Cumhuriyet Halk Partisi

Carolina Horse Park

Classics in the History of Psychology

Chilean Peso

Capillary Hydrostatic Pressure

Council to Homeless Persons

Combined Heat and Power

CHP Market in Germany

Dipl.-Ing. Mgr. **Maria Grajcar,** MA

District Heating Research Workshop
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WÄRME I KÄLTE I KWK

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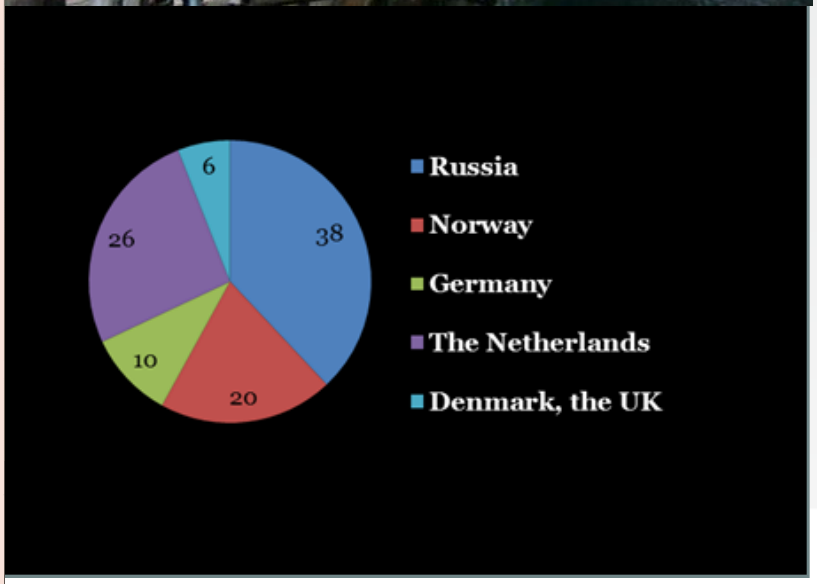


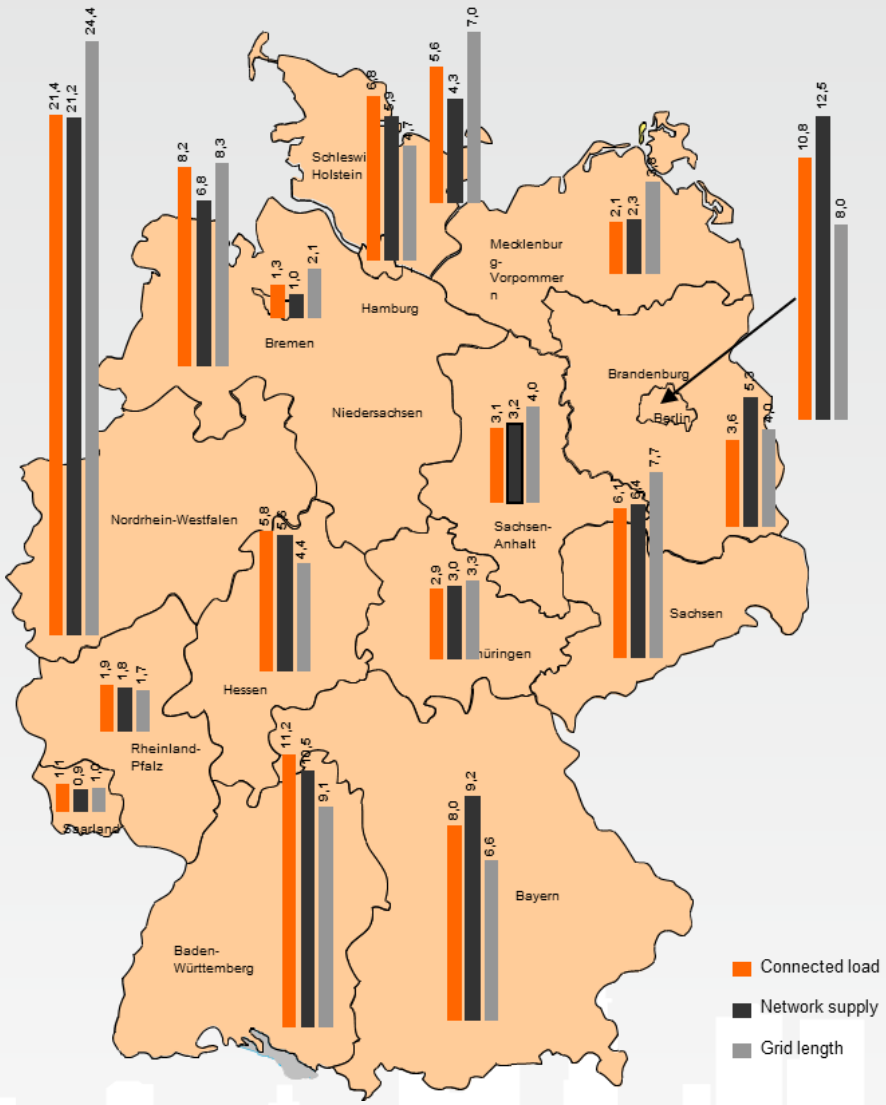
Statistics

Legal Framework

Situation on the market

Conclusions

Basic facts - Germany and Estonia



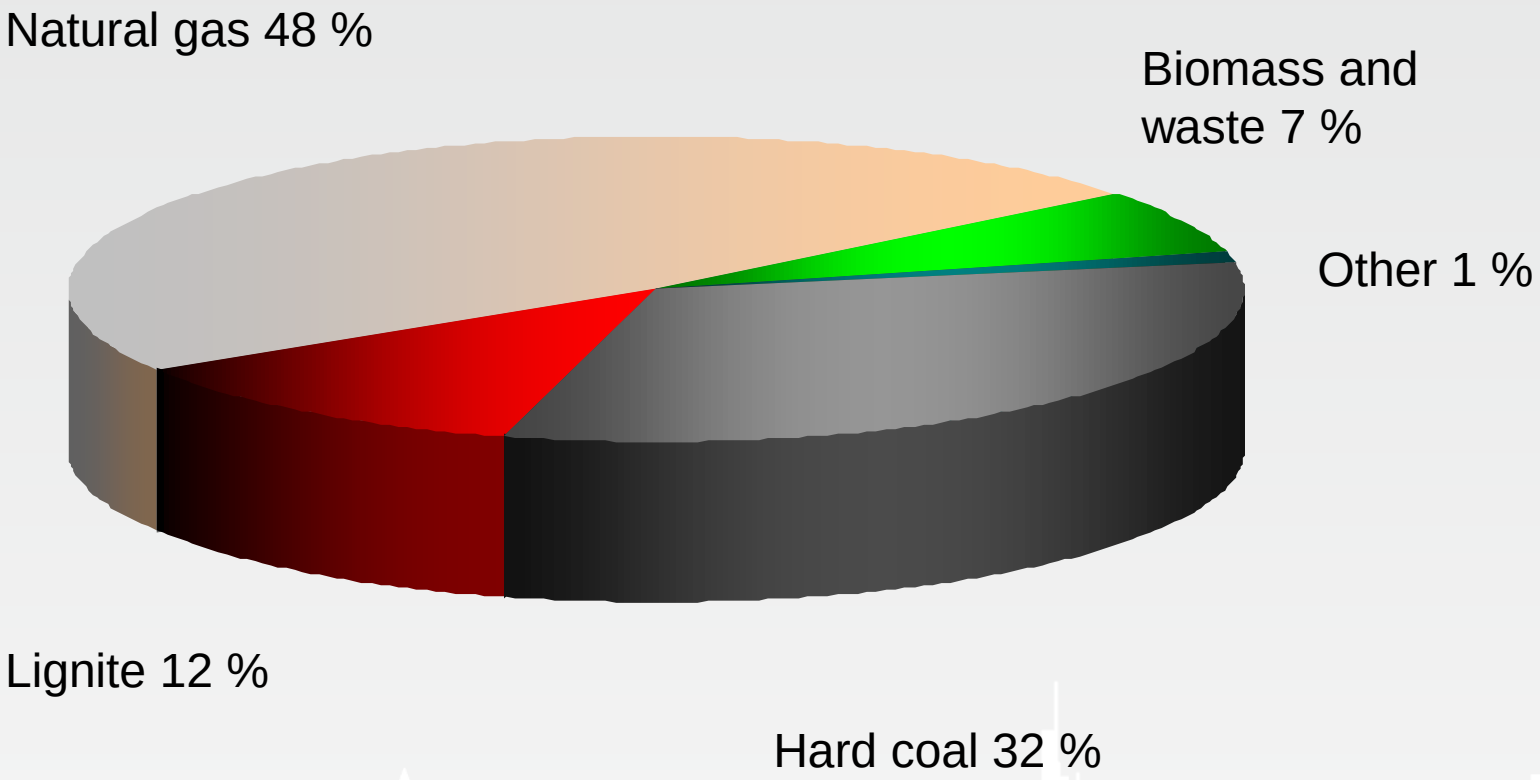
GERMANY

- The district heating connected load in Germany is approx. 57,000 MWth
- 16.2% CHP share in total net electricity production (target 2020: 25 %)
- Over 84 % of DH is generated in high-efficient cogeneration (CHP) plants

ESTONIA

- Connected load: 8,954 MWth
- Approx. 36 % of DH is generated in the CHP plants

Fuel use in CHP 411,915 TJ



Conceptions and Acts of Law

- Energy conception of the federal government, 2010
- CHP law
- Renewable Energy Law
- Act on Tax on Energy (EnStG)

Energy Markets

Stock markets:
Day-ahead market (short-term, one day before delivery)
Intra-day market (very short term- several hours before delivery)

3 EPEX SPOT Markets (DE/AT, 40 % of the German electricity consumption 2013), France, Switzerland
http://www.epexspot.com/en/market-data

Market on the regulatory energy/system services markets

Energy conception of the federal government (2010)

	Today	2020	2030	2040	2050
Cut in greenhouse gas emissions (against 1990)	- 27 %	- 40 %	- 55 %	- 70 %	- 80 %
Proportion of renewable energy in gross final energy consumption	10 %	18 %	30 %	45 %	60 %
Share of renewables in electricity consumption	16 %	35 %	50 %	65 %	80 %
Cut in primary energy consumption (against 2008)	- 6 %	- 20 %			- 50 %
Cut in electricity consumption (against 2008)	- 7 %	- 10 %			- 25 %
Cut in energy consumption in transport sector (against 2008)		- 10 %			- 40 %

Legal framework to realize these targets

» Combined heat and power (CHP) Act (KWKG)

»Introduced in 2002

»Target: Increasing the share of CHP electricity in Germany to **25% until 2020**

»Obligation of grid operators to connect CHP plants and give priority to buying CHP electricity

»Grid operators pay a **fixed premium for CHP electricity** (1,5 – to 5,11 ct/kWh) on top of the market price for a limited time (40.000 operating hours) for new and modernized plants

»Support for district heating (DH) grids based on CHP as heat sinks within this support system

»Costs for the premium are shared among all electricity consumers (currently 0.002 – 0.05 ct/kWh)

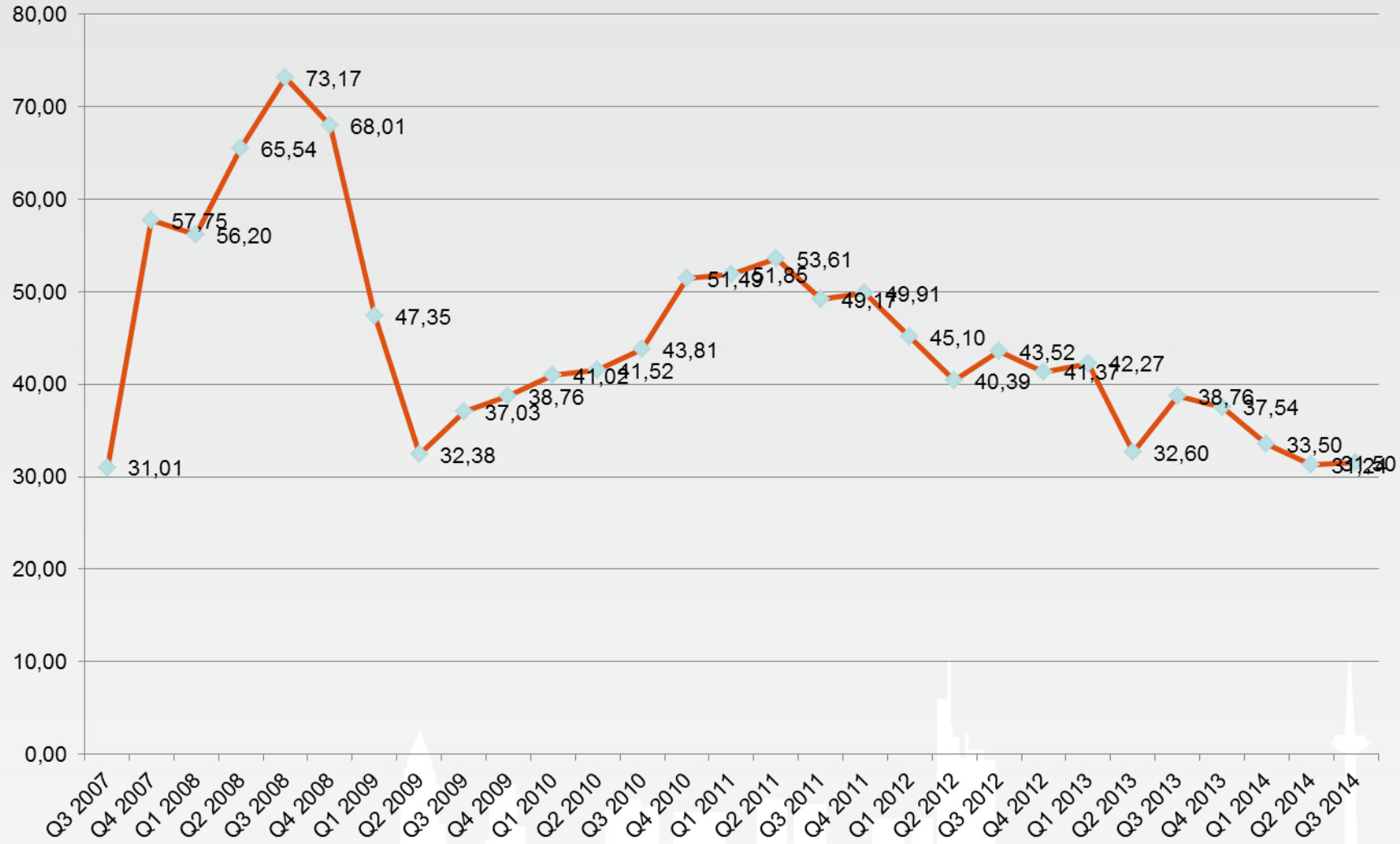
CHP Act

- Compatible/in line with European law
- No burden on the national budget. **No state aid**

The new CHP Law – into force since July 19th, 2012

- **Amendments include:**
- Increasing the fixed premium (+ 0,3 EUR Cent /kWh)
- Additional premium for CHP plants that take part in the EU Emissions Trading System (+ 0,3 EUR Cent / kWh)
- Extending the support (30% of the construction costs) for district heating grids to **district cooling (DC) grids**
- Support for thermal storage (heating and/or cooling) used in conjunction with CHP plants for the integration if renewable energy sources in the energy system

Average Price for Baseload Power at EPEX Spot per Quarter



CHP under pressure

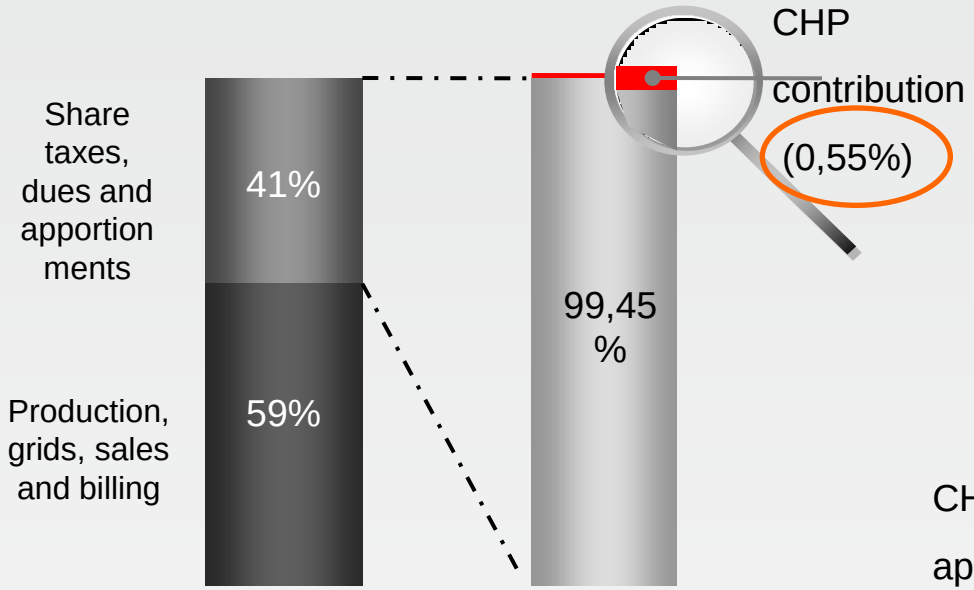
»Due to the system of fixed feed-in-tariffs for RES electricity the market is becoming more and more volatile

»Grid operators are obliged to buy RES electricity at fixed prices and market the electricity at the electricity exchange

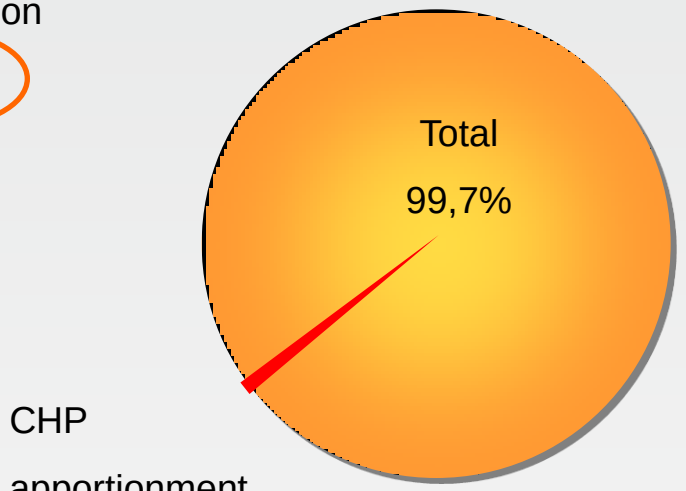
»This leads to increasing hours of very low electricity prices, even negative prices

»Installations with relatively high marginal costs, such as CHP combined cycle plants have fewer operating hours where they run economically viable

Households 2010



Industry 2010



Example household
Electricity demand per annum: 3 500 kWh
Total amount electricity bill: 829 €/a
of which CHP support: **4,6 €/a**

Example Industry
Electricity demand per annum: 40 000 MWh
Total amount electricity bill: 4 000 000 €
of which CHP support: 10 000 €

Renewable Energy Sources Act (EEG)

- **The amended Act came into effect 1 August 2014**
- **The aim: to integrate renewable energy into the market and grid**

The renewables surcharge	6,24 ct/kWh

- **for 2015: 6,17 ct/kWh**
- All installations producing electricity for its own use and connected to the electricity net from 2015- are obliged to pay 30 % of the EEG surcharge (nowadays 1,9 Ct/kWh), in 2016 -35 %, from 2017 – 40 %

- Installations other than CHP or running on renewable energy (wind, PV, biomass, water, geothermal) shall pay 100 % of the surcharge

Renewable Heat Act (EEWärmeG)

- Target: Increasing the share of renewable energy sources (RES) in the heating and cooling sector to **14% in 2020**
- Promote the further development of fossil resources and the reduction of import dependence
- Obligation for the use of RES for heating and cooling purposes in new buildings
- Possibility for 16 German states, “Bundesländer” to extend obligation to building stock
- **Alternative measures** may be used to fulfill obligations for the use of RES, such as CHP, district heating and cooling (DHC) and increased energy saving measures
- DHC has to consist of a substantial share of RES, 50% waste heat or CHP or 50% of a combination thereof

Directive on Energy Efficiency

» (not) implemented until 5 June 2014

»**Article 7**: Energy efficiency obligation schemes for cumulative end-use energy savings (1,5 % of the annual energy sales, reference: the average of the most recent 3-year period)

»The most important provision, half of the savings are supposed to stem from this article alone

»**Article 14**: assessment of the potential for CHP and DHC by the end of 2015 „Legitimation“ des KWK-G

»MS develop their own binding energy efficiency targets

First results from the CHP monitoring and analysis of potential of CHP: support schemes in the CHP law shall not be amended in the significant manner

Conclusions

- Pre-condition for the future of the CHP: a magic word flexibility (use of heat storages)

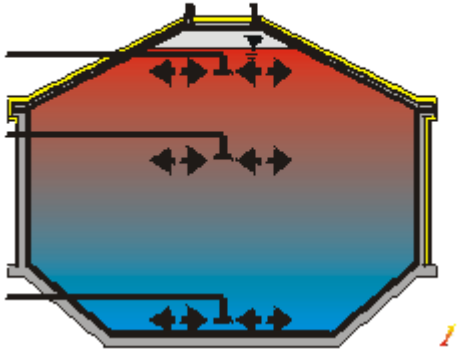
- Energiewende shall not focus on electricity side only

- Alternatives

CHP market without changes
CHP market with capacity mechanisms
Regulation of the market

Illustration: Andrew Baker/Début Art

hot-water heat storage



~~State Aid~~

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6 messages to be remembered in pictures