

Impact of competition claims for food and energy on German biogas production

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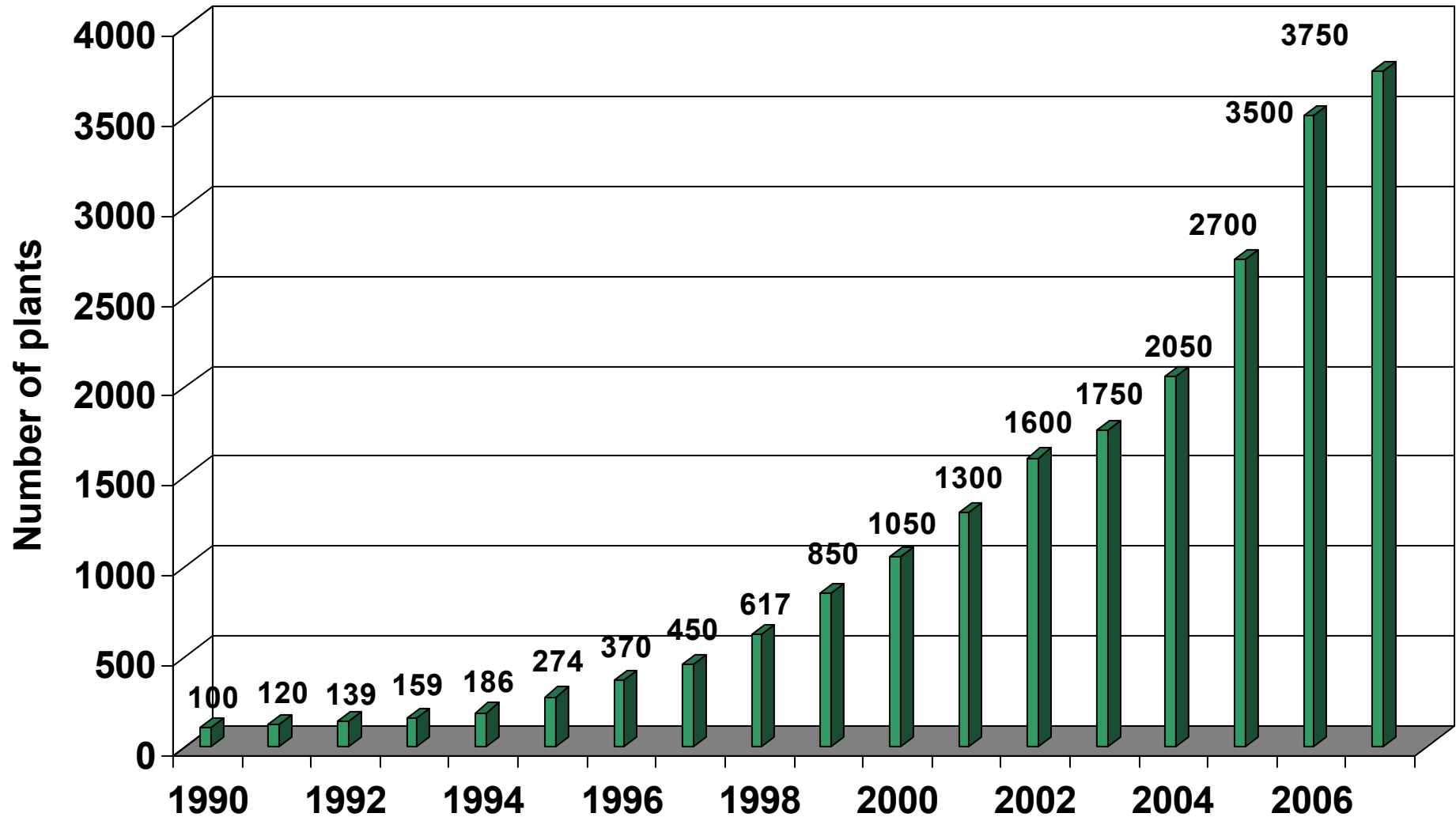
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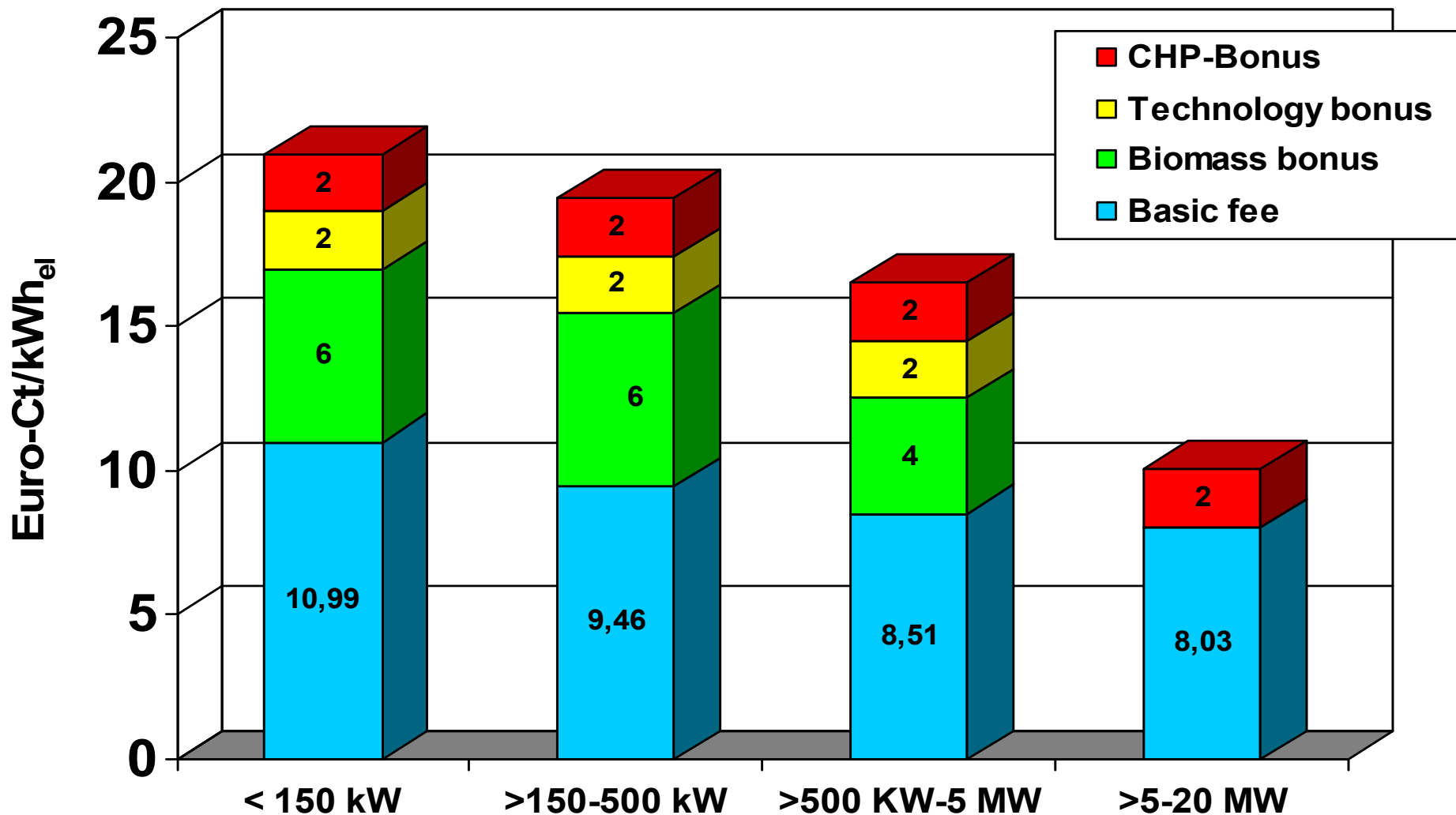


- **Introduction**
- **Plant construction**
- **Substrates for biogas production**
- **LCA of biogas production**
- **Gas grid injection act**
- **Amendment of the EEG (actual draft)**

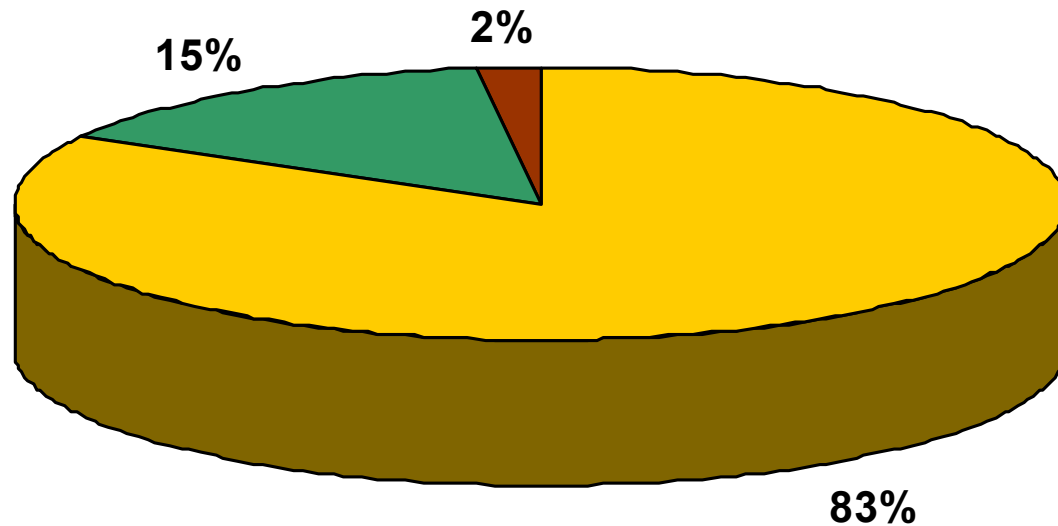
Biogas plants in Germany



Compensation for electricity 2007 (EEG)

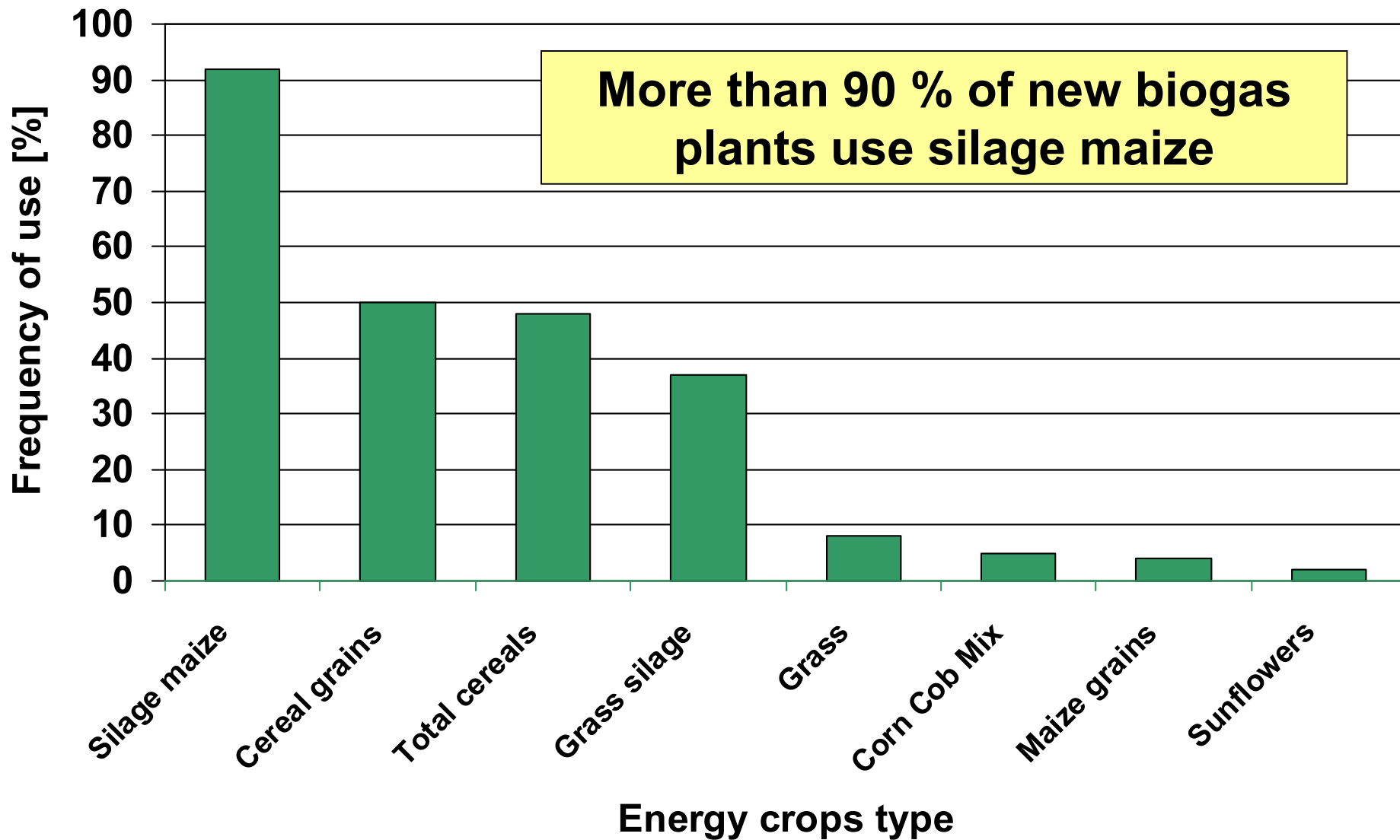


Substrate application in agricultural biogas plants (2005-2007)



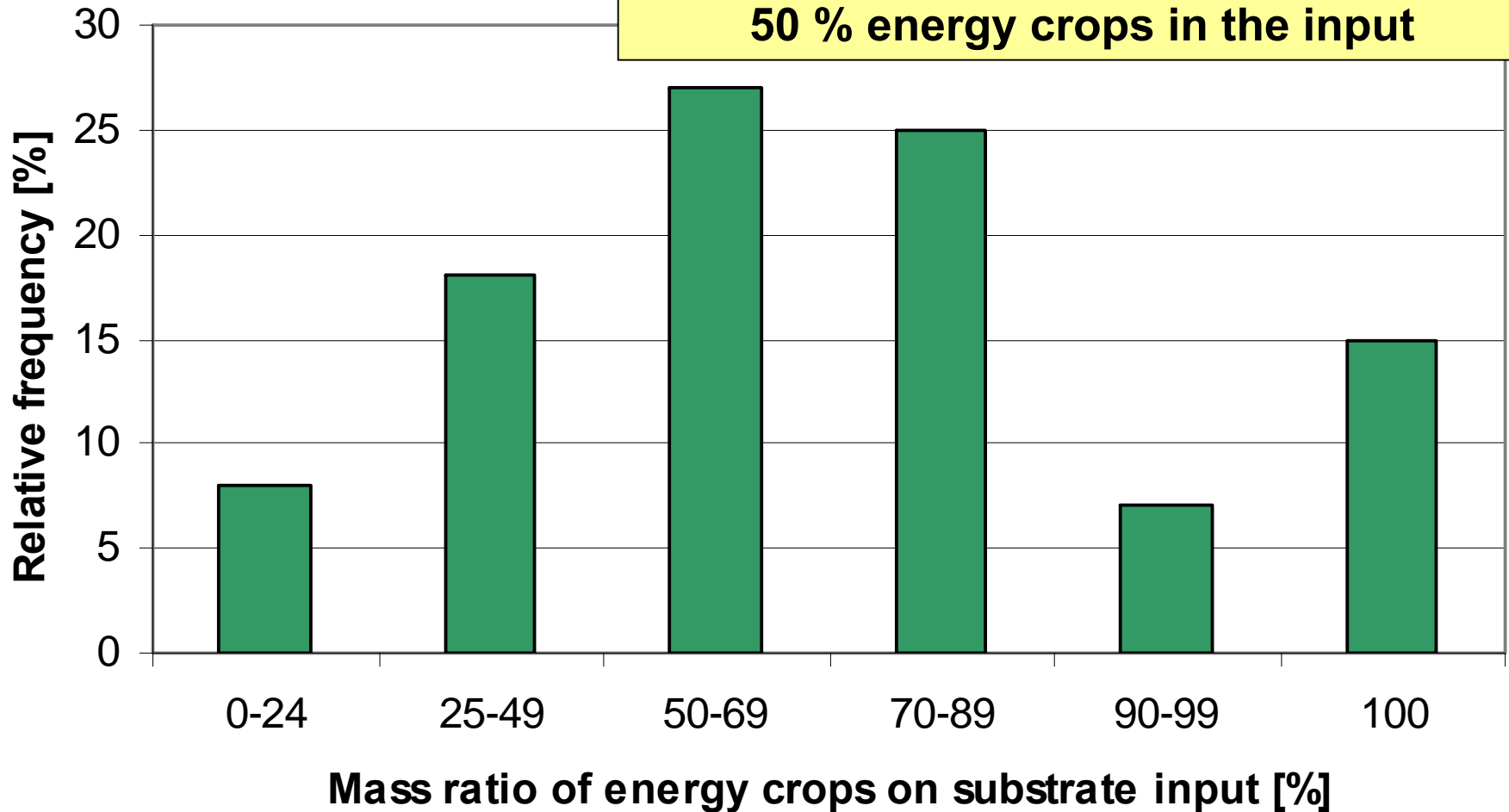
- Energy crops and manure
- Energy crops
- Manure

Use of renewable raw materials (2005 – 2006)

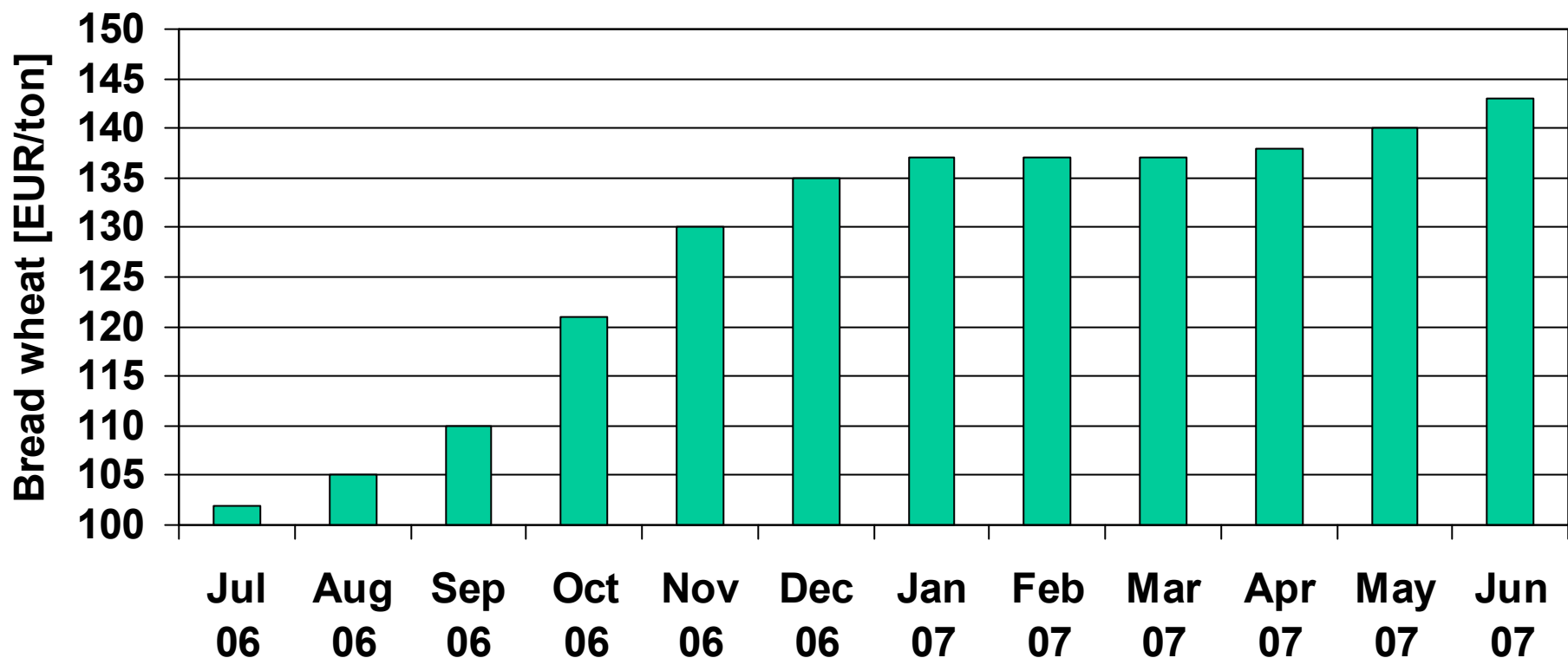


Share of energy crops on substrate input

2/3 of the biogas plants have more than 50 % energy crops in the input



Growing substrate costs since 2006



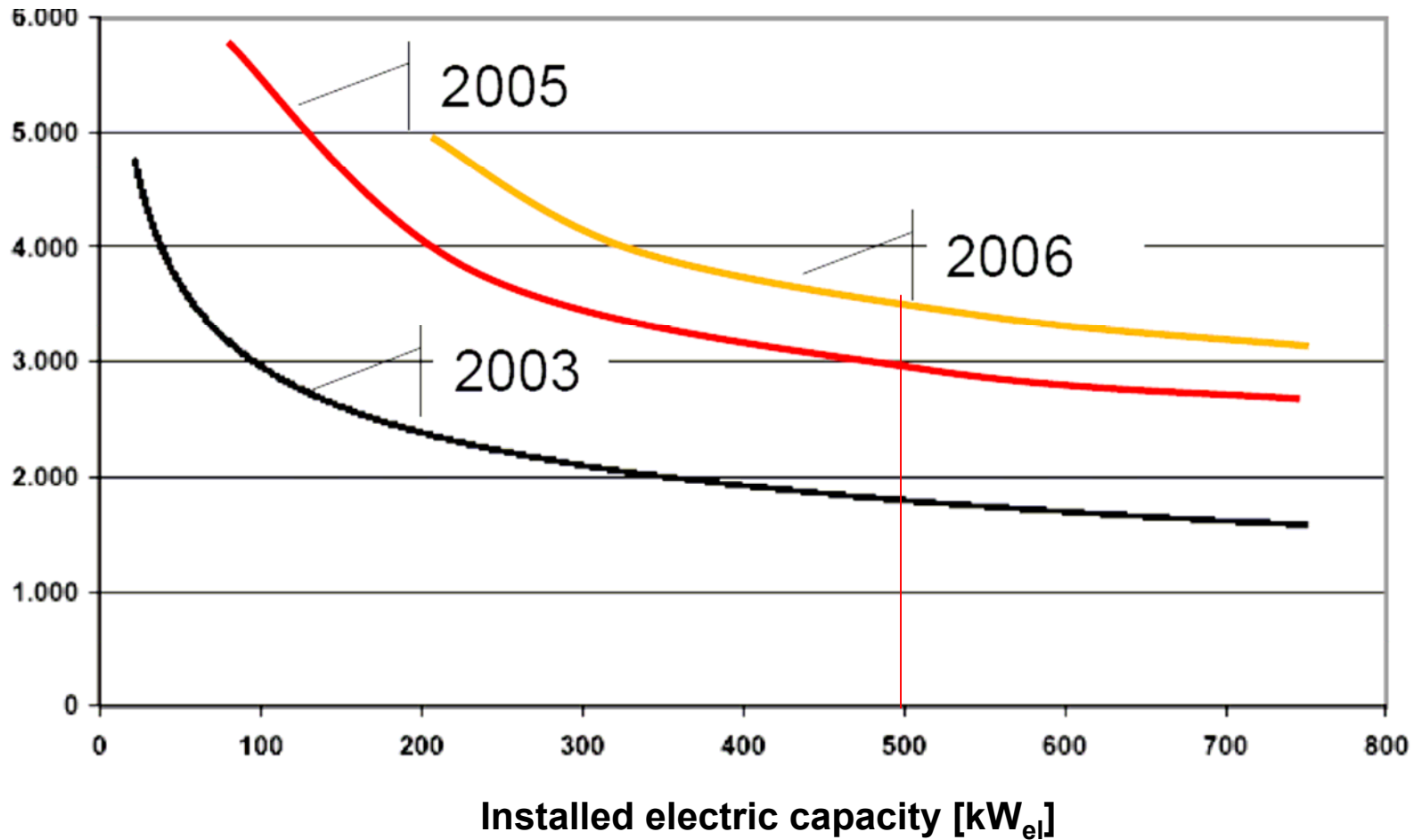
Silage maize without transport and ensiling

Oct 06: 18 EUR/ton FM – Oct 07: 33 EUR/ton FM

Cost increase: 83 %

Specific investment costs for biogas plants

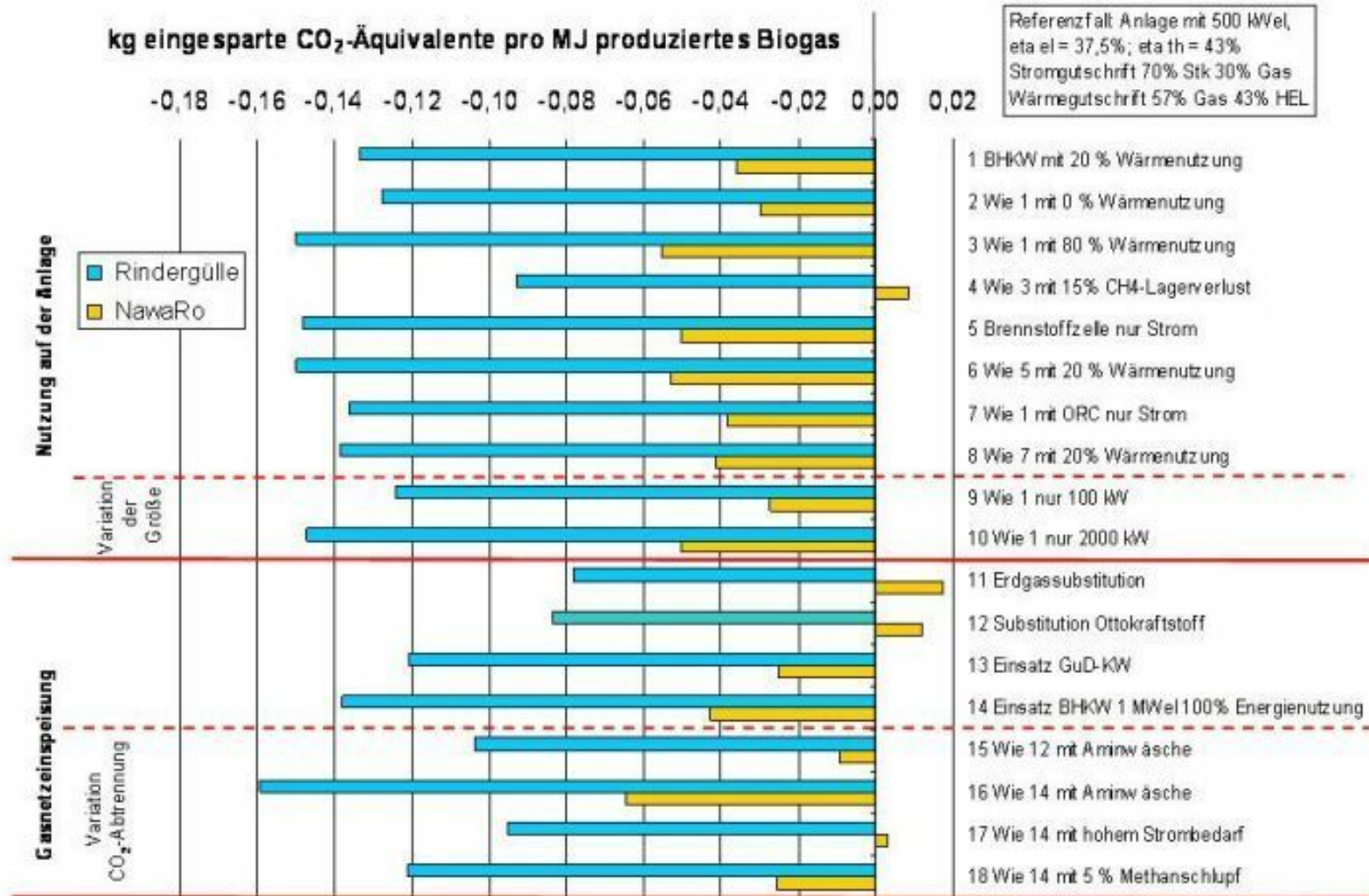
Spec. investvestment costs €/kW_{el}



Profit of a 500 kW biogas plant with silage maize (7,750 h/a, η_{el} =37 %, no heat utilization)

Silage maize [EUR/ton]	Investment costs [EUR/kW _{el}]		
	3,000	3,500	4,000
18.00	155,500	129,800	104,000
20.00	135,800	110,000	84,300
22.00	116,000	90,300	64,600
24.00	96,200	70,500	44,800
26.00	76,500	50,700	25,000
28.00	56,700	31,000	5,300
30.00	36,900	22,200	-14,500

Reduction of the greenhouse effect by biogas production



- In most of the applications biogas production result in reduction of greenhouse gases.
- The best ecological effect can be achieved by anaerobic treatment of manure.
- For biogas production with energy crops up to 60 % of the relevant ecological effects are caused by crop production (e.g. fuels consumption for sewing, fertilization, harvesting, transport).
- Energy crops with a high biomass yield per area should be used to reduce the ecological effect of this module.

- **Without gas-tight covering of the storage tank biogas production can have a negative climate effect (methane losses: 2-10 %).**
- **The utilization of the heat from the CHP is important for a positive ecological effect.**
- **Biogas upgrading and gas injection with conventional upgrading technologies can enhance the greenhouse gas emissions.**
- **The lowest methane losses can be achieved by using mono ethanol amine scrubbing (MEA: 0,1%) for biogas upgrading.**

New gas grid injection act (Gasnetzzugangsverordnung)

- **On 12 March 2008 the German Federal Cabinet has decided a new gas injection act in order to promote the injection of biomethane (BNG) into the gas grid.**
- **The aim of the act is to substitute at least 10 % of the natural gas consumption up to 2030 by biogas.**
- **This act regulates the priority of connections to the grid for suppliers of upgraded biogas.**
- **A considerable part of the costs for gas injection have to be paid by the grid operators and not by the biogas producers.**

Important regulations of the gas injection act (1)

- **Gas grid operators must connect biogas plants to the grid (obligatory connection).**
- **50 % of the costs for the grid connection must be paid by the grid operator.**
- **The grid operator is responsible for the odorization, the control of the gas quality and the compression to the grid pressure and has to cover all these costs.**
- **The gas can be supplied by the biogas plant at various pressures according the different upgrading processes.**

Important regulations of the gas injection act (2)

- **The gas transport customer will receive a fee from the gas grid operator to the amount of 0,7 €-Cent/kWh because gas grid operator saves costs for long distance transport.**
- **The methane losses by upgrading must be lower than 1 % within the next 3 years, and afterwards maximally 0,5 %.**
- **The injected gas must be feed-out within 12 month with a flexibility of 25 %.**

- The basic fee is enhanced by 1 ct/kWh_{el} for biogas plants with a capacity lower than 150 kW (11.67 ct/kWh_{el}).
- The biomass bonus is enhanced from 6 ct/kWh_{el} to 8 ct/kWh_{el} for biogas plants up to 500 kW.
- A manure bonus of 2 ct/kWh_{el} is paid for biogas plants with a capacity lower than 150 kW_{el} if at least 30 vol-% manure is used for biogas production.
- The CHP-bonus is enhanced from 2 ct/kWh_{el} to 3 ct/kWh_{el}.
- The technology bonus of 2 ct/kWh_{el} is cancelled for dry fermentation and will be paid for biogas upgrading if the methane losses are maximum 0.5 vol-%.
- The total fee (not only the basic fee) will be reduced by 1 % per year.

- **A competition between food and biogas production does not exist, because only 2 % (350,000 ha) of the agricultural land is used for energy crops.**
- **The increased costs for energy crops are the result of the high world market prices (increased demand in USA, India, China, Brasilia).**
- **The share of small biogas plants which use manure, intermediate crops and organic wastes increases.**
- **The number of large biogas plants with gas injection into grid increases.**
- **Without using the heat from CHP most of the biogas plants cannot make a profit in future.**

**Many thanks for your
attention!**

