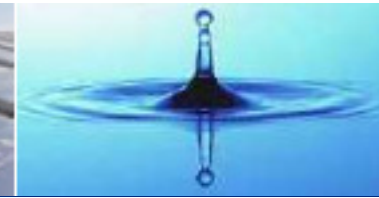


WIP



Germany: Biogas market development



Dominik Rutz

WIP – Renewable Energies, Munich, Germany

High-level conference on
“Contribution of biogas to the EU targets: Is biogas the right direction?”

Moravske Toplice, Slovenia, 28 September 2012





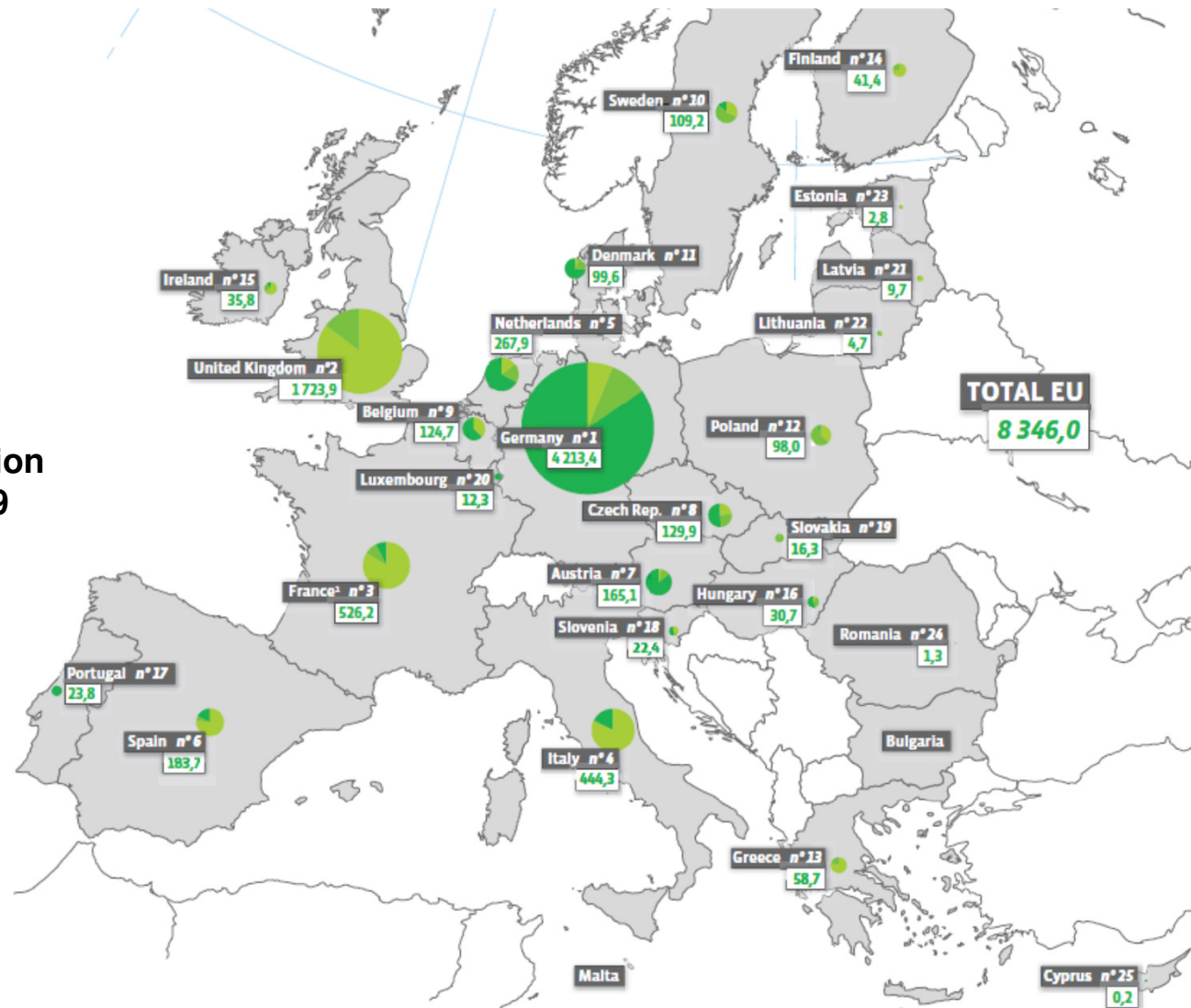
Content

1. Biogas Market in Germany
2. Biogas Policies in Germany
3. Permitting Procedures in Germany
4. Conclusion



1. Biogas Market in Germany

Primary Energy Production of Biogas in Europe 2009



Légende/Key

4 231,4 Les chiffres en vert indiquent la production totale en ktoe. Green figures show total production in ktoe.

■ Biogaz de décharges. Landfill gas.

■ Station d'épuration urbaine et industrielle. Urban sewage and industrial effluent sludge gas.

■ Autres biogaz. Other biogas.

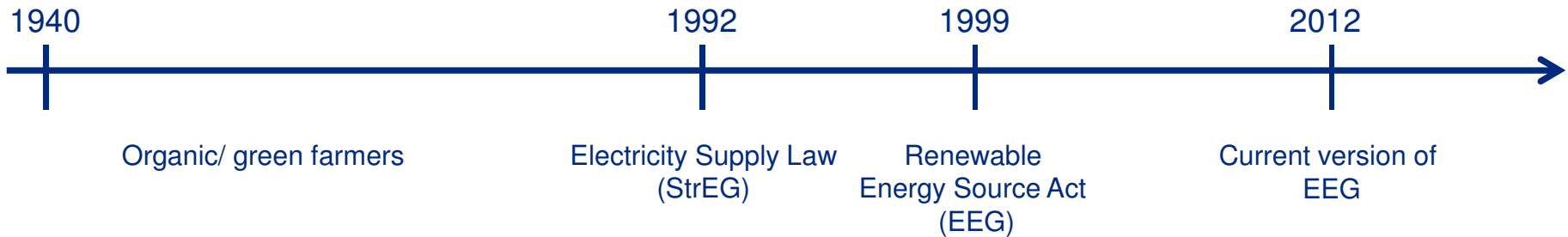
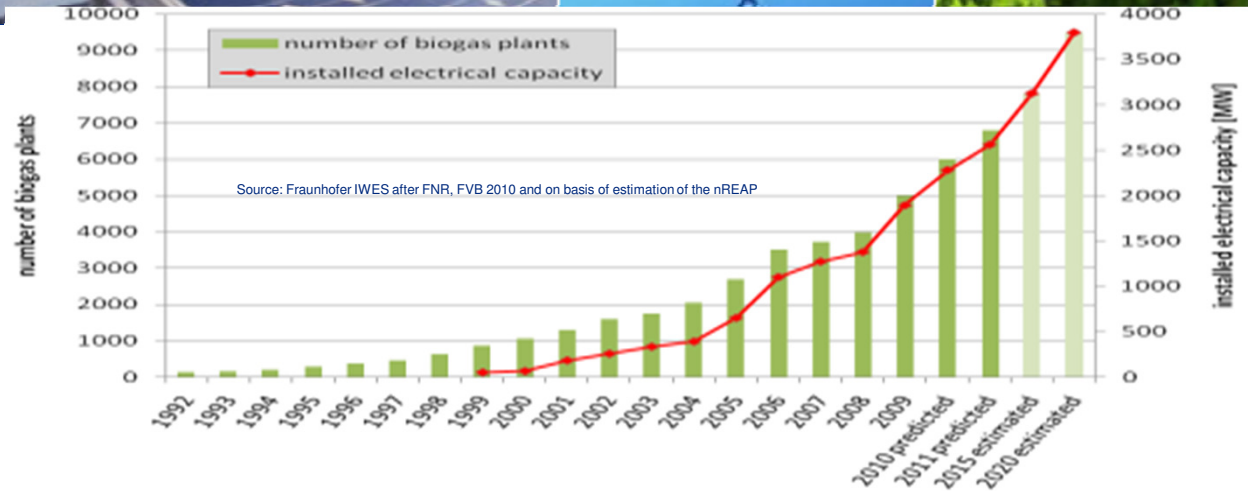
Unité décentralisée de biogaz agricole, unité de méthanisation des déchets municipaux solides, unité centralisée de codigestion. Decentralised agricultural plant, municipal solid waste methanisation plant, centralised co-digestion plant.

* Estimation.

1 - DOM non inclus. French overseas departments excluded.

Source: EurObserv'ER 2010.

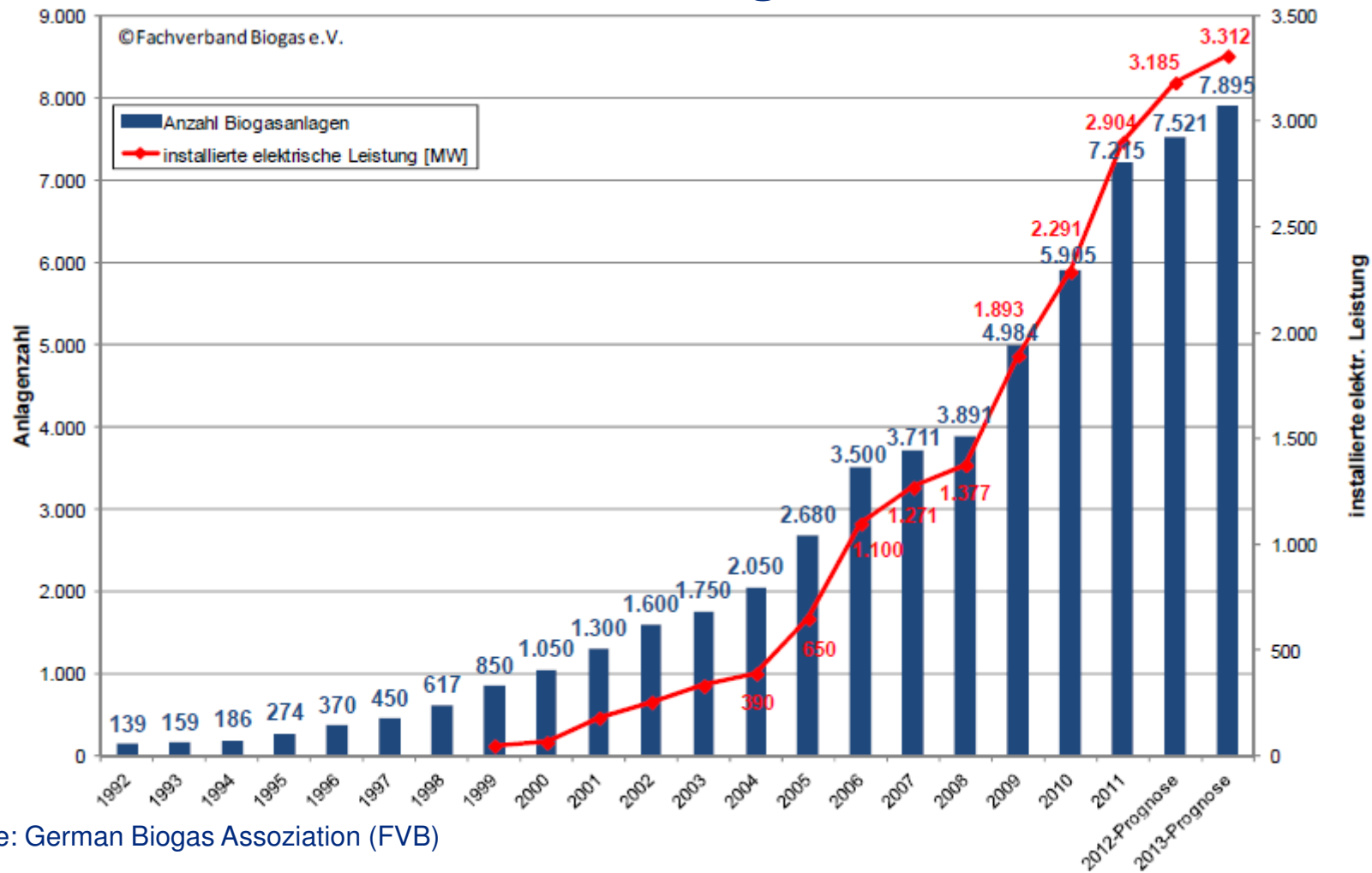
Source: <http://www.eurobserv-er.org/>



Germany needed more than 70 years to develop biogas...



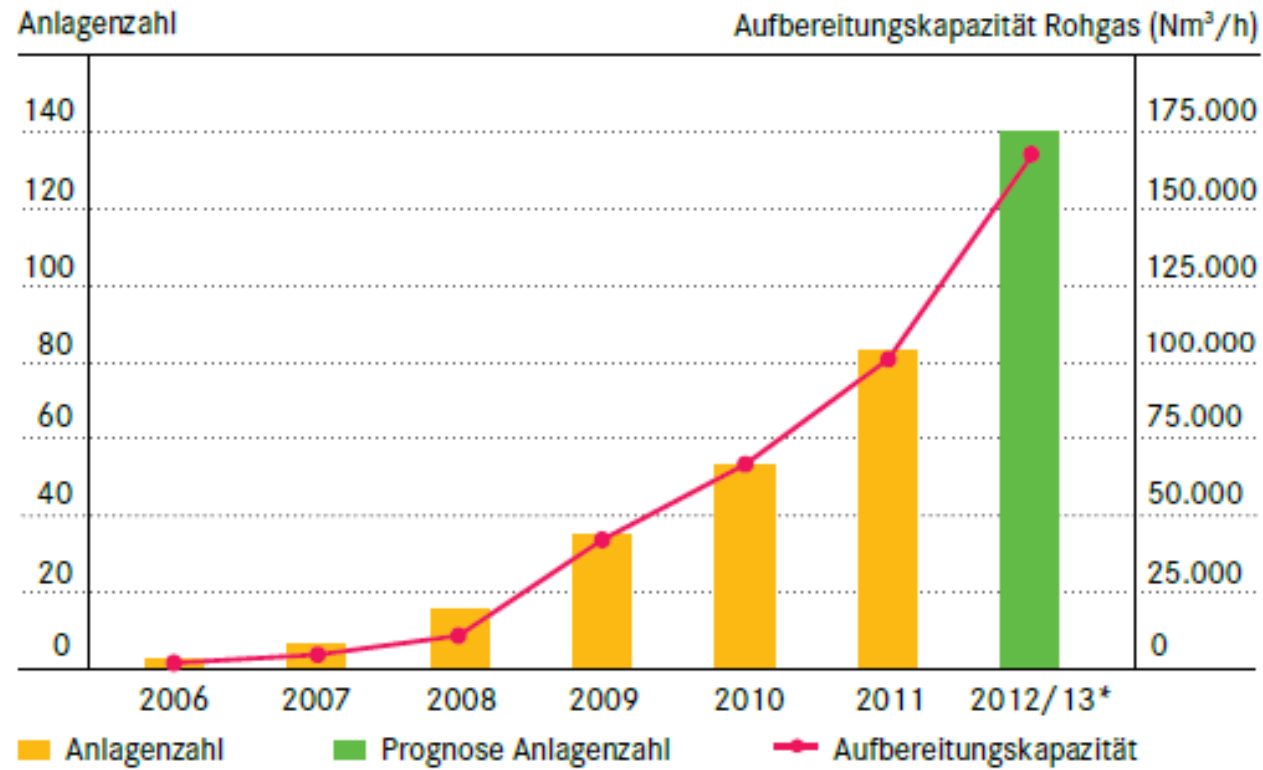
Number of Biogas Plants



Source: German Biogas Association (FVB)



Number of Biomethane Plants



Quelle: FNR nach Fraunhofer IWES (2012)

* Prognose

© FNR 2012



Developments in 2012

- About 7,500 biogas plants
- 70% less new installed plants than 2011
- Decrease from 1,300 to 300 new plants (2011-2012)
- 50,000 jobs in the sector

- Consolidation phase with insolvencies in 2013?

Data source: German Biogas Assoziation (FVB)



Typical biogas plant in Germany

- Average Size: ~500 kWel
- Biogas use: electricity
- Feedstock: mainly corn silage, but also manure, waste, etc.





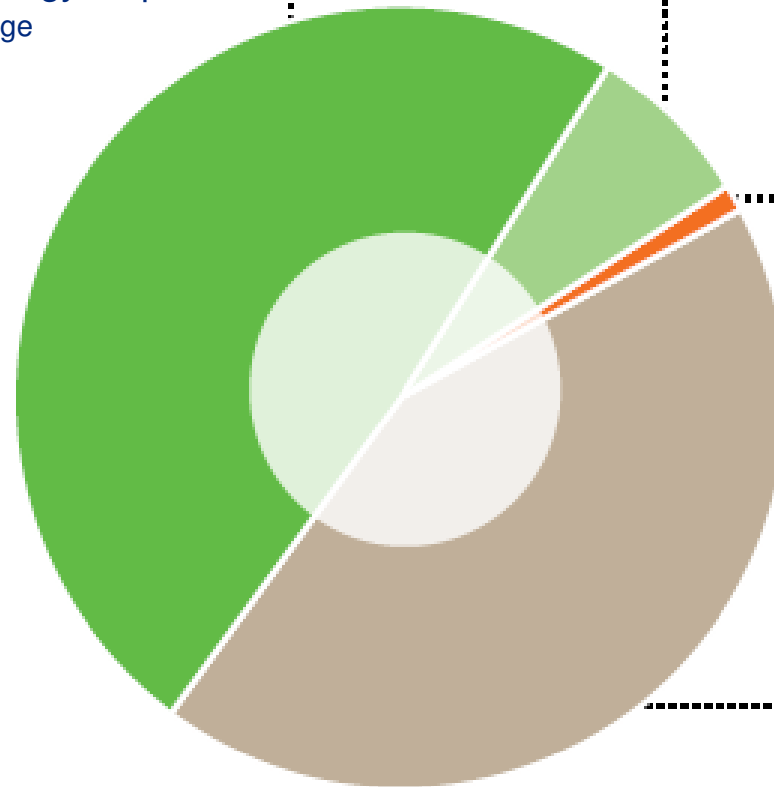
Typical biogas plant in Germany





49% dedicated energy crops
Thereof 79% corn silage

7% biowaste



1% industrial wastes and agricultural residues

43% livestock excreminents

Quelle: DBFZ-Betreiberumfrage (2011/2012)

© FNR 2012



Learning effect: Reasons why German biogas plants struggled in 2007/2008



OUT:
wasted heat



OUT:
electricity EEG



IN:
only corn silage;
High corn prices
in 2007/08



2. Biogas Policies in Germany

Feed-in tariffs for electricity from biomass under Renewable Energy Sources Act (EEG) 2009

(euro cents/kWh), with annual degression of 1 % on basic tariffs and bonuses

		2010	2011
Basic tariff	up to 150 kW _{el} ^a	11.55	11.44
	150 to 500 kW _{el}	9.09	9.00
	500 kW _{el} to 5 MW _{el}	8.17	8.09
	5 MW _{el} to 20 MW _{el} ⁱ	7.71	7.63
Cultivated biomass bonus^{a, m}	up to 150 kW _{el}	5.94/6.93 ^c	5.88/6.86 ^c
	150 to 500 kW _{el} ^b	5.94/6.93 ^c	5.88/6.86 ^c
	500 kW _{el} to 5 MW _{el} ^b	3.96 ^{c, d} /2.48 ^e	3.92 ^{c, d} /2.46 ^e
Slurry bonus^{a, c, f, k}	up to 150 kW _{el}	3.96	3.92
	150 to 500 kW _{el}	0.99	0.98
Landscape conservation material bonus^{a, c, l}	up to 500 kW _{el}	1.98	1.96
Emission reduction bonus^{a, c, f, n}	up to 500 kW _{el}	0.99	0.98
Technology bonus	up to 5 MW _{el}	1.98/0.99 ^g	1.96/0.98 ^g
CHP bonus	up to 20 MW _{el}	2.97 ⁱ /1.98 ^j	2.94 ⁱ /1.96 ^j

Source: ENR

Information not legally binding

Remuneration for biomass/biogas plants (Renewable Energy Sources Act [EEG] 2012)

(euro cents/kWh)

		2012	2013 ⁹
Basic tariff^{1, 3}			
	up to 150 kW _{el}	14.30	14.01
	up to 500 kW _{el}	12.30	12.05
	up to 5 MW _{el} ⁸	11.00	10.78
	up to 20 MW _{el} ⁸	6.00	5.88
Special tariff²	up to 75 kW _{el}	25.00	24.50
Input material tariff³			
Input material category class I	up to 500 kW _{el}	6/6 ⁴	6/6 ⁴
	up to 750 kW _{el}	5/2.5 ⁴	5/2.5 ⁴
	up to 5 MW _{el}	4/2.5 ⁴	4/2.5 ⁴
Input material category class II	up to 500 kW _{el}	8	8
	up to 5 MW _{el}	8/6 ⁵	8/6 ⁵
Gas upgrading bonus⁶			
	up to 700 Nm ³	3.00	2.94
	up to 1,000 Nm ³	2.00	1.96
	up to 1,400 Nm ³	1.00	0.98
Biowaste fermentation bonus⁷			
	up to 500 kW _{el}	16.00	15.68
	up to 20 MW _{el}	14.00	13.72

Source: EEG 2012

Information not legally binding



Major changes in the EEG 2012

- Mandatory **heat use** of 60%
(25% can be allocated to digester heating)
- Exempted from mandatory heat use are plants that use **more manure** (>60%)
- **Maximum use of corn silage** of 60%
- **Small plants** that use >80% manure (<75 kW) have a special tariff
- Alternative tool to feed-in tariff:
„**Direct selling**“ option
„Market Premium“ and „Flexibility Premium“



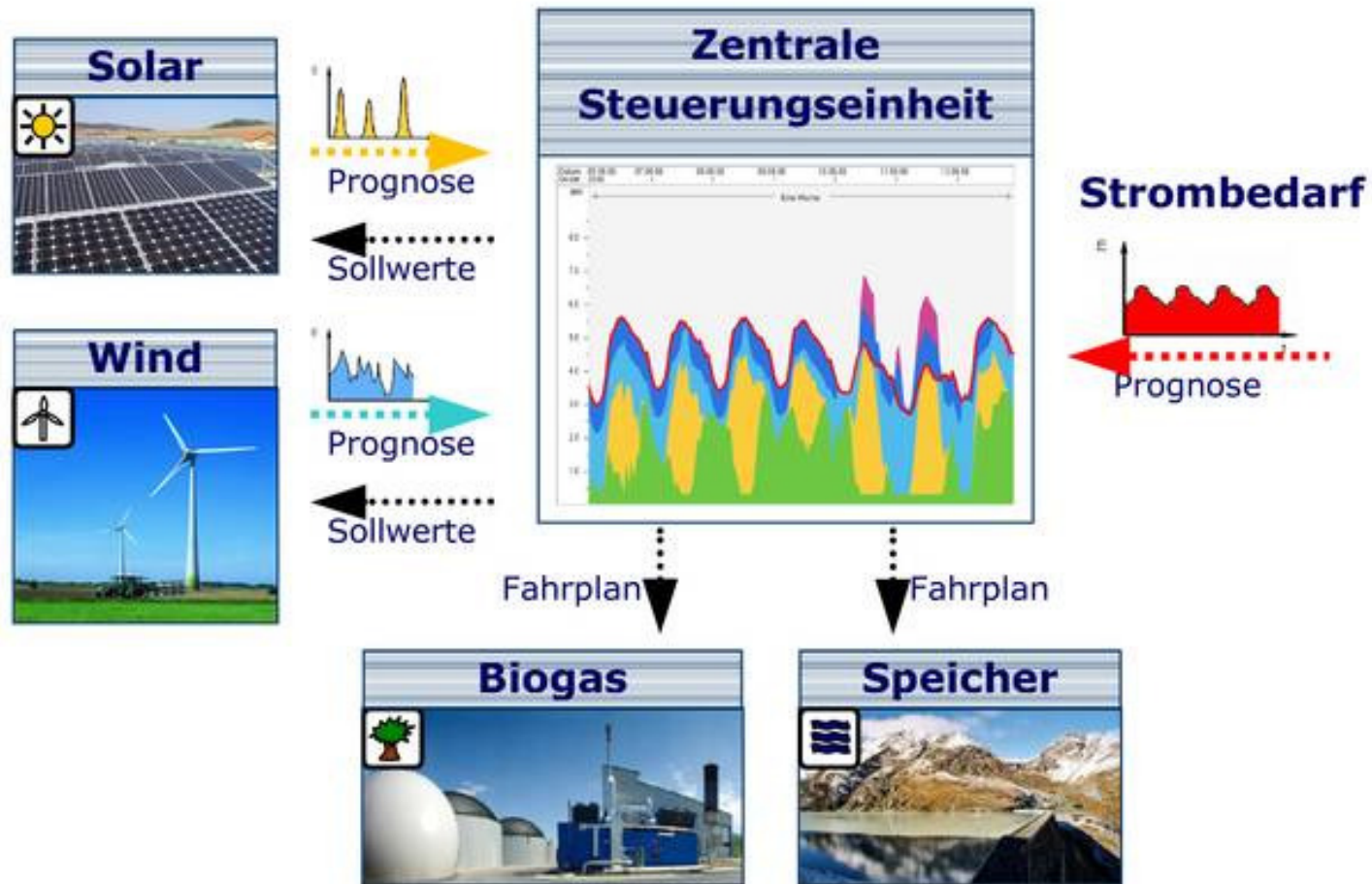
New Tool: Direct Selling

Objectives:

- to prepare the biogas sector **for the future**
(after the feed-in tariff phase)
- to contribute to load management and grid stability (**smart grids**)

Details:

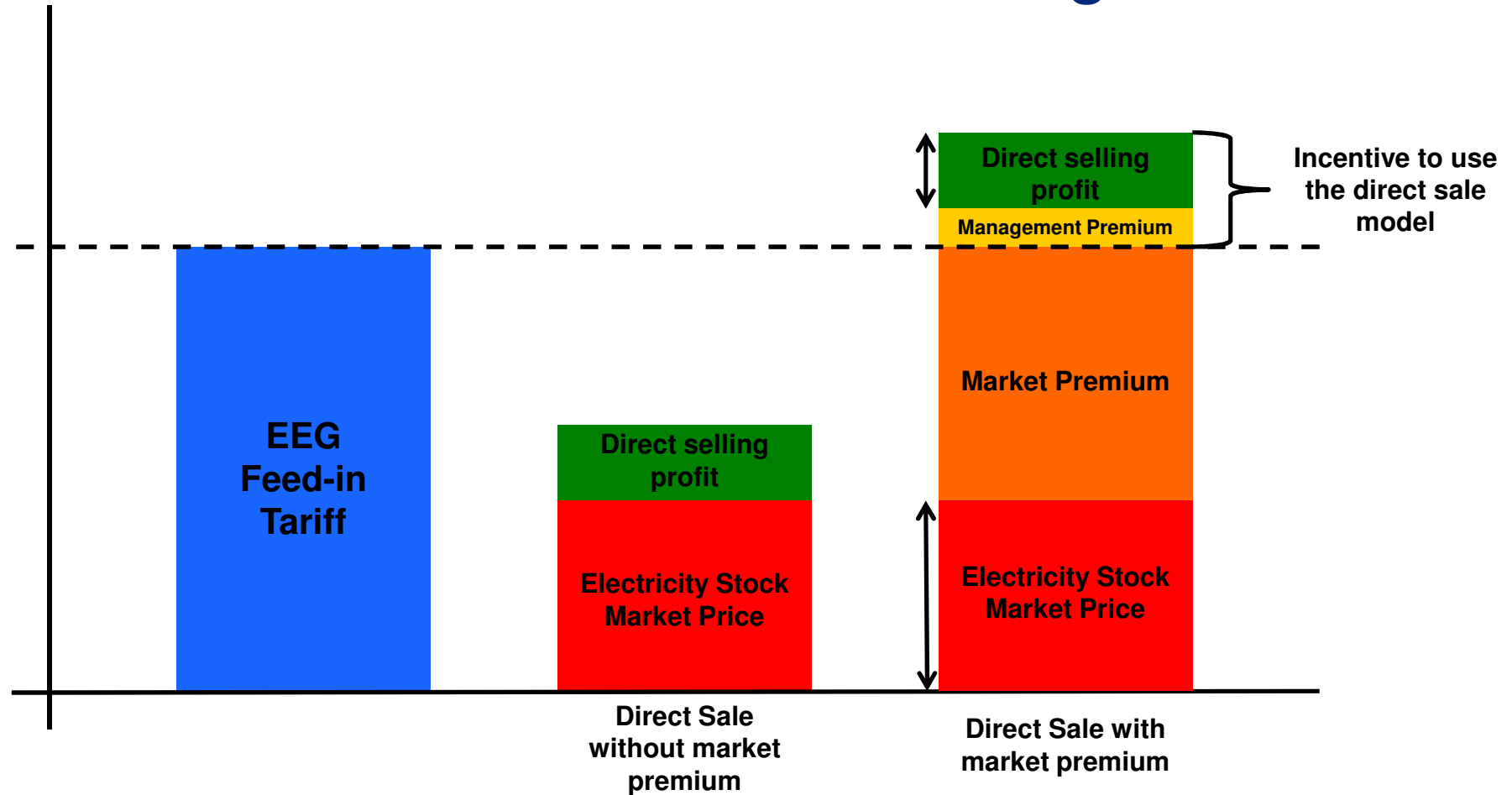
- Switching from feed-in tariff system to direct selling is every month possible
- New plants of >750 KW are not eligible for feed-in tariffs if installed after 1.1.2014
- Direct Selling tools are only applicable if the public power grid is used for transmission
- Mandatory heat use of 60% is not applicable for plants that use direct selling!



Source: <http://sahne.wikispaces.com/Virtuelle+Kraftwerke>



New Tool: Direct Selling





3. Permitting Procedures in Germany



Is one of the following criterion applicable?

- The total capacity of the fermenters and the storage facilities is higher than 6,500 m³
- The total thermal output of the CHP plant is higher than 1 MW (and lower than 50 MW)
- The daily treated non dangerous waste is higher than 10 t (and lower than 50 t)
- It exists a temporal storage facility of non dangerous wastes with a capacity higher than 100 t
- The biogas plant is installed in combination with a permit-requiring facility for animal breeding

No

Building permit
is sufficient

Yes

Permit according to
BlmSchG is required

Is one of the following criterion applicable?

- The daily treated non dangerous waste is higher than 50 t
- The daily treated dangerous waste is higher than 10 t

No

Simplified procedure
applicable

Yes

Formal procedure is required

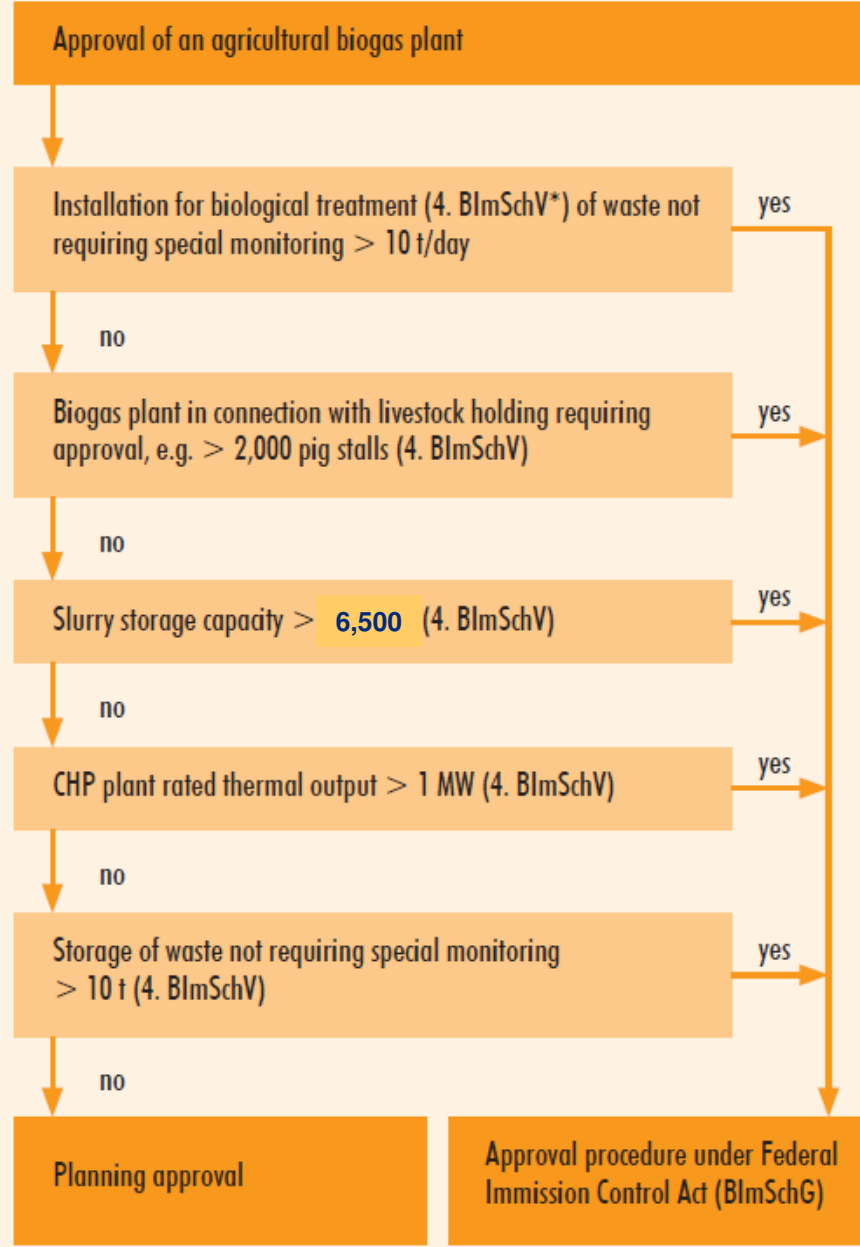


BlmSchG = Federal Imission Control Act



Legal framework

Criteria for approval of a biogas plant





German acts and ordinances

- Federal Building Code and secondary legislation (BauGB and state building codes)
- Federal Immission Control Act (BImSchG)
- Environmental Impact Assessment Act (UVPG)
- Ordinance on Installations Requiring a Permit (4. BImSchV)
- Closed Substance Cycle and Waste Management Act (KrW-/AbfG)
- Animal By-Products Act (TierNebG)
- Regulation (EC) No. 1774/2002 of 3 October 2002 laying down health rules concerning animal by-products not intended for human consumption
- Ordinance on Biowastes (BioAbfV)
- Feedstuffs Act (FutmG), Cattle Transport Ordinance (ViehVerkV)
- Fertilizer Application Ordinance (DüV), Fertilizer
- Ordinance (DüMV), Fertilizer Act (DüngG)



Rules on handling of fermentation residue (biogas slurry)

Legal stipulations	Affected substrates
Fertilizer-related rules	
Fertilizer Application Ordinance (DüV) Fertilizer Ordinance (DüMV)	<ul style="list-style-type: none"> • All substrates • All substrates not applied on own land
Pollution-related rules	
Ordinance on Biowastes (BioAbfV) Animal By-Products Act (TierNebG)	<ul style="list-style-type: none"> • All biowaste not coming under the EU Animal By-Products Regulation • Fermentation residues with biowaste as coferment
Product hygiene rules	
EU Animal By-Products Regulation Fertilizer Ordinance (DüMV) Ordinance on Biowastes (BioAbfV) Animal By-Products Act (TierNebG)	<ul style="list-style-type: none"> • Substrates of animal origin • All substrates not applied on own land • All biowaste not coming under the EU Animal By-Products Regulation • Fermentation residues with biowaste as coferment

Source: FNR



4. Conclusion





Conclusion


- Germany has developed a **sound biogas market** which still grows, although growth has slowed in 2012 (~7,500 biogas plants; ~100 methane injection plants)
- This is due to many **favourable framework conditions**
 - Support of electricity from biogas
 - Support of grid-access for biomethane injection
 - Simplified permit procedures
 - Open-minded financing institutes in favour of biogas
- Details are described in the **German Renewable Energy Sources Act (EEG)**
- **Problems** (corn silage use, waste heat) and **challenges** (contribution to grid stability & load management) lead to continuous adaptation of legislation



Further Information

Available at:
www.biogasin.org

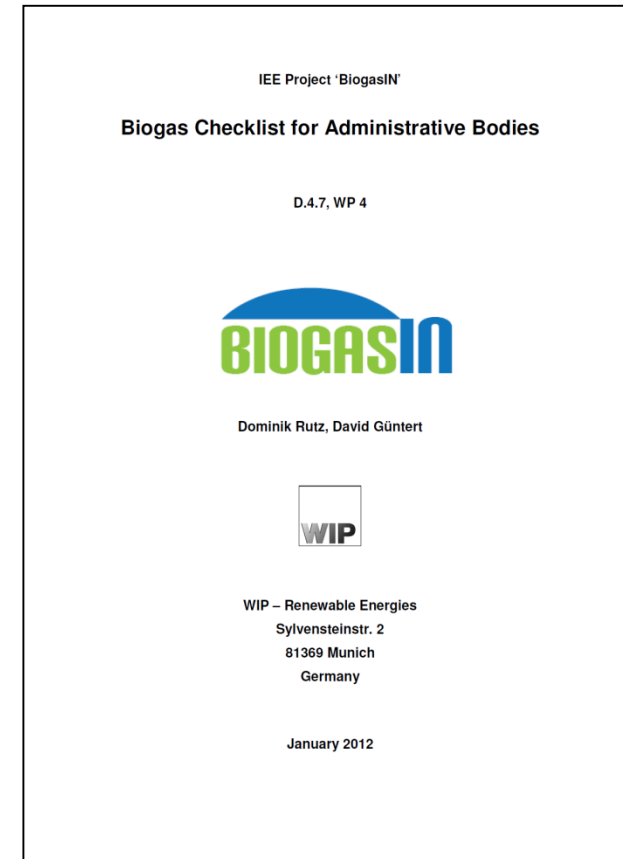
IEE Project 'BiogasIN'
Biogas Checklist for Administrative Bodies
D.4.7, WP 4

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January 2012

IEE Project 'BiogasIN'
**Permitting procedures for biogas projects
in Austria, Germany, Denmark,
The Netherlands and Italy**
WP 3.1

Franz Kirchmeyr, Arthur Wellinger, Henning Hahn,
Erik Ferber, Dominik Rutz
2010 12 07
1



Further Information: Checklist for permitting process

- Feedstock
- Electricity production and use
- Heat production and use
- Upgrading biogas to bio-methane and use
- Use of digestate
- Environmental protection and emissions
- Safety regulations
- Public participation





References



<http://www.springer.com/environment/sustainable+development/book/978-94-007-2180-7>

www.big-east.eu



www.urbanbiogas.eu



www.biogasheat.org





Thank You



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