

Country Report Germany

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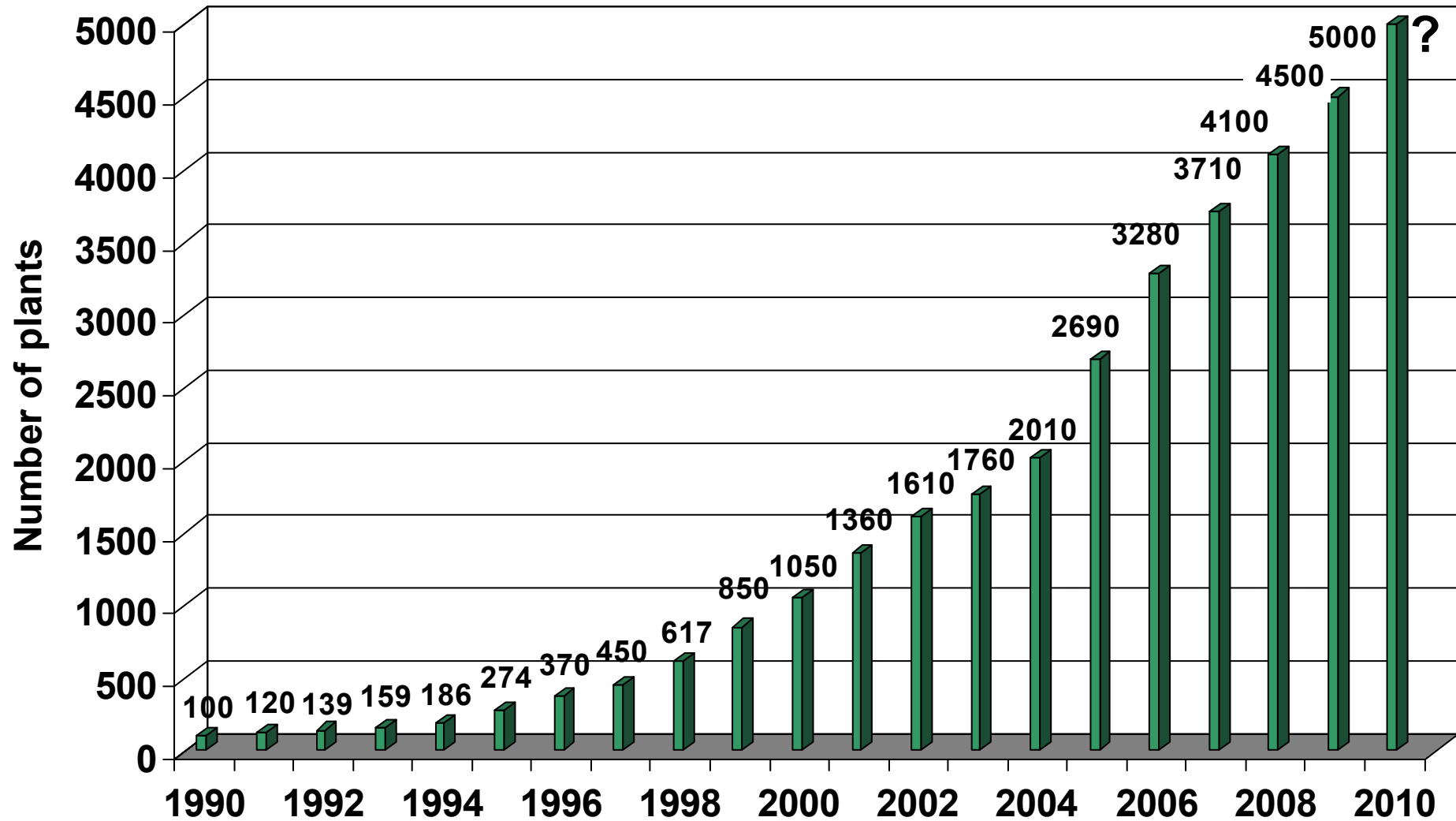


Summary of AD plants in Germany

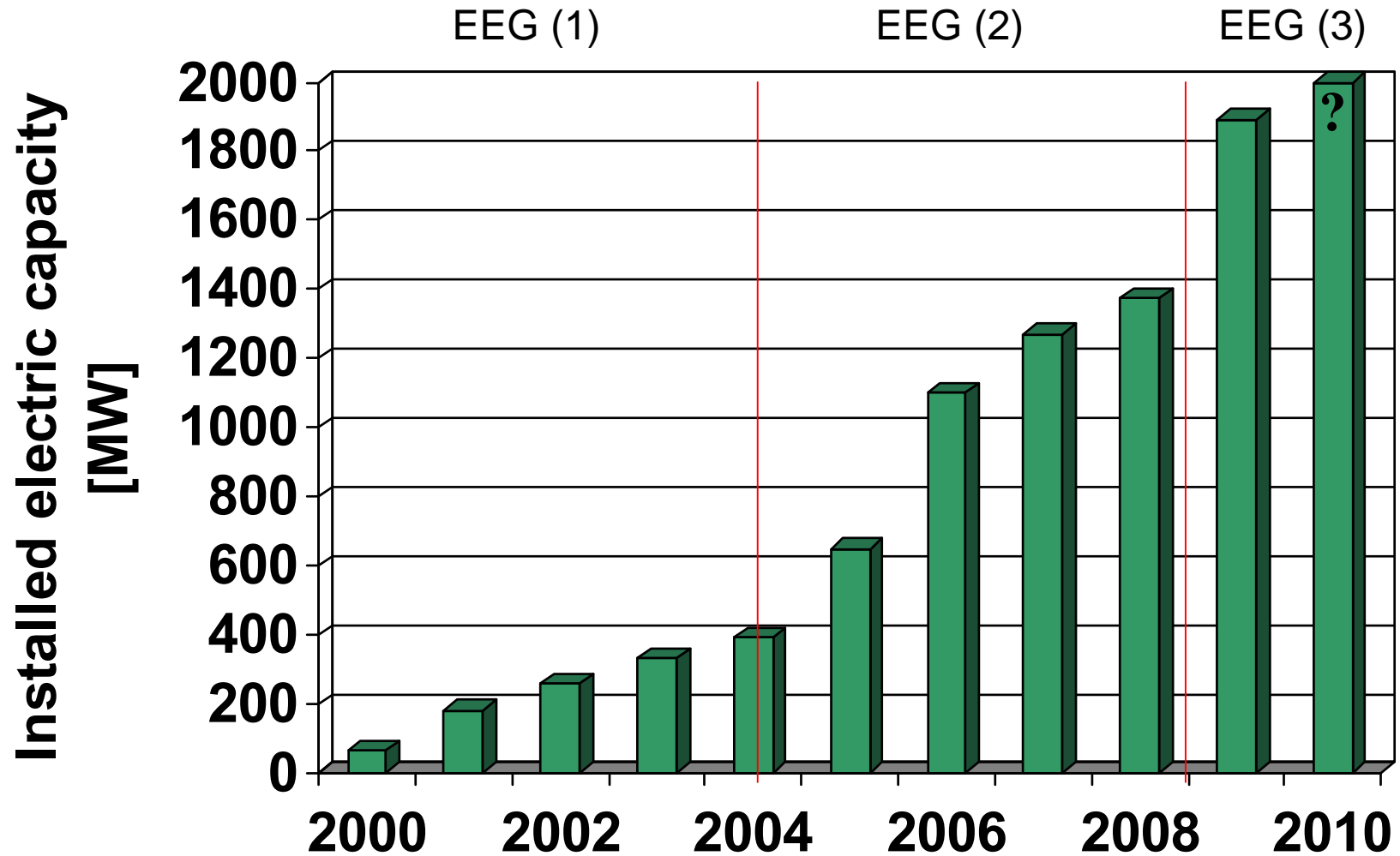


Sector	Number of plants
Agriculture	5000
Industrial wastewater treatment	174
Sewage sludge treatment	?
Municipal biowaste treatment	74
Landfills	1645 (out of operation for biowaste)

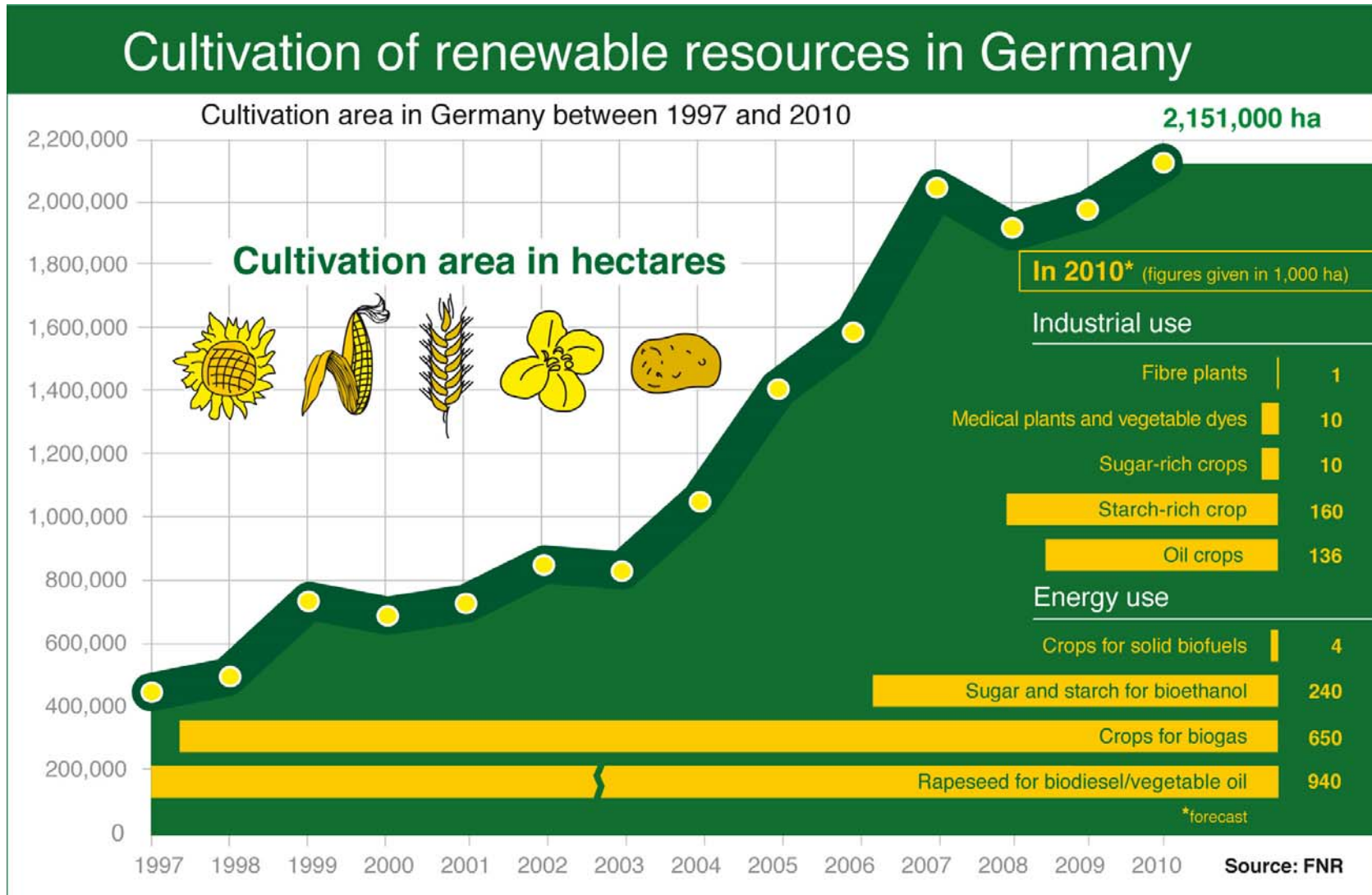
Number of agricultural biogas plants



Electric capacity of agricultural biogas plants



Cultivation of energy crops for biogas



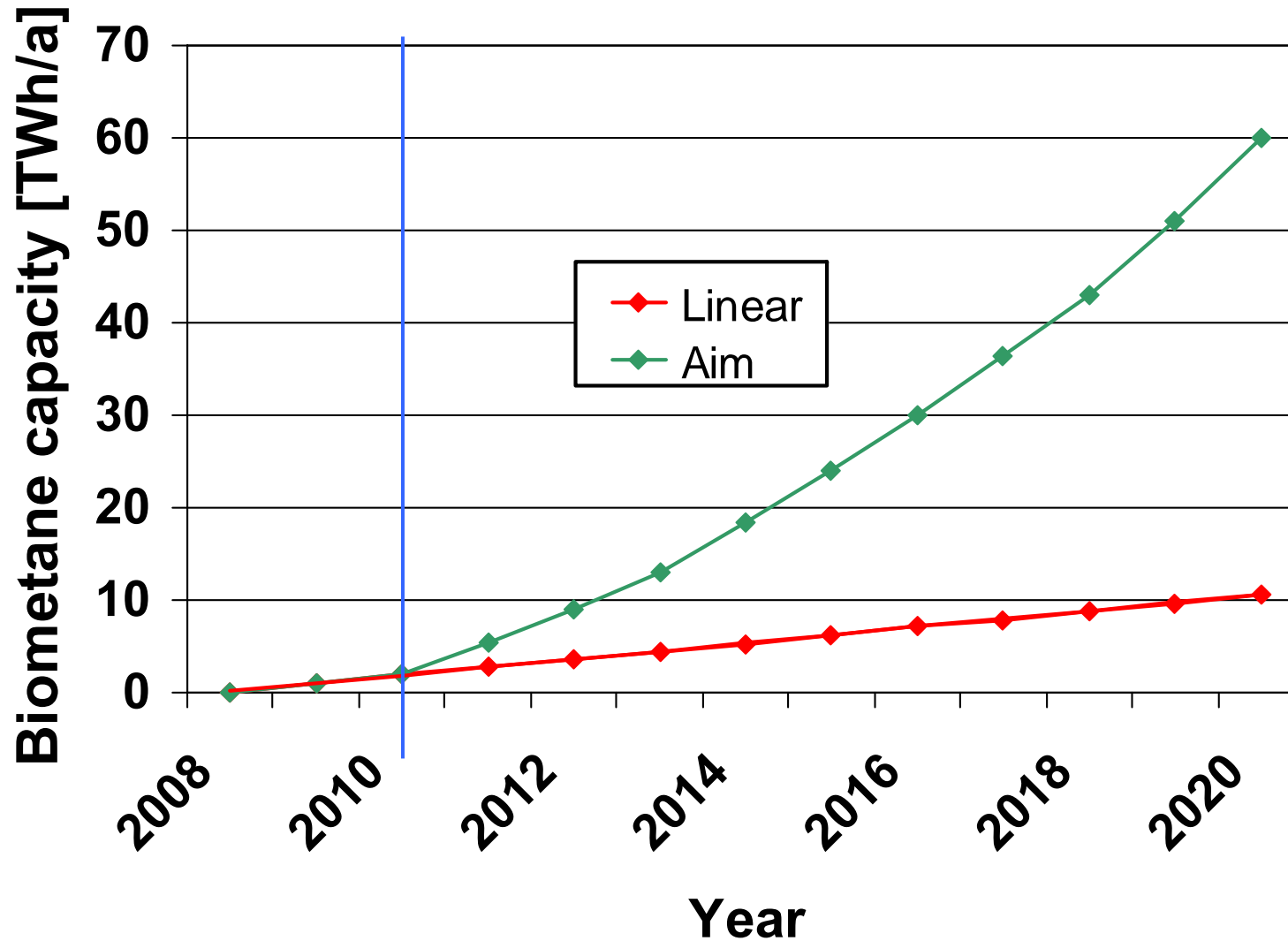
Actual situation

- 35 upgrading plants are in operation
- 10 upgrading plants are in construction
- 80 upgrading plants should be in operation at the end of 2011
- Main treatment capacity 500-800 Nm³/h

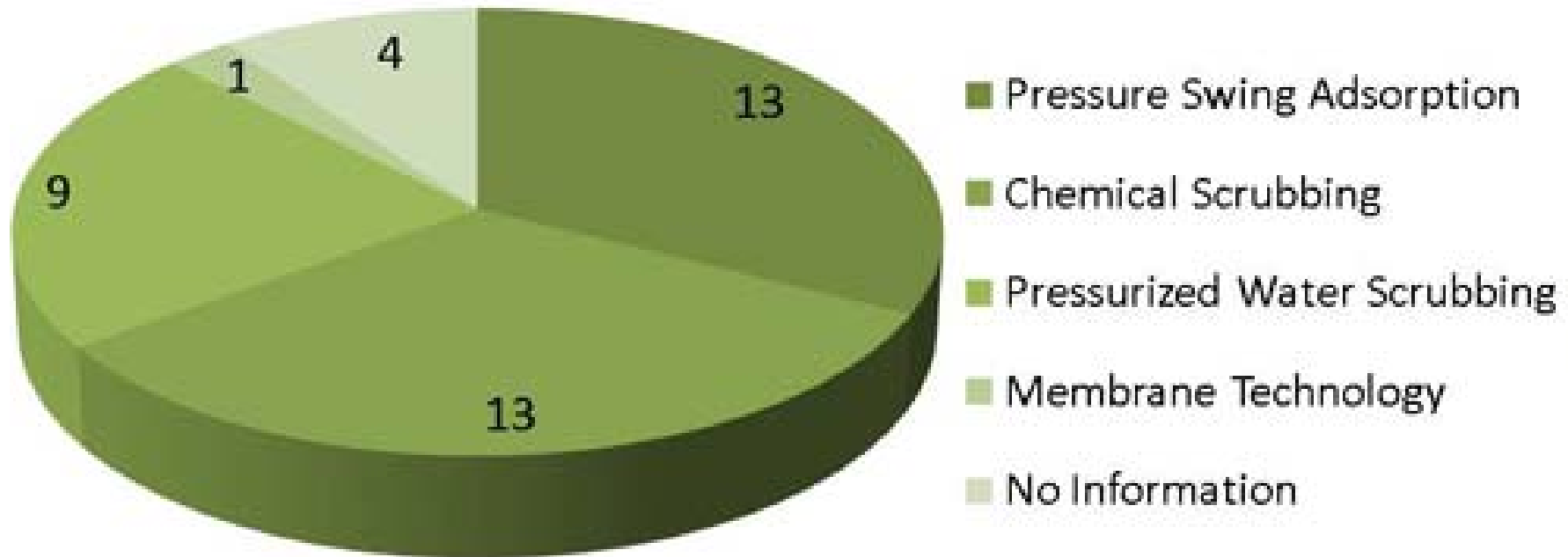
Aim for 2020

- 1000-1400 upgrading plants of mean capacity
- Around 120 plants per year up to 2020
- Total injection capacity 6 bill. m³ per year
- According the actual development only 20 - 40 % of the aim can be achieved up to 2020

Increase of the biomethane upgrading capacity

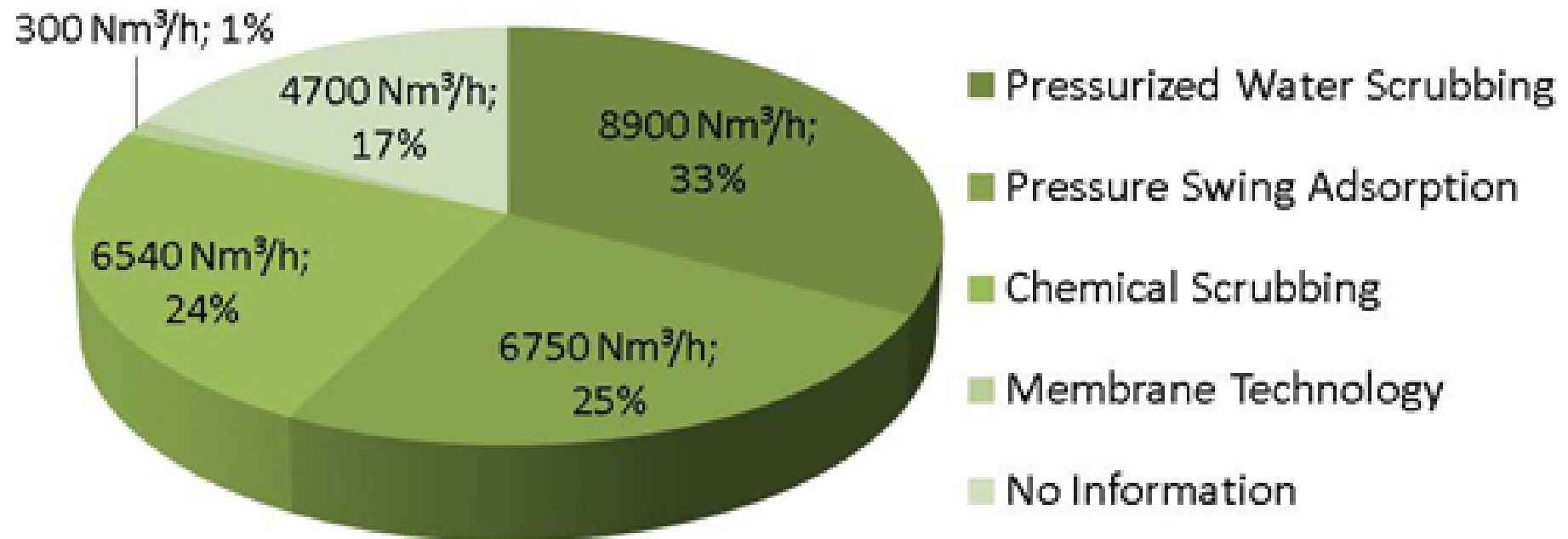


Applied technologies for biogas upgrading



*German Energy-Agency (dena)
September 2010*

Feed-in capacities according the applied upgrading technology



*German Energy-Agency (dena)
September 2010*

- **The production costs for biomethane are too expensive compared to natural gas:**
 - Biomethane: 6-8 Cent/kWh
 - Natural gas: 2-3 Cent/kWh
- **The legislative regulations are not optimized for biomethane injection:**
 - The gas must be used in CHP-plants in order to achieve a fixed compensation (EEG).
 - The use of biomethane for only heat production is not supported by the regulations.
 - The use of biomethane as vehicle fuels is tax-free only up to 2016.

Necessary measures to increase the biomethane production

- **The biomass-bonus of 7 Cent/kWh_{eI} should not be limited to plant capacities of ≤ 500 kW.**
- **The use of biomethane in heating systems with a condensation boiler should get a fixed compensation.**
- **The addition of biomethane to natural gas should result in a reduced tax for vehicle fuel.**
- **The sale of gas driven vehicles should be supported by the Government in order to increase the market for gas vehicles (2010: 90,000 gas vehicles).**

Amendment of the Gas Network Access Ordinance (18.08.2010)

- **The grid_access costs are split between the grid operator and the biomethane supplier in the ratio 75 %/25% (previous: 50%/50%).**
- **The grid operator is owner of the grid access and covers the costs of maintenance and operation.**
- **For grid access with a connecting pipeline of < 1 km, the biomethane supplier has to pay maximum 250,000 €.**
- **The grid operator has to provide a grid access availability of 96 %.**

- **Decoupling of the manure bonus from the biomass-bonus in order increase the co-fermentation of manure and wastes.**
- **Uniform compensation of biogas independent on the biogas plant size.**
- **Increased application of biogas for producing heat, cold and vehicle fuel.**
- **Simplification of the regulations of Renewable Energy Act.**

Enhancement of the process efficiency

- **Technologies to reduce the energy losses during ensiling and storage (compacting, ensiling additives).**
- **Technologies for disintegration of substrates to increase the bioavailability (enzymes, physical methods).**
- **Feed-in technologies for solid substrates in order to achieve a better homogeneity in the fermenter.**
- **Membrane reactor for higher conversion rates.**
- **New stirrer types to reduce the energy input for mixing.**

- **Technologies for increasing the electric efficiency of CHP by using the surplus heat for electricity production (ORC, exhaust turbo generator).**
- **Development of biogas upgrading technologies for raw gas capacities of $\leq 250 \text{ Nm}^3/\text{h}$ (amine washing process).**
- **New membrane types for biogas upgrading.**
- **Optimization of technologies for digestate upgrading.**
- **Development and test of new measuring devices for process control.**

Energy crops for biogas

- **Test of conventional and new energy crops at different climate and soil conditions.**
- **Development of high yield crops with low input.**
- **Test of wild crops for biogas production.**
- **Reduction of GHG during cultivation of energy crops.**

**Many thanks for your
attention!**

