

GERMAN POLICY AND MARKET UPDATE

COGEN Europe Webinar – 20.09.2012

Adi Golbach

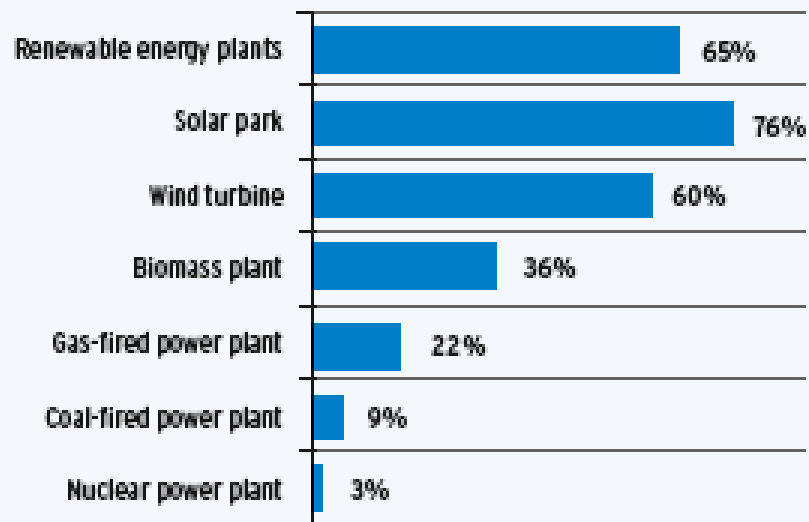
www.kwkkommt.de

Adi.golbach@kwkkommt.de

Phone +49 30 436 055 72

After Fukushima: no acceptance for nuclear power plants

Respondents who consider electricity generation near their homes 'very good' or 'good' according to power plant type:



Source: Survey conducted by TNS Infratest 2011

No polls regarding decentralized in-site-power production but perceived tendency towards high acceptance

Germany's Energy Transformation ("Energiewende")

Energy Policy Objectives of the German Government	2010	2020	2030
Phasing out of nuclear power by the end of 2022			
Decreasing greenhouse gas emissions compared to 1990	23%	40%	55%
Renewable energy share of el. production	17%	35%	50%
CHP share of el. Production (incl. Bio-CHP)	15%	25%	

Short history of CHP policy (1)

- 2001 - CHP preposal law
 - for existing big plants only
 - stranded investment prevention
- 2002 - 1st CHP law
 - Only for CHP which gets no support from RES law (actually: fired with fossile fuels)
 - mainly for modernisation of big plants,
 - new installations only up to 2 MW_{el}
 - Bonus support for electricity fed into the public grid only
 - Bonus hight depending on size category, 3 categories: up to 50 kW_{el}; up to 2 MW_{el}; bigger than 2 Mw_{el}.
 - Some amendments since than, 2004 legal definition of the „usual price“

Short history of CHP policy (2)

- 2009 - 2nd CHP law
 - Objective of the law: 25% CHP share in total electricity production (but no time target)
 - Modernisation and new installations without size limit
 - Bonus payments for the complete produced electricity (also for use in site)
 - Support for heat grids (up to 20% of invest-cost)
 - Yearly cost limit 750 million €;
 - The support is not paid out of the federal budget but by the grid operators as a apportionment allocated to all electricity consumers; the 750 million cup is an upper limit; if in one year the limit of 750 million € is reached than installations bigger than 10 MWel get proportionally less and they have to wait for getting their complete bonus payment until the overall payment goes down under 750 million €.)
 - Monitoring of effects after 2 years (-> 2011)
- 2011 the Monitoring of the CHP law showed
 - CHP share incl. bio CHP 15%
 - Without additional efforts only 20% will be reached up to 2020

Essentials of the revised law (1)

- Start July 2012
- Runtime up to 2020
- Objective 25% CHP share up to 2020
- Priority of connection and dispatch equal to Renewable Energy
- Overall budget allocated 750 million € / year (unchanged)
- All categories get 0,3 Cent more; from 2013 ETS CHPs additional 0,3 Cent (cost compensation)
- A new category was introduced for systems from >50 to 250 kW_{el}
 - to avoid a too big step in bonus payments and to smooth the bonus curve
- Options for Mini-CHP (≤ 50 kW_{el}) for 30.000 full operation hours (foh) support instead of 10 years
- Option for Micro CHP up to 2 kW_{el}: one time payment equivalent to the amount of 30.000 foh.

Bonus payments

for new high efficient installations and modernisations

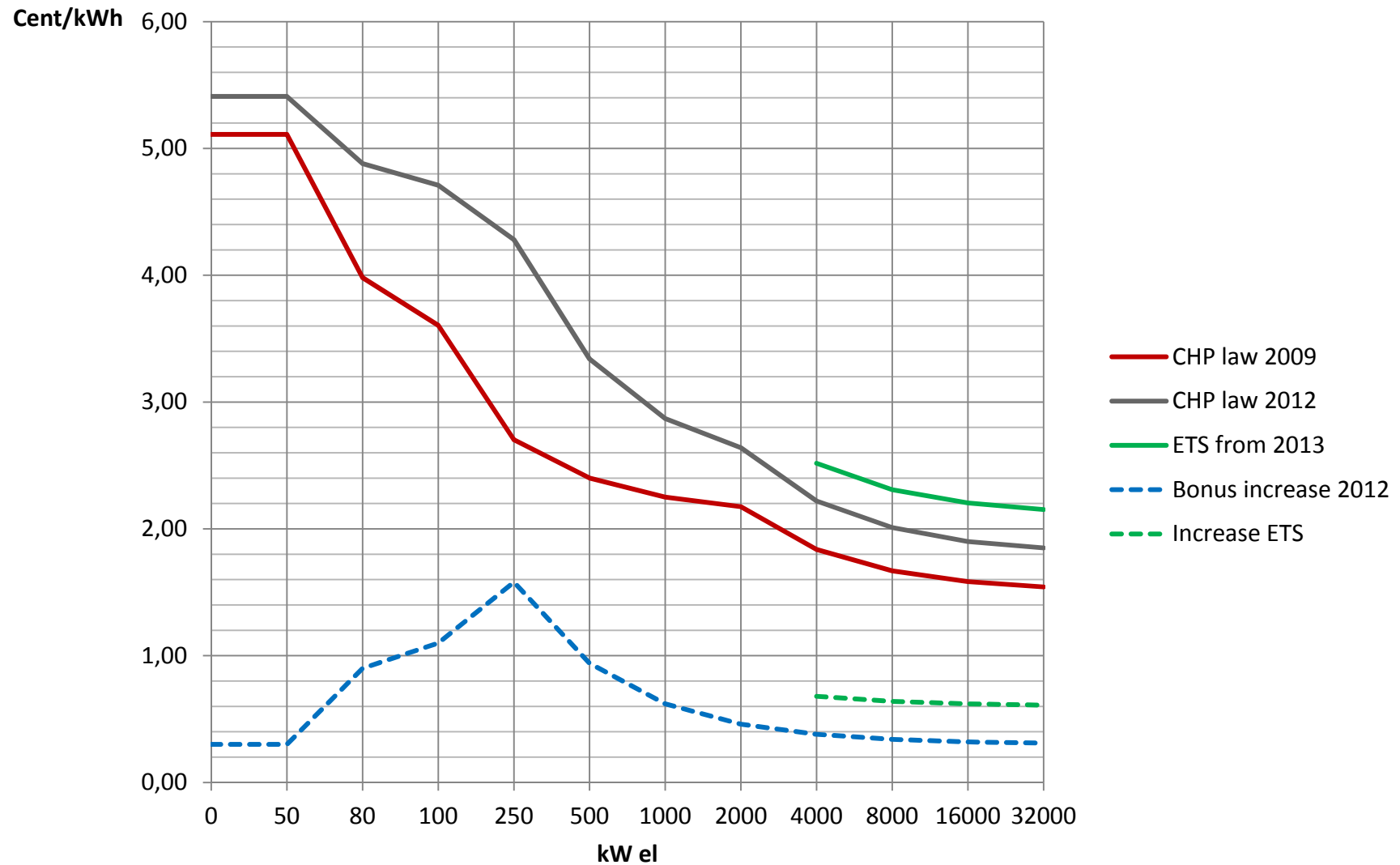
elektr. power (proportional*)	Bonus per kWh produced	Support duration
≤ 50 kW	5,41 Cent optional for ≤ 2 kW: one-time payment for 30.000 foh**	10 years or optional 30.000 foh**
≤ 250 kW	4 Cent	30.000*** foh **
≤ 2000 kW	2,41 Cent	
> 2000 kW	1,8 Cent	
from 2013 for ETS plants	2,1 Cent	

* Proportional means: for the first 50 kW 5,41 Cent; for the next 200 kW 4 Cent; for the next 1750 kW 2,41 Cent; for the exceeding power capacity 1,8 Cent or – if ETS plant – 2,1 Cent.

**foh = full operating hours

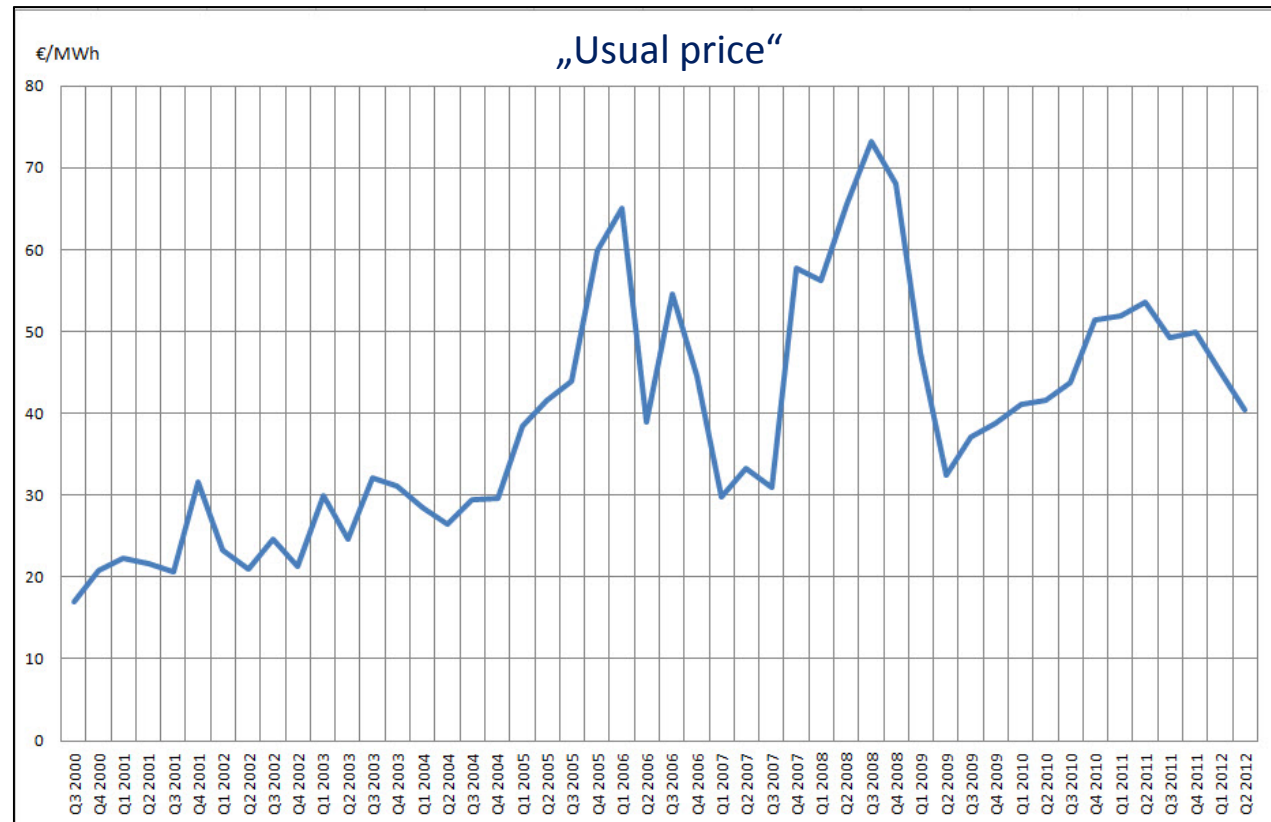
*** if modernisation cost are ≥ 50% of the cost of a new installation; otherwise (if ≥ 25%) 15.000 foh

Bonus payments CHP law 2009 and 2012/ ETS CHP from 2013



Additional payments by the grid operator for CHP electricity fed into the public grid

1. Refund of the avoided grid cost
(which the grid operator saves by receiving a part of its electricity from the CHP on a lower voltage level instead from the higher voltage level grid)
actually 0,1 to 3 Cent/kWh
2. For CHP up to 2 MW: the „Usual price“, defined as the average baseload price in the last quarter at the European Energy Exchange.



Essentials of the new law (2)

- Support for heating and cooling networks if 60% of the heat or cold comes from CHP or waste heat; new:
 - Inclusion of cooling into the network support
 - The support for heat (and cold) networks rises to 100 €/m and max. 40% of investment (≤ 100 mm diameter) or 30% (> 100 mm diameter).
 - Industrial waste heat is counted as chp heat.
- New: Support of heat storage infrastructure 250 €/m³ up to 30% of investment costs and capped to € 5 million €; incentive for flexible CHP operation with regards to growing supply of fluctuating wind and solar electricity
- Monitoring of the impact of the new CHP Law in 2014.

Valuation

- Overall the new CHP law is viewed as representing a step ahead for CHP, containing several positive elements, such as the introduction of a new class of small scale of CHP plant between 50-250 kW, support especially for heat storage with regards to the new role of CHP as instrument to ensure at any time sufficient electricity supply capacity
- But will the increase in bonuses be enough for achieving the target 25% CHP share in 2020 ?
- Main todos for 2014:
 - Stronger impulse
 - Differentiated bonus depending on current electricity demand
 - Further simplification for Micro CHP

Mini-CHP Support Program

- Since 1. April 2012
- CHP up to 20 kWel,

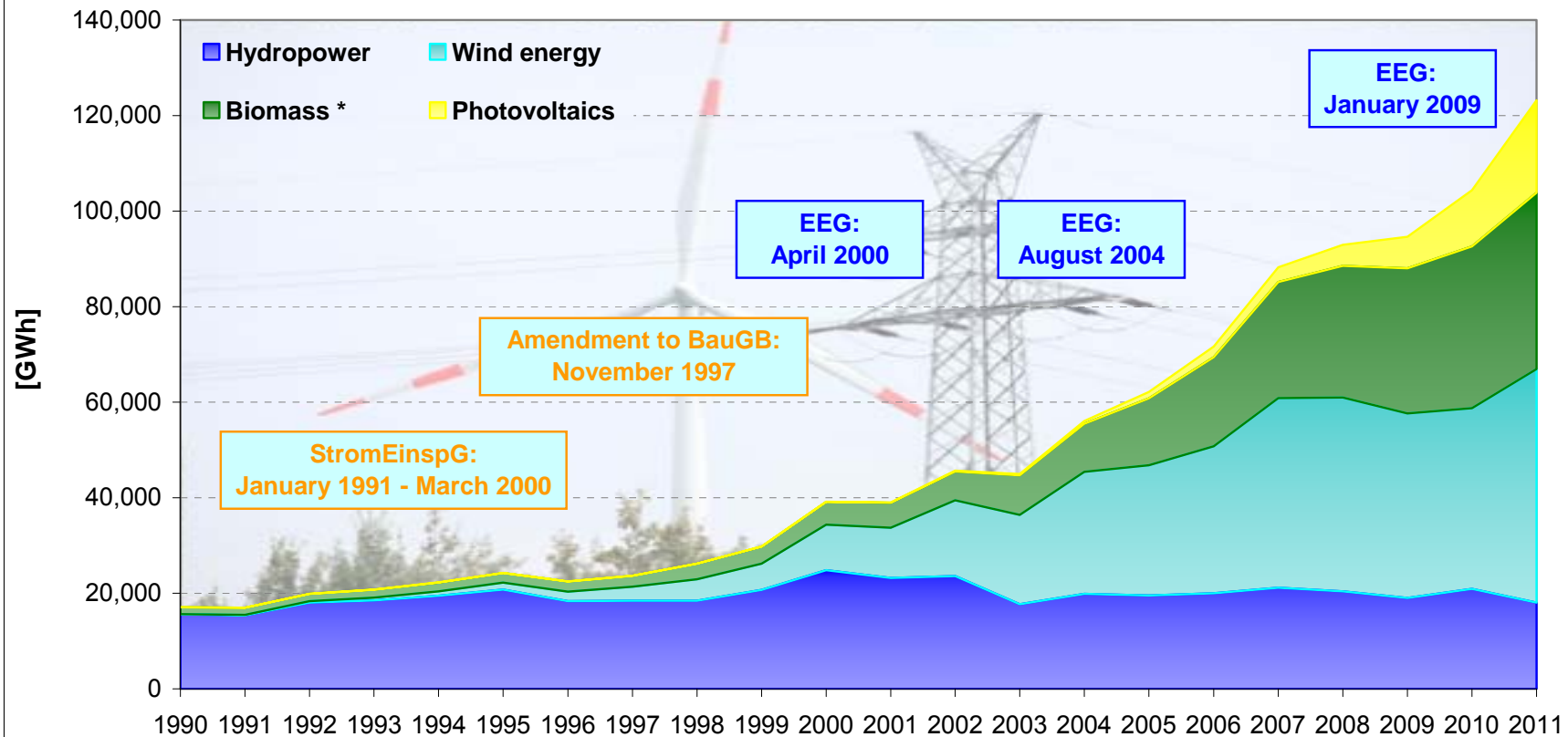
investment grant per kW el	
≤ 1kW	1.500 €
>1 to 4 kW	300 €
>4 to 10 kW	100 €
>10 to 20 kW	50 €

example 20 kW el: 1.500 + 3 x 300 € + 6 x 100 € + 10 x 50 € = 3.500 €

- Conditions :
 - For installation in existing buildings only
 - Not in areas with district heating
 - Metering electricity and heat production
 - Total efficiency ≥ 85%, Primary energy saving (based on the EU-CHP directive) at least 15%; if >10 kWel 20%
 - Heat storage with ≥ 1,6 kWh per kW thermal, hydraulic balance of the heating system, high-efficiency circulation pumps, CHP ≥3 kWel remote control.
- From 2014 for new installations the subsidy is reduced by 5% per year.

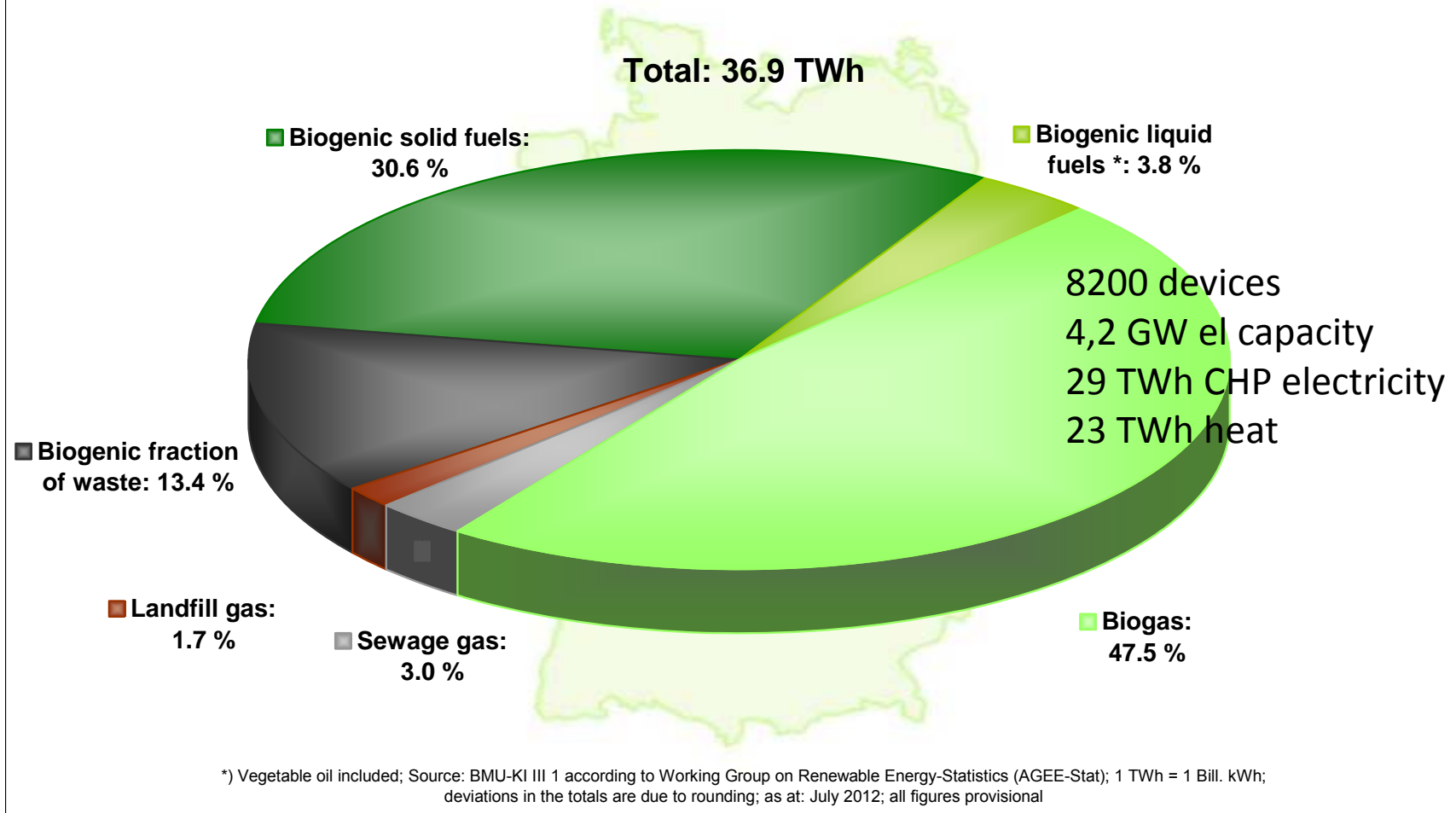
More information see http://www.bafa.de/bafa/de/energie/kraft_waerme_kopplung/mini_kwk_anlagen/index.html

Development of renewables-based electricity generation in Germany since 1990



* Solid and liquid biomass, biogas, sewage and landfill gas, biogenic fraction of waste; electricity from geothermal energy not presented due to negligible quantities produced; 1 GWh = 1 Mill. kWh;
 StromEinspG: Act on the Sale of Electricity to the Grid; BauGB: Construction Code; EEG: Renewable Energy Sources Act;
 Source: BMU-KI III 1 according to Working Group on Renewable Energy-Statistics (AGEE-Stat); image: BMU / Christoph Edelhoff; as at: July 2012; all figures provisional

Structure of biomass-based electricity supply in Germany 2011



Revised Renewable Energy (electricity) Law 2012

- Feed-in-tariff for
- General CHP obligation for bio energy
 - but important exemptions, e.g. if more than 60% manure is used or if the electricity is sold directly in the market
- Higher tariff for biomethan
- Cut of subsidy for liquid bio energy for new installations

RES Law 2012: Tariff structure for electricity from biomass

Feed-in-tariffs 2012, degression 2 % p.a., duration of tariff payment 20 years

rated average annual capacity	tariff for					
	biogas (excl. biowaste fermentation and small manure installations) and solid fuel installations				biowaste fermentation installations ⁶⁾ (Section 27a)	Small manure installations (Section 27b)
	basic tariff	substance tariff class I ²⁾	substance tariff class II ³⁾	gas processing bonus (Section 27c(2))		
[kW _{el}]	[ct/kWh]					
≤ 75 ⁴⁾				≤ 700 standard cubic metre (scm)/h: 3	18	25 ⁵⁾
≤ 150	14.3	6	8			
≤ 500	12.3					
≤ 750	11	5		≤ 1,000 scm/h: 2	14	
				≤ 1,400 scm/h: 1		
≤ 5,000	11	4	8 / 6 ⁴⁾			
≤ 20,000	6	-		-		

2) Over 500 kW and up to 5,000 kW only 2.5 ct/kWh for electricity from bark or forest waste wood.

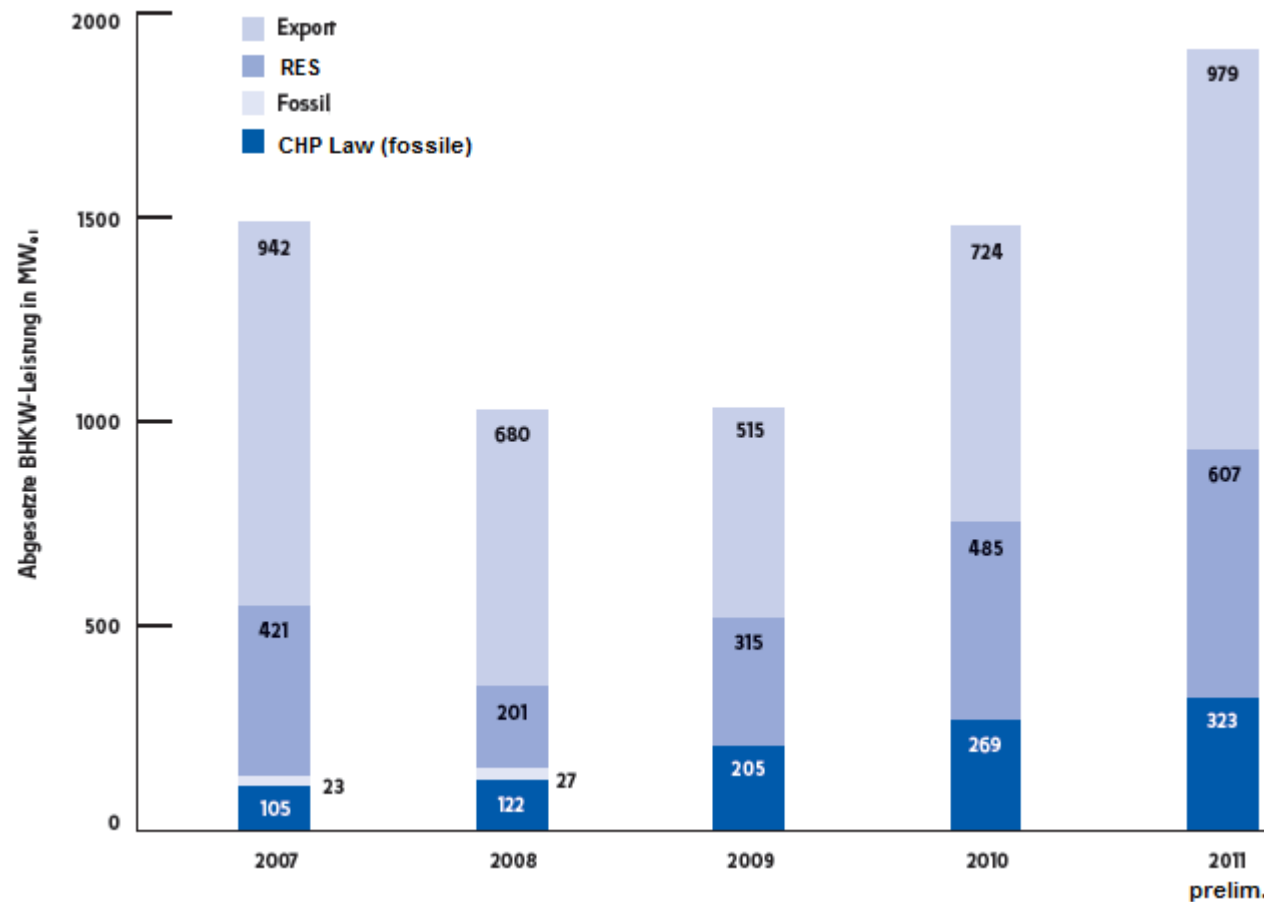
3) Only for selected, ecologically desirable substances.

4) Over 500 kW and up to 5,000 kW only 6 ct/kWh for electricity from manure (only nos. 3, 9, 11 to 15 of Annex 3 of the Biomass Ordinance (BiomasseV)).

5) Applies exclusively to biogas installations which ferment certain types of biowaste (pursuant to Section 27a (1)) and which are directly connected to a facility for post-rotting the solid fermentation residues. The post-rotted fermentation residues must be recycled. The tariff may only be combined with the gas processing bonus.

6) Special category for biogas installations utilising manure of up to 75 kW installed capacity at the site of the biogas generation plant; may not be combined (i.e. no additional basic tariff, substance tariff or gas processing bonus).

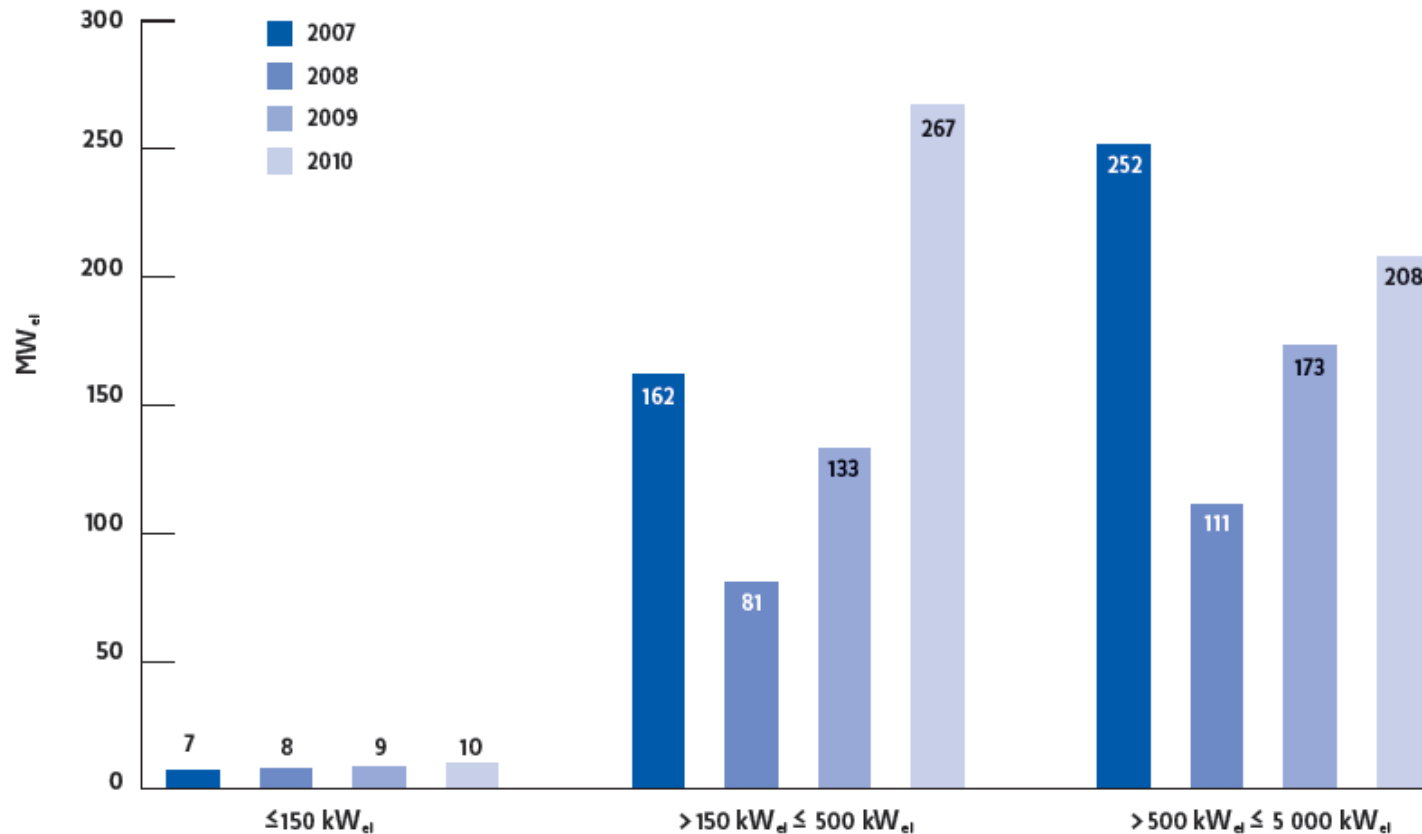
Development of new motor driven CHP installations in Germany (≤ 20 MWeI)



Source: Ökoinstitut; Energie & Management

Development of new motor driven CHP installations - size categories

≤ 20 MWeI

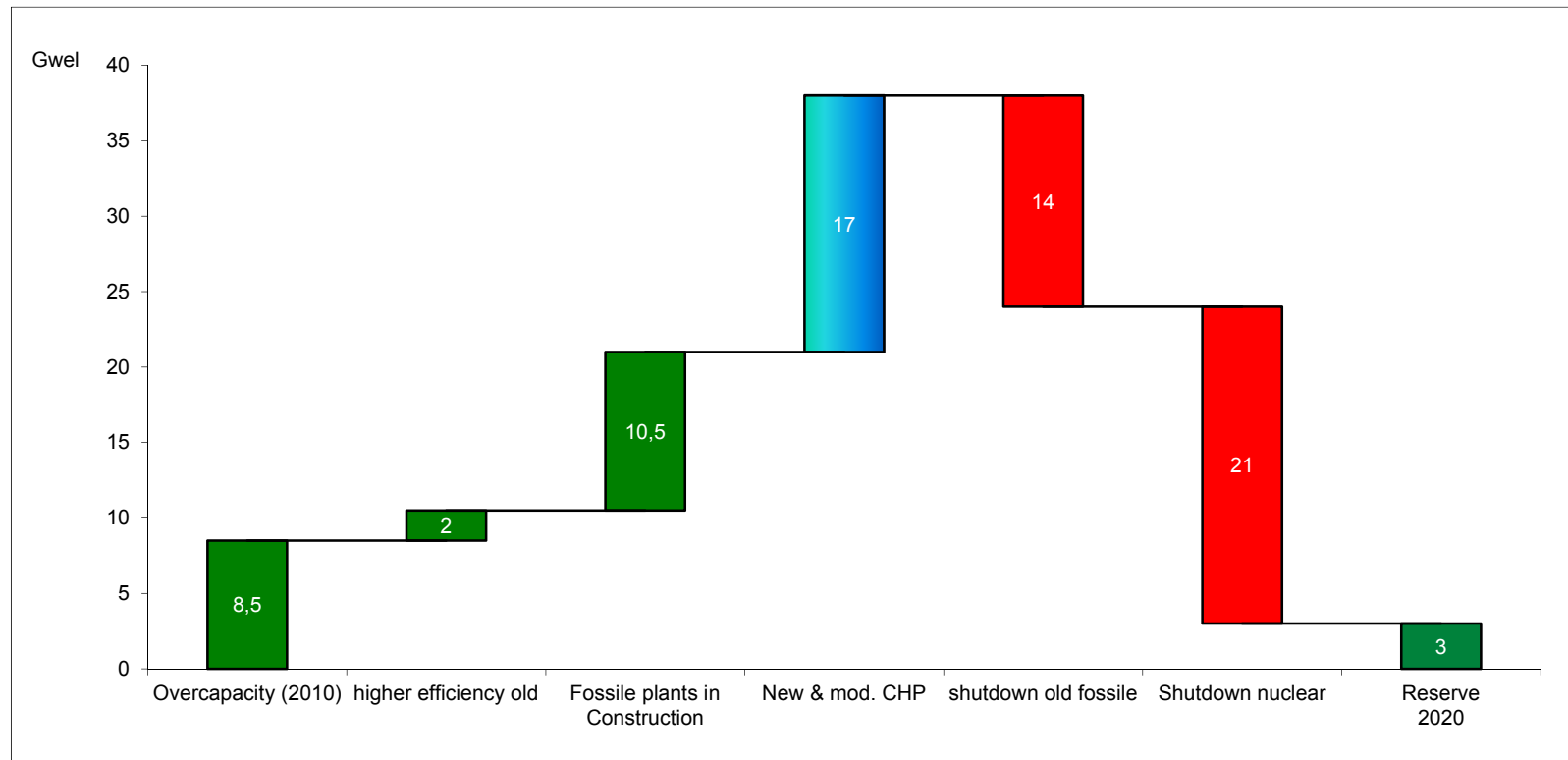


Source: Ökoinstitut; Energie & Management

Current energy policy discussion points

- Does Germany need special mechanisms or new markets to ensure supply safety for electricity with regards to growing capacities of unsecure wind and solar electricity?
 - Special payments for new back-up power plants?
 - Or will it be sufficient to plan and operate new CHP plants power led in combination with big heat storages?
 - *Special conference in Berlin 27./28.09.12: <http://www.hdt-essen.de/W-H110-09-119-2> (in German)*
- Electricity grid development plan
 - Does germany need new transmission lines from offshore windparks in the North to the South
 - Or are decentral production capacities (fossile & bio CHP, solar, wind) sufficient
- Does Germany need a general revision of the RES law?

CHP contribution to electricity supply security in the energy transformation



☞ With a 25% CHP share in 2020 no additional condensing power plants are needed

Prospects of the German CHP market

- Official target: 25% CHP share in electricity production in 2020 (fossile and bio energy)
- That would mean a growth of 10 points from 2010 about 15%.
- Because the total electricity consumption is planned to decrease by 10% up to 2020 by better device efficiency, the absolute CHP electricity increase would be about 48 TWh net , with estimated 8 TWh shutdown of old CHP and 56 TWh by new or modernized installations.
- That would require new CHP capacities of 16 to 18 GWel (assumed that 10 GWel old devices installed before 1990 will be closed down)
- Without an amended CHP law only 21% would have been achieved, according to an official government ordered study

Can the 25% target be achieved?

- My answer is Yes, although not only driven by the CHP law as it is, but may be driven by the next revision scheduled in 2014/15.
- **And with a CHP roadmap covering more than only aspects of political incentives even more can be achieved. The official potential estimation is nearly 60%. So let's make CODE 2 a success!**