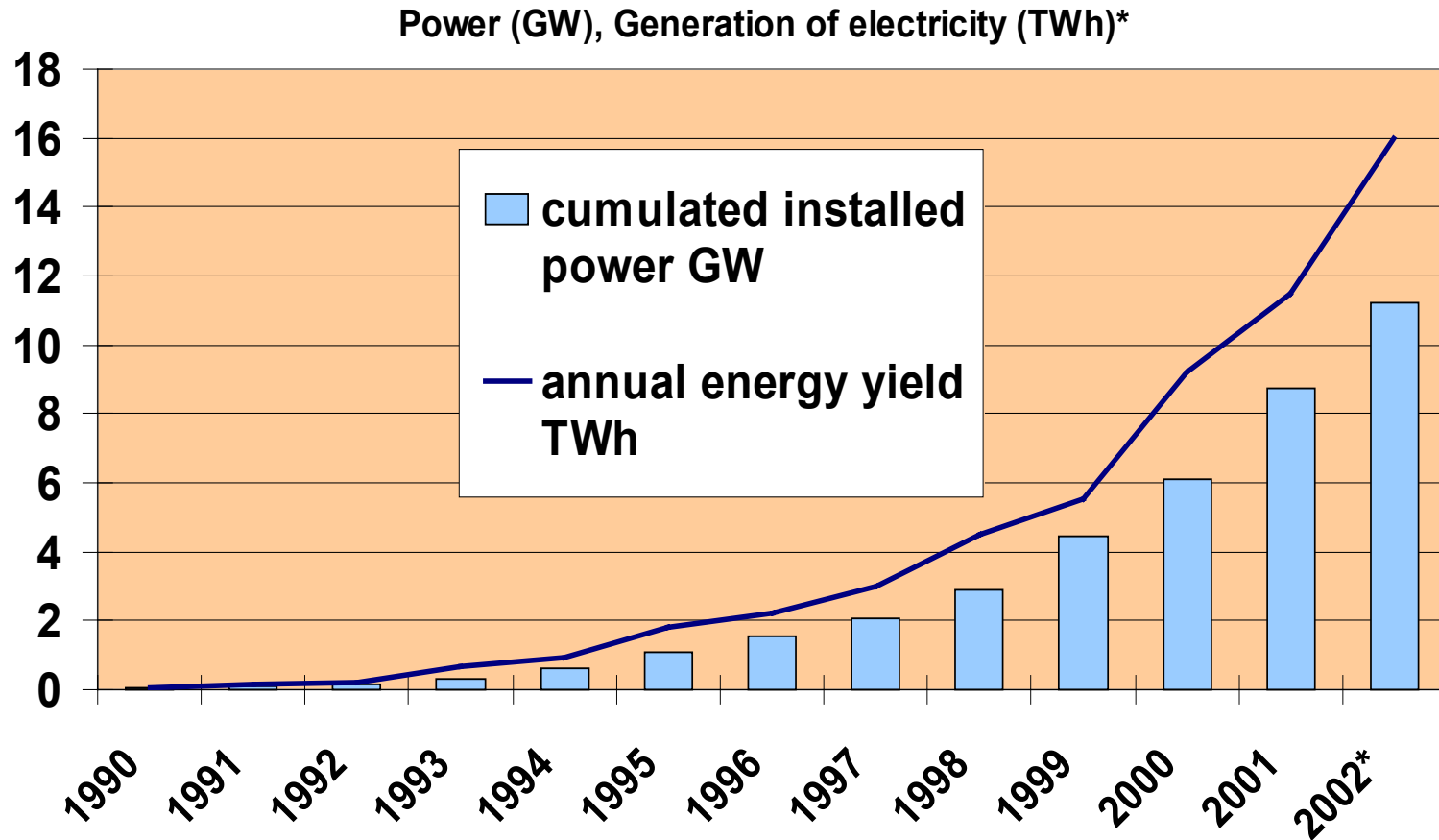
Generation of renewable electricity



Source: F. Staiß, Jahrbuch Erneuerbare Energie 2001/ Kurzziel.

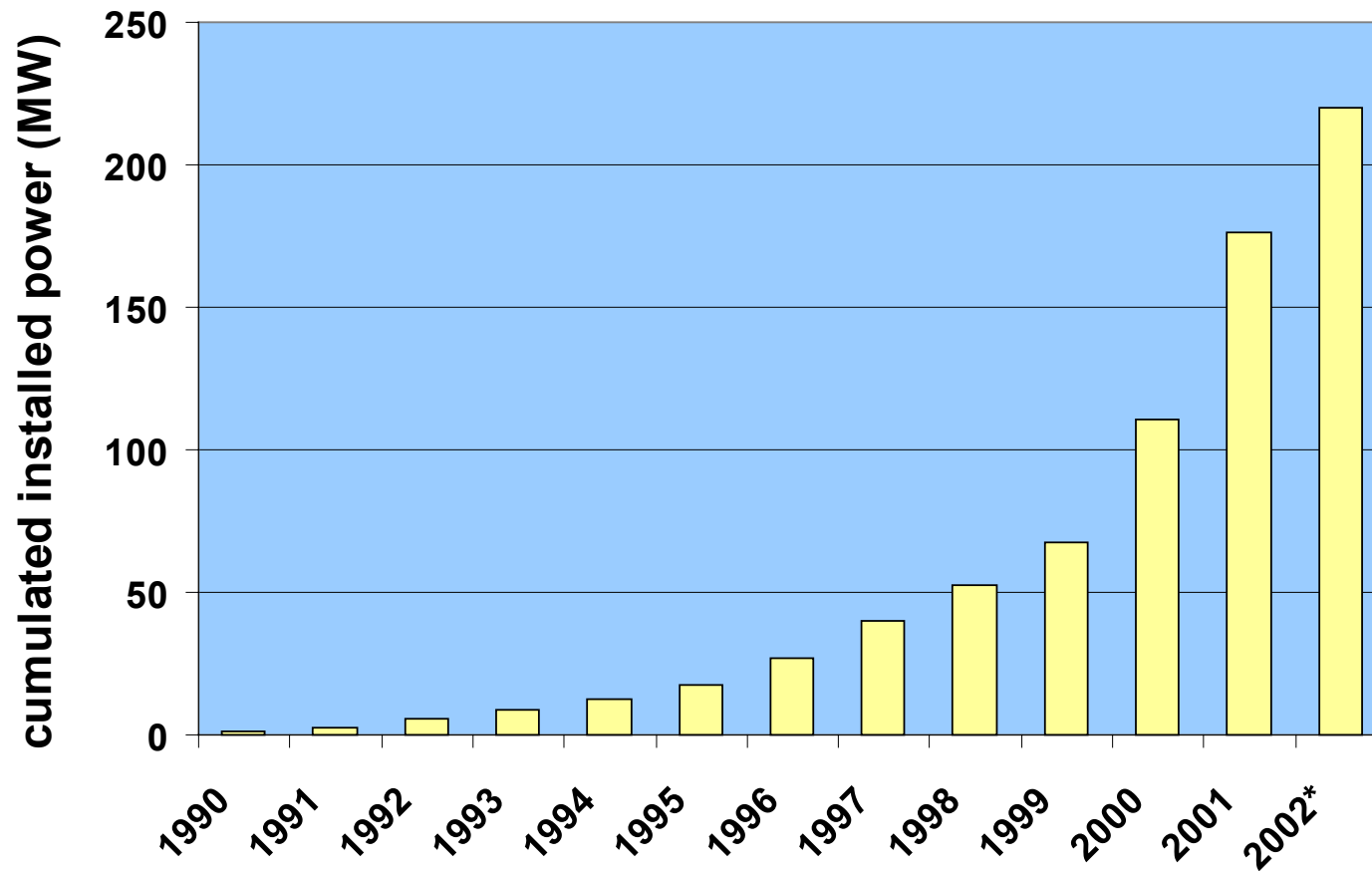
\*Prediction

# Wind energy - market development



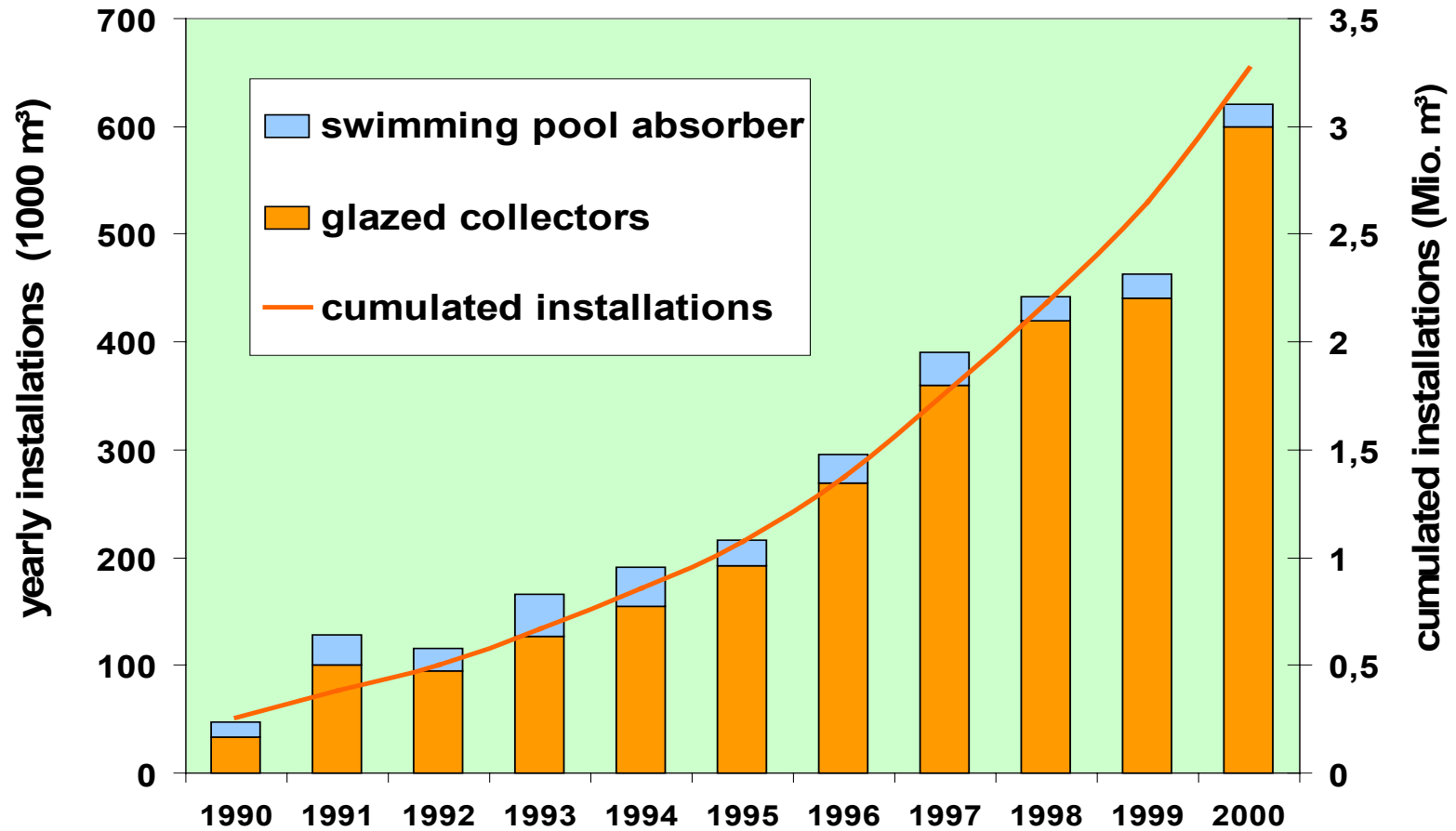
Source: German Wind Energy Association e.V., F. Staiß,  
Jahrbuch Erneuerbare Energie 2001. \*Prediction

# Photovoltaics



Development of the cumulated installed power of photovoltaics. Source: F. Staiß, Jahrbuch Erneuerbare Energie 2001/ Kurzziel. \*Prediction

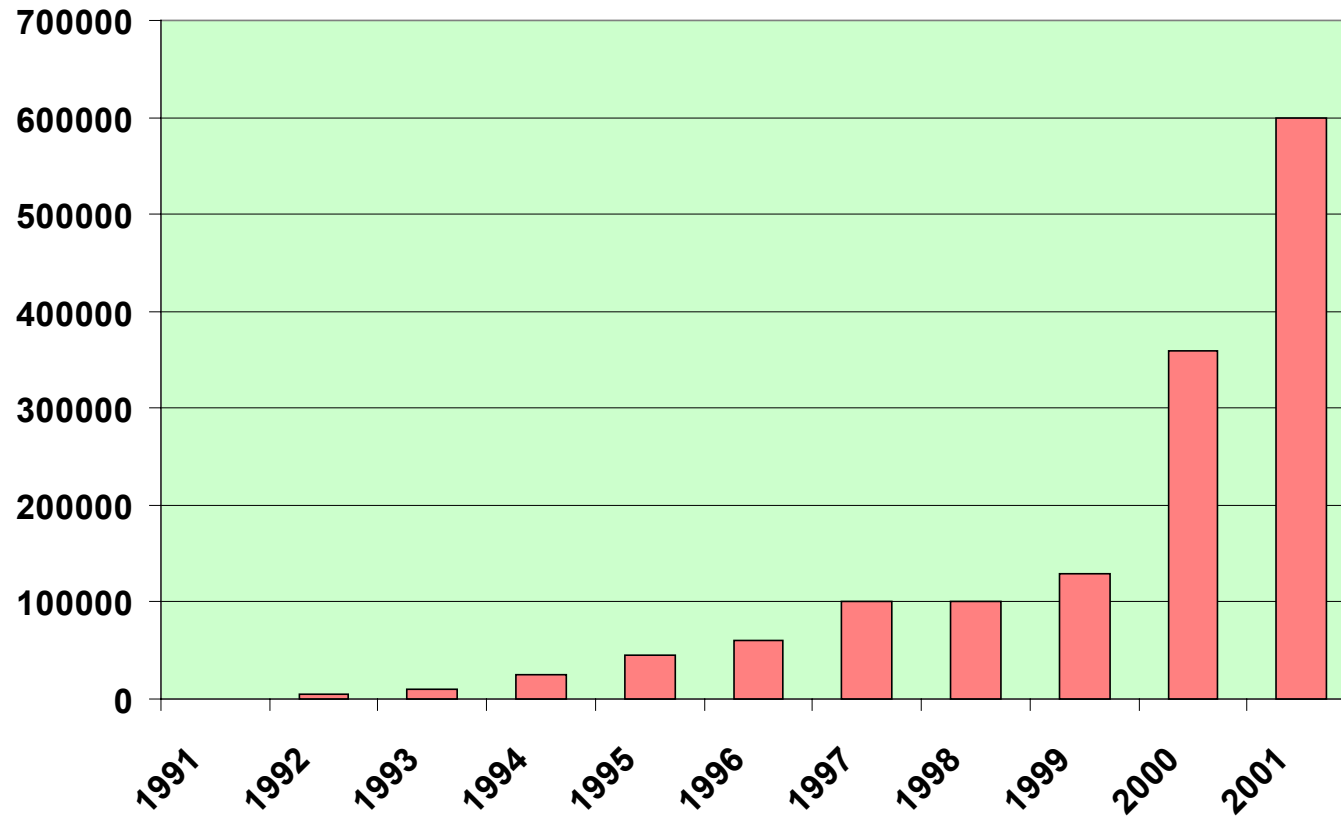
# Solar thermal



Development of the thermal solar installations. Source: F. Staiß, Jahrbuch Erneuerbare Energie 2001

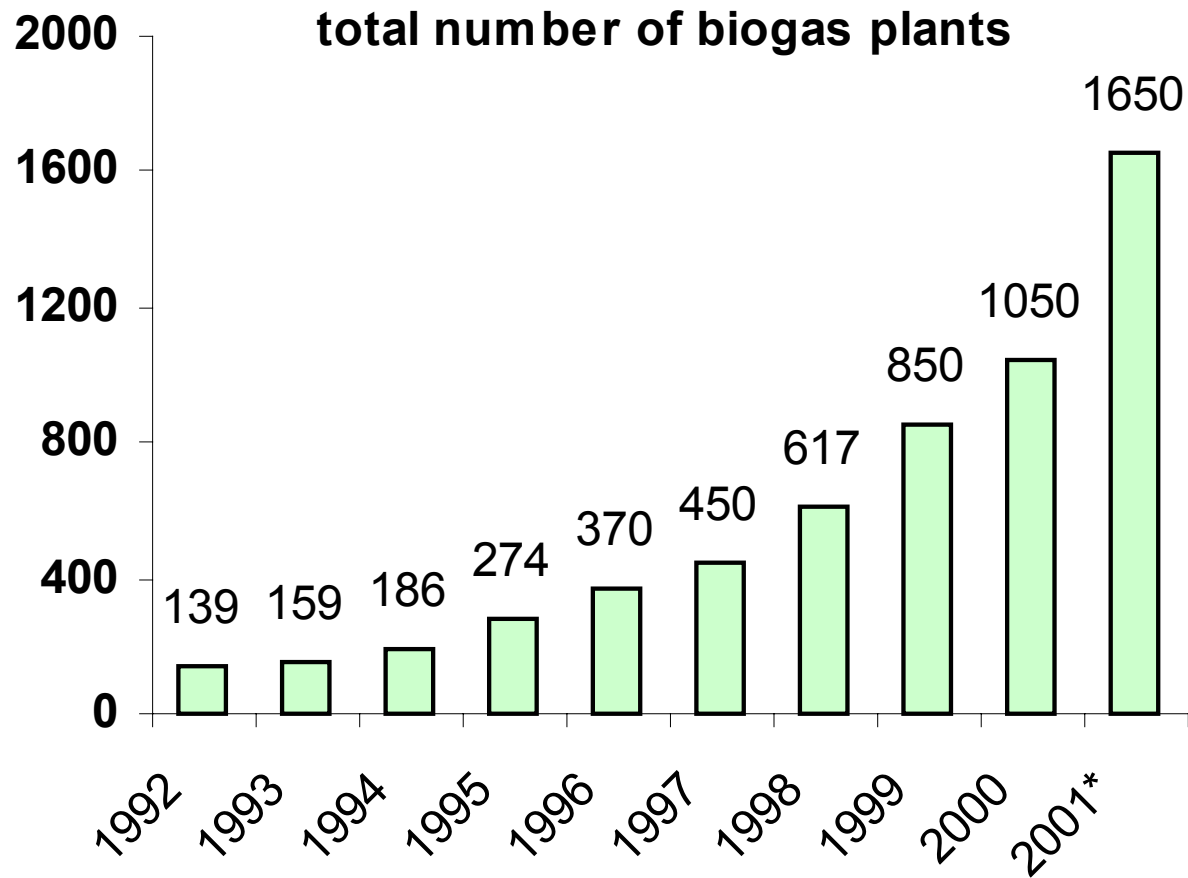
# Biodiesel

Development of Biodiesel [t]



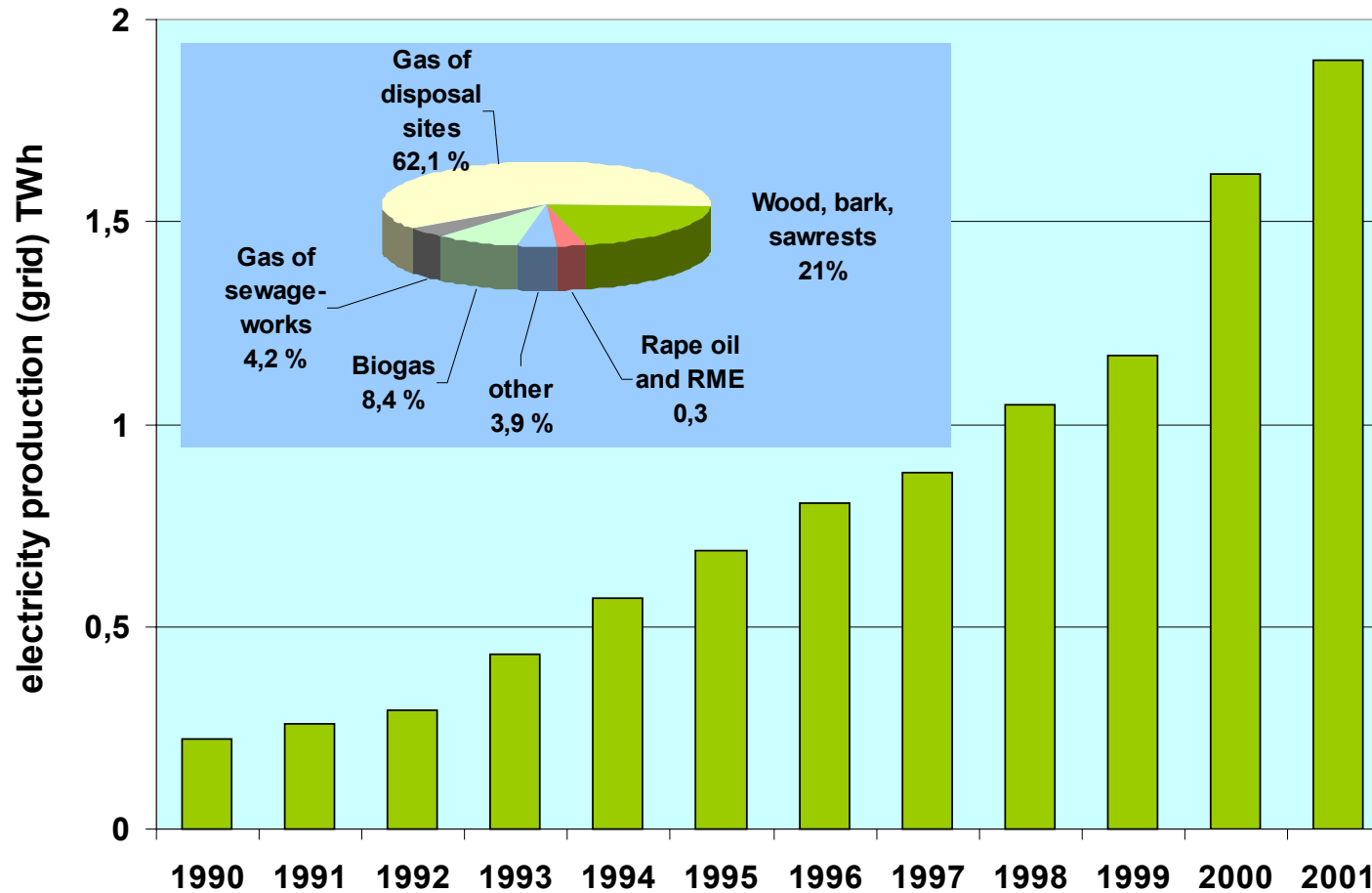
Development of Biodiesel in Germany; Source: F. Staiß, Jahrbuch Erneuerbare Energie 2001

# Biogas



Development of biogas plants in Germany, \* 2001 estimated; Source: Fachverband Biogas e.V.

# Biomass electricity production



Electricity production of biomass (without private consumption) and structure in 1999;  
Quelle: F. Staiß, Jahrbuch Erneuerbare Energie 2001

# Support schemes for renewable energies

## 1. Budgetary dependent support schemes (unstable)

- “Market incentive programme ”
- 100 000 Roofs Programme
- ERP, DTA, REN
- Tax incentives, environmental tax

## 2. Budgetary independent support schemes (stable)

- Payment regulation systems (Feed in law) (EEG)
- quantity regulation system (Quota/ bidding system)
- voluntary trade with “Green electricity”

# Support schemes for renewable energies

## Market Incentive Programme

- Amount 2001: 150 Mill. EUR, 2002: 200 Mill. EUR
- Start of construction is possible with the application
- not cumulative to other public funds
- financed by the eco-tax revenue

## 100 000 Roofs Programme

- Amount 500 Mill. EUR, investments total 1,25 Mrd. EUR
- effective interest 1,91 %
- 10-year term
- < 5 kWp credit to 6412,50 EUR/kW
- > 5 kWp 50 % of 6412,50 EUR/kW

# Support schemes for renewable energies

## ERP/DTA credit resources

- interest rate 5,35 eff. (at the moment)
- for all renewable energy projects available

## REN NRW

- 50 Mio. DM mainly for solar energy and biomass

## Tax incentive

- allowance for home-owners: solar thermal 8 years max. 250 EUR
- Eco-tax: advantage for renewable energy in the Heat market 0,18 Pf/kWh
- Fuels: mineral oil and eco-tax exemption 0,56 EUR/l (5,6 ct/kWh)

# Support schemes for renewable energies

## Feed in law (EEG)

- advantages:
  - high efficiency
  - allows price differentiation and reduces costs
  - high reliability and certainty of planning
  - low expense of administration
  - no burden to the government budget, no subsidies of the energy prices
- disadvantages:
  - lack of acceptance by followers of neo-liberal ideology
  - balancing scheme of the EEG only works in the power market

# Support schemes for renewable energies

## Quota system and certificate trading

- advantages:
  - high acceptance by followers of neo-liberal ideology
  - works both in the power market and the heat market
- disadvantages:
  - low efficiency
  - low reliability and certainty of planning
  - high expense of administration
  - hinder decentralised medium-sized structures
  - nearly unlimited possibilities of abuse

## “Green electricity” trading

- electricity consumers’ low willingness to change entails a low market share of under 0,1 %

## Wind energy in Europe

### Payment regulating versus quantity regulation system

	Country	Installed Power End 2000 (MW)	Installed Power End 2001 (MW)
<b>Countries with a payment regulating system (Feed in law)</b>	Germany	6.113	8.754
	Spain	2.235	3.337
	Denmark*	2.300	2.534
	total	10.648	14.625
<b>Countries with a quantity regulation system (Quota/ bidding system)</b>	UK	406	474
	Ireland	118	125
	France*	66	116
	total	590	715

\* Denmark has announced a new quota system. France has established a minimum price remuneration system

# German Renewable Energy Act (EEG)

- On 25 February 2000 the German Parliament has adopted the Renewable Energy Act (EEG - Law for the priority access of electricity from renewable energy sources)
- The EEG replaces the former German Feed-In Law from 1990
- Objectives of the EEG:  
Doubling the share of renewable electricity within 10 years

## Definition of renewable energies to be granted by EEG

- Hydropower up to plant capacities
- Biomass up to plant capacities of 20 MW including gas from landfills, sewage treatment plants and mines

An additional ordinance specifies the substances and technical processes which are included in the application of the EEG (only extremely contaminated wood (PCB) is excluded by this ordinance which was released in June 2001)

- Electricity from geothermal plants
- Wind power including off-shore windfarms outside an area of 3 nautical miles from the coast
- Electricity produced from solar radiation energy up to 5 MW on roofs or 100 kW elsewhere

## Obligation to purchase and pay for electricity from renewable plants

- The grid operators are obliged to connect renewable power plants to their grid at the point where a connection is technically and economically suitable. The suitability of the grid includes a reasonable upgrade if required.

The grid operators have to purchase the electricity at the fixed tariffs of EEG

# Grid costs

The costs caused by connecting the plants to the most suitable point of the grid have to be paid by the plant operator

The costs for upgrading of the grid for public power supply have to be settled by the grid operator

# Nation-wide balancing schemes

Step 1. A renewable energy generator is entitled to feed his electricity into the next appropriate electricity system (usually a local network). He receives a payment for his electricity by the (local) transmission system operator, differing for each renewable energy technology based on their real costs.

Step 2. The regional transmission system operator is obliged to purchase electricity from renewable energy sources from the local transmission system operator.

Step 3. All regional transmission system operators are obliged to exchange their electricity from renewable energy sources, resulting in an equal share among all regional transmission system operator in Germany (flexible quota on the transmission system level)

# Nation-wide balancing schemes

Step 4. All electricity suppliers are obliged to purchase from their regional transmission system operator an equal share of electricity from renewable energy (flexible quota on electricity supplier level).

Step 5. The electricity supplier delivers electricity to the electricity consumers. The supplier may or may not rise prices to compensate for his extra costs due to the purchase of electricity from renewable energy sources. He may also offer special green tariffs in order to sell his green electricity for an appropriate price

## EEG Feed-In Tariffs (per kWh electricity)

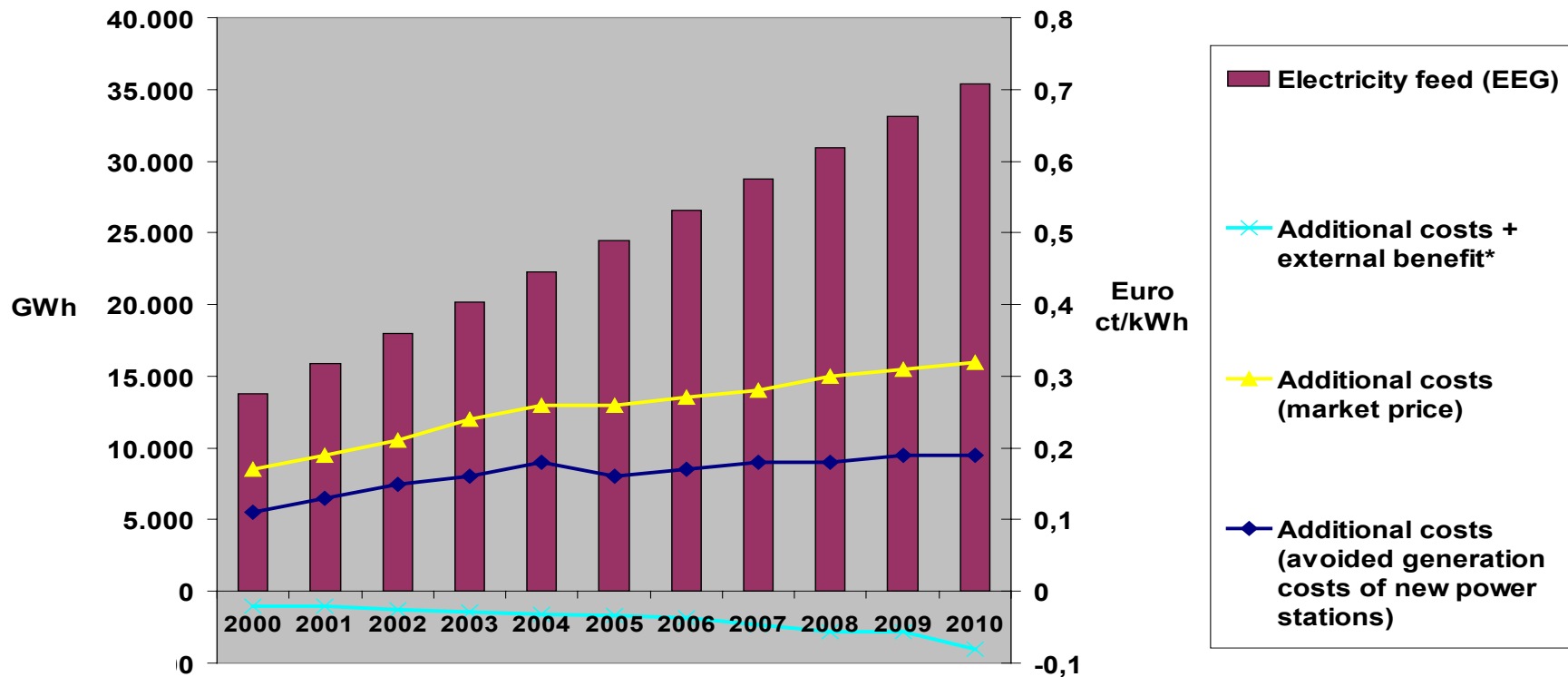
	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Solar power</b>	48,1	45,7	43,4	41,2	39,1	37,1	35,2	33,4	31,7
<b>Wind power initial tariffs/ prolongation*</b>	9	8,9	8,8	8,7	8,6	8,5	8,4	8,3	8,2
<b>Wind power final tariffs</b>	6,1	6	5,9	5,8	5,7	5,6	5,5	5,4	5,3
<b>Biomass &lt; 500 kW</b>	10,1	10	9,9	9,8	9,7	9,6	9,5	9,4	9,3
<b>Biomass 500 kW - 5 MW</b>	9,1	9	8,9	8,8	8,7	8,6	8,5	8,4	8,3
<b>Biomass 5 MW - 20 MW</b>	8,6	8,5	8,4	8,3	8,2	8,1	8	7,9	7,8
<b>Hydropower and Gas (from landfills, mines, sewage plants) &lt; 500 kW</b>	7,65	7,65	7,65	7,65	7,65	7,65	7,65	7,65	7,65
<b>Hydropower and Gas &lt; 5 MW</b>	6,63	6,63	6,63	6,63	6,63	6,63	6,63	6,63	6,63
<b>Geothermal power &lt; 20 MW</b>	8,93	8,93	8,93	8,93	8,93	8,93	8,93	8,93	8,93
<b>Geothermal power more than 20 MW</b>	7,14	7,14	7,14	7,14	7,14	7,14	7,14	7,14	7,14

\*windpower: initial tariffs: first 5 years (onshore), first 9 years (offshore, if installed till 2006), Prolongation 0-15 years depending on site quality, Feed-In tariff duration 20 years

# Results of the German renewable energy policy

- Increased dynamic in market growth in all sectors of RES (electricity)
- Compliance with EU-regulations (EEG is no state aid according to EU-court 13, 2001)
- Reduction in production costs (wind energy: 50 % reduction within 10 years) due to:
  - strong competition among the manufacturers of plants
  - large scale effect by serial production
  - enormous technological development
  - different feed in tariffs for each sector and for different sites
- Negligible impact on consumer prices for energy  
(New BET-Study proofs: Price increase for electricity consumers prices caused by EEG is only 0.11 EuroCent per kWh in 2000 and will be 0.19 EuroCent under the presumption of doubling the percentage of RES within the next 10 years.)
- High acceptance of RES projects due the decentralised structure with many local participants

# Electricity feed (EEG) and electricity prices



Source: BET, \*R. Bischof/ External benefit 5 ct/kWh Article 6 of the EC Treaty  
 „Community guidelines on state aid for environmental protection”

# EEG - Evaluation report

- EEG has caused big growth of renewable energy
- objectives for 2010 (doubling the share of renewable electricity to 12 %) can be reached earlier if the growth will continue
- turnover: more than 8 billions EUR/a
- jobs: 120.000
- Availability of budgetary funds limits the development of renewable energy plants, which need additional support besides the EEG
- § 3 Obligation to purchase and pay for electricity from renewable plants
  - Obligation to purchase and pay for electricity from renewable plants is a very important aspect of the EEG: enable medium-sized economy entry into the market
  - although the grid operators are obliged to connect renewable power plants to their grid, many problems exist in this field

# EEG - Evaluation report

- Double commercialisation of electricity from renewable energy:
  - lack of transparency of the nation-wide balancing scheme of the EEG (§11):
    - control of the double commercialisation not possible (EEG + trade with “Green electricity” or EEG + foreign certificates of “Green electricity” )

# EEG - Evaluation report

- **heat market**

The development of the heat market is considerably slower in contrast to the EEG (power market), as this sector (solar thermal, heat of biomass and geothermal) is mainly dependent on public support

- **fuel market**

the mineral oil exemption for biofuels is probably also a reliable support scheme