German Biogas Association Association Allemande du Biogaz Asociación Alemana de Biogás



Biogas - Trends in Germany Biogas as a key in future energy systems

Clemens Findeisen

Consultant Development Cooperation German Biogas Association



On behalf of

BMZ

Federal Ministry for Economic Cooperation and Development



- German Biogas Association
- Development of biogas production and political framework in Germany
- Actual trends in Germany



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German Biogas Association - Objectives

Objectives :

- Promotion of the biogas sector
- Promotion of a sustainable energy supply
- Definition of legal framework for reliable and long-term investments
- Creation of adequate technical rules
 and standards
- Promotion of R & D
- Exchange of information
- Members service

Lobbying on federal state, federal and EU level in the following fields:

- Renewable Energy Act (EEG)
- Energy management
- Regulatory approval
- Environmental law
- Laws on agricultural issues

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- Tax law
- . . .



Structure of the German Biogas Association

Steering 7 members, electer	Headquarters in Freising 23 employees, organised in 10 departments		
Board of Elected honorary spokesmen of re advisor	Berlin Office 5 employees		
Advisory Boards Advisory boards of plant operator funders; Working groups for the a of biogas, environment, h	Regional offices (North, South, East, West and Editorial Office Biogas Journal 5 employees		
	23 Regional groups in Ge	rmany	
Operators of biogas plants Providers of feedstock Research Institutions	4.800 Members Interested private individuals Public authorities Lawyers	Companies and manufacturers Corporate finance Planners, advisers, laboratories	



Provision of electricity in Germany in 2012



Structure of the German electricity production from renewable energy sources (2012)



Flexibility instead of base load: The new role of bioenergy



- With increasing share of RES baseload loses importance
- Flexible systems fill the valleys of wind and sun
- CHP with bioenergy
 & natural gas
- → New role of biogas
- red Demand (2010) green Production Wind & Solar

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The biogas principle – like a concrete cow



product: slurry



Scheme of an agricultural biogas plant



Fields of Application for Biogas



Biogas plant



Biogas plant in maize field



Stainless steal digester under construction



Foto: Weltec



Inside a digester



The inside of a digester



Gas storage facilities

Gas hood with EPDM foil



Fotos: Biolene, Cenotec

Foil roof (tight)



Transport air foil roof



Fotos: Cenotec, Sattler

External gas storage facilities



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Gas utilisation in CHP



Foto: Energiebüro Wiebking

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Feedstock of biogas plants



Feedstock in German biogas plants in 2012



Collection of catering waste in Germany



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Number of biogas plants & installed electric capacity (as of 05/2013)



Biogas sector at a glance

	2011*	2012*	Forecast 2013**	
Number of biogas plants (thereof plants feeding-in biomethane)	7.180 (77)	7,500 (109)	7.770 (124)	
Additional installations per year	1270	340	257	
Installed electric capacity in MW (without feeding-in of biomethane)	2,980	3,200	3,360	
Installed electric capacity in MW (with feeding-in of biomethane)	3,100	3,350	3,530	
Overall capacity for upgrading of raw gas to biomethane (Nm ³ /h)	86,000	116,000	132,000	All values rounded!
Additional electrical capacity new installations in MW per year	806	255	177	
Annually net generation of electricity inTWh	19.1	22.8	24.4	
Households supplied with electricity from biogas in Mio.	5.5	6.5	7.0	
Share of German electricity generation in %	3.2	3.9 %	4.1	
Volume of trade in billion Euro	8.3	7.3	6.9	
Jobs	63,000	45.000	42,000	

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own extrapolation on the basis of data of the German states

** on basis of an expert survey



German Renewable Energy Act (EEG)

- Priority connection, purchase and transmission for electricity from renewable energy sources
- A consistent fee for this electricity paid by the grid operators for a 20- year period

The core elements of the EEG guarantee :

- Mid and long term planning and investment security
- Calculable cost for consumers
- Specific fees for different technologies
- Low bureaucratic effort
- Participation for local and regional players



Renewable Energy Act: Conclusion

The EEG is one of the world's most efficient support mechanism for RES (copied by nearly 50 countries)

But:

Germany's success of RES would not be possible with today's law and the relatively low tariffs – so it is worthwile to have a look at the older versions of the EEG



Development of the Renewable Energy Act (2000-2012)



Additional biogas plant installations per year



EEG 2012

- Reduction of compensation, but possibility of mixture of input material (compensated according to methane production), advantages for big plants.
- Limitation of maize as feedstock (not more than 60 % maize silage over the year - by weight)
- Obligation for covering of digestate storage and necessity of hydraulic retention time of at least 150 days
- Either 60 % heat utilization or 60 % manure utilization (by weight)
- Minimum external heat utilization (at least 35 %)
- Direct marketing possible due to market premium and flexibility premium



Promotion of Direct Marketing of Electricity

- Increasing share of renewable energy leads to a more volatile electricity production
- Increasing importance of controlled power stations: e.g. biogas
- EEG 2012 (market bonus management bonus, flexibility bonus) offers opportunities for additional income
- Special biogas plants for electricity production according to market need
- Storage capacity
- Higher installed capacity



New feed-in system EEG 2012



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New Feed-In Tariffs under the EEG 2012 (ct/kWh_{el})

Category	Basic compensation	Input material category I	Input material category II	Digestation of biowaste ^{b)}	Bonus for upgrading of biogas	
≤ 75 kW		25 ct/kWh ^{a)}				
≤ 150 kW	14.3 ct/kWh	6.0 ct/kWh	8.0 ct/kWh	16 ct/kWh	3 ct/kWh to 700 Nm ³ /h 2 ct/kWh to 1,000 Nm ³ /h 1 ct/kWh to 1,400 Nm ³ /h Nominal output of feed-in	
≤ 500 kW	12.3 ct/kWh	6.0 ct/kWh	8.0 ct/kWh	16 ct/kWh		
≤ 750 kW	11.0 ct/kWh	5.0 ct/kWh	8.0/6.0 ^{c)} ct/kWh	14 ct/kWh		
≤ 5.000 kW	11.0 ct/kWh	4.0 ct/kWh	8.0/6.0 ^{c)} ct/kWh	14 ct/kWh	plant	
≤ 20.000 kW	6.0 ct/kWh	0.0 ct/kWh	0.0 ct/kWh	14 ct/kWh		

- a) No combination with basic compensation and/or compensation for input material of category I and II possible!
- b) No combination with basic compensation and/or compensation for input material of category I and II possible!
- c) Electricity from manure and dung

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Advantages of using manure and waste as substrates for biogas

- Reduction of waste volume by 50-80% (depending on share of biowaste)
- Production of organic fertilisers and reduction of mineral fertilisers by closed nutrient cycles (e.g. phosphorus)
- Sustainable energy production and substitution of fossil energy carriers
- Increasing independence and security of energy supply
- Reduction of greenhouse-gas-emissions (by substitution of fossil energy carriers and mineral fertilisers, avoidance of methane emissions digesting manure and biowaste)
- Creating jobs

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Example

10.000 t rejected vegetables
7.500 t waste from vegetable processing
2.000 t food left overs
2.000 t green cuttings from privat/public garden
20.000 t manure from 1.000 cows

500 kW electric power \rightarrow electricity for 1.000 households \rightarrow heat for 300 households



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- Biogas as allrounder
- Biogas as key in Energy Turnaround
- High interest for biogas all over the world
- Four main trends in Germany:
 - 1. Small farm-sized plants based on manure and agricultural by-products
 - 2. Using of the natural gas grid as storage
 - 3. Specialized direct marketing: Balancing the fluctuating power generation from wind und sun (flexibility)
 - 4. Export Business (40 % up to may 2013)



Thank you for your attention!



- ... we will see us in Nuremberg! 14.01 – 16.01. 2014
- Export Workshop!
 - International Panel on opportunities and experiences in Development & Emerging Countries!

www.biogas.org www.biogas-kanns.de www.biogas-tour.de www.farbe-ins-feld.de www.biogas-in-sh.de www.biogas-in-bayern.de www.biogastagung.org www.multitalent-biogas.de



Clemens Findeisen

Consultant Development Cooperation German Biogas Association

Telefon: 0049 (0) 1763 / 17 88 290 Email: clemens.findeisen@biogas.org Internet: www.biogas.org



