



Export Initiative Energy Efficiency

Energy-Contracting

Measures to renew, upgrade, optimize and innovate

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- ▶ Pros & Cons
- ▶ Situation in Germany
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Contracting – what is it?

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Contracting – definition and the concept

- ▶ Transfer of „own“ tasks (energy supply, energy services, energy management) to a service company (ESCO: **E**nergy **S**ervice **C**ompany)
- ▶ Common energy forms to be supplied: heat, cold, electricity, steam, compressed air
- ▶ Concept
 - ▶ Contractor/ESCO (Investor) installs/modifies/manages/operates installations as ist core business → energy and cost savings
 - ▶ Building operator (Client) buys energy/services
 - ▶ profits from savings and
 - ▶ Investment money is free to be invested in core business e.g. production facilities, buildings, expansion etc.
- ▶ Profits are split between investor and client



Modes of Contracting

- ▶ **Performance-Contracting**
 - ▶ Contractor/ESCO (Investor) installs/modifies installations → energy saving → profits from saving
 - ▶ building operator (Client) profits from saving
- ▶ **Energy supply-Contracting**
 - ▶ Contractor/ESCO (Investor) installs/modifies installations → energy saving → profits from selling energy (heat/cold/electricity)
 - ▶ building operator (Client) profits from buying less expensive energy
 - ▶ Profit is split between investor and client
- ▶ **Energy/Building Management-Contracting**
 - ▶ building operator (Client) invests in energy improvements or systems → profiting from core competence of the ESCO → focus on core own business
 - ▶ Contractor/ESCO (Operator) is hired to operate the energy supply system or building
- ▶ **Third-Party-Financing (TPF) or system-leasing**
 - ▶ Similar to energy supply contracting but goes further to providing an entire building or even including production facilities



Key components of Contracting

- ▶ Contracts covering all energy services provided
 - ▶ Difficult in performance contracting (!)
- ▶ Energy management systems → saving costs by saving energy

DIN EN 16001 (1st int. Management norm for energy efficiency)/ISO 50001; from 2013 on companies will receive tax savings only if implemented!
- ▶ Control, visibility, continuous improvement and verification
 - ▶ Metering to control the contractual parameters
 - ▶ Visibility of building management systems
 - ▶ Automated analysis and reporting of key performance indicators
 - ▶ On-going monitoring of subsystems → expand energy conservation efforts and maintenance management improvements
→ further cost reductions
 - ▶ Independent verification of ESCO



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Situation in Germany

...and in Spain?

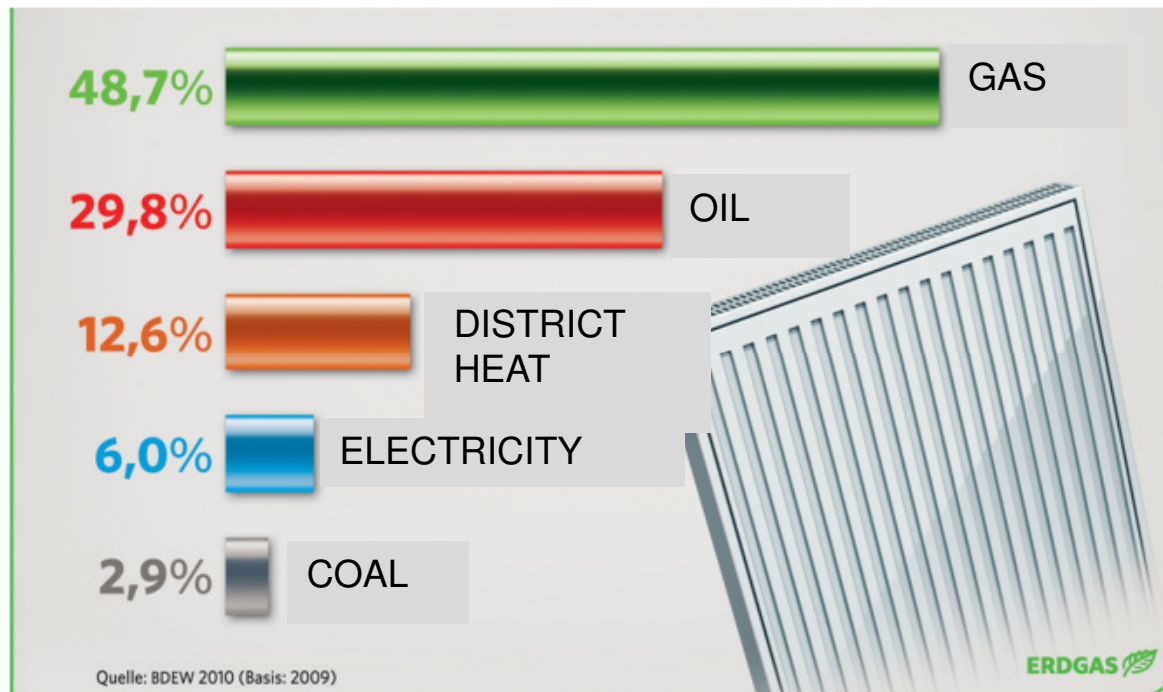
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Motivation for contracting solutions in Germany

- ▶ Continuous changes in regulations call for renewal of energy systems and improvements of energy efficiency
 - ▶ Buildings → decrease energy demand
 - ▶ Improve efficiency of energy supply
 - ▶ More use of renewable energy
- ▶ Energy demand and supply situation is becoming more complex
- ▶ Public sector has limited financial resources → more than 50% of new heat supply projects go for contracting solutions
- ▶ industrial/private sector wants to focus on core business
- ▶ ESCO's offer full service

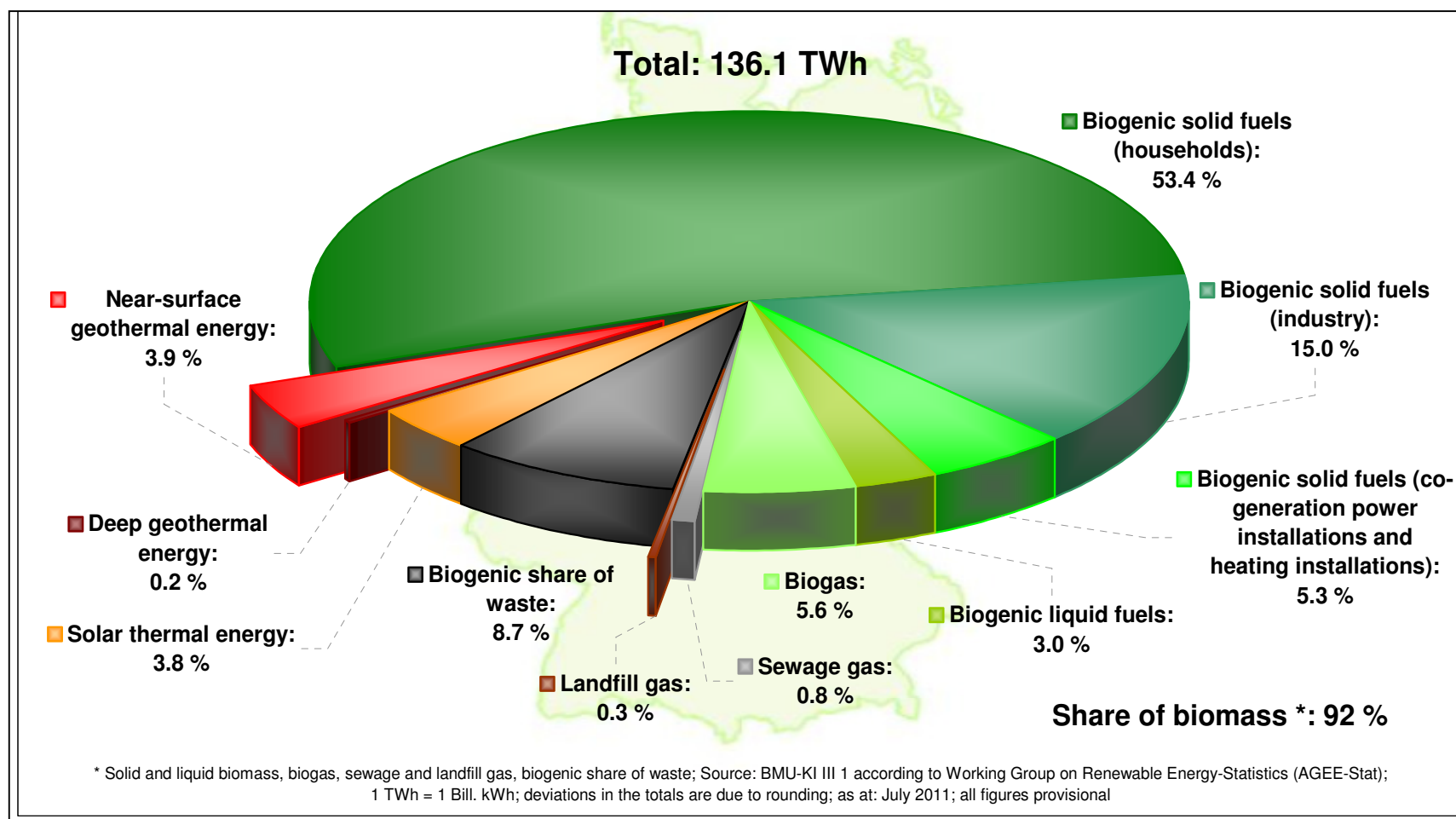
Energy carriers to satisfy German heat demand



Source: BDEW, 2010

...and heat from renewable energy sources?

Heat supply from renewable energy sources in Germany 2010





ESCO's in Germany

- ▶ Most local utilities offer „standard“ (mainly heat) energy supply contracting services with conventional systems
- ▶ Sustainable energy supply contracting; e.g.
 - ▶ KWA Contracting AG
 - ▶ AGO
 - ▶ ECH
- ▶ Performance contracting; e.g.
 - ▶ Hochtief Energy Management
 - ▶ Kofler Energies
 - ▶ Cofely
 - ▶ Getec



What's the situation in Spain?

- ▶ CTE - Código Técnico de la Edificación
 - ▶ Requirements on buildings: quality, materials, safety, energy efficiency, renewable energy
 - reducing energy consumption
 - improvement of energy efficiency
 - Increasing the use of renewable energy
- ▶ Soon to come: CTE plus with increased requirements
- ▶ RITE - Reglamento de Instalaciones Térmicas en los edificios
 - ▶ All heating systems need to have a minimum efficiency
 - ▶ From 2012 on systems not fulfilling the technical requirements need to be replaced

? Do building operators oversee the full scale of changes?



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Best-practice examples

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Heat supply to school and public swimming pool in Hamminkeln

- ▶ contractor: GELSENWASSER AG
- ▶ measures
 - ▶ Construction of 150 m local district heating grid
 - ▶ Installation of new high-efficiency gas boilers
- ▶ energy data
 - ▶ Energy savings: 450000 kWh/a
 - ▶ Heat capacity installed: 895 kW_{th} + 2x 375 kW_{th}
 - ▶ CO₂-reduction: 90 t/a
- ▶ commissioning: 2005
- ▶ advantages
 - ▶ Higher efficiency
 - ▶ No need to invest
 - ▶ Security of supply
 - ▶ Cost savings



Source: www.esc-thermomat.de

Biomass heat supply to OBI Heidelberg

- ▶ Contractor: ECH
- ▶ measures
 - ▶ Construction of local district heating grid incl. Heat transfer station and metering device
 - ▶ Connection to existing renewable heating system of neighbor Eternit
- ▶ energy data
 - ▶ Heat capacity: 800 kW_{th}
 - ▶ Heat demand: 850 MWh/a
 - ▶ CO₂-reduction: 200 t/a
 - ▶ Fuel: wood chips
- ▶ commissioning: 2009
- ▶ advantages
 - ▶ 100 % CO₂-neutral
 - ▶ Security of supply
 - ▶ Cost savings
 - ▶ Regional fuel supply: wood chips



Source: ECH



Source: KWA Eviva GmbH

Biomass heat supply to brewery Rothaus (Tannenzäpfle) in Grafenhausen

- ▶ Contractor: ECH
- ▶ measures
 - ▶ Planing, financing, realisation and commissioning of biomass heating
 - ▶ Organisation of biomass fuel supply
 - ▶ Operation of heating plant
- ▶ energy data
 - ▶ Heat capacity installed: 3 MW_{th}
 - ▶ Heat supply: 12.000 MW_{th}/a
 - ▶ Steam: 4,5 t/h at 7 bar
 - ▶ CO₂-reduction: > 3000 t/a
 - ▶ Fuel: wood chips
- ▶ commissioning: 2008
- ▶ advantages
 - ▶ 100 % CO₂-neutral
 - ▶ Security of supply
 - ▶ Cost savings
 - ▶ Regional fuel supply: wood chips



Source: ECH

Performance and energy supply contracting: 20 municipal buildings in Rommerskirchen

- ▶ Contractor: Hochtief Facility Management Energy
- ▶ Measures in 20 buildings
 - ▶ Modernisation of metering and control
 - ▶ installation of modern central control system and integration of all systems
 - ▶ Renewal and optimisation of all pumps
 - ▶ Optimisation of airconditioning devices
 - ▶ Renewal and optimisation of heatings
 - ▶ Implementation of energy management system
- ▶ Start of services: 2004
- ▶ advantages
 - ▶ Guaranteed cost saving of 24%
 - ▶ No investment of building operator
 - ▶ Security of supply
- ▶ Energy data - Performance contracting balance



Source: Energieagentur NRW

	Baseline	Guaranteed performance
Natural gas	3.930 MWh/a	2.990 MWh/a
Electricity	632.650 kWh/a	472.650 kWh/a
CO ₂ -Emissions	1.200 t/a	905 t/a



Full service Energy/Building Management-Contracting for industrial area in Berlin

- ▶ Contractor: Cofely
- ▶ Measures/services
 - ▶ Supply of all services to manage the entire real estate complex of the industrial area
 - ▶ Supply of electricity and gas
 - ▶ Operation and maintenance of all technical installations
- ▶ Start of services: 1997
- ▶ advantages
 - ▶ Full service from professional supplier

Heat and power supply contracting in Monheim

- ▶ Contractor: KWA Contracting AG
- ▶ Measures
 - ▶ installation and O&M of two CHP units
- ▶ Energy data
 - ▶ CHP capacity installed: 2 x 2 MW_{el}
 - ▶ Heating capacity installed: 2200 kW_{th}
 - ▶ Electricity generated: 16 Mio. kWh/a
 - ▶ Heat supplied to district heating grid: 17.6 Mio. kWh/a
 - ▶ CO₂-reduction: 11000 t/a
- ▶ Start of services: 2005
- ▶ Advantages
 - ▶ Highly efficient use of gas
 - ▶ CO₂-emission reduction
 - ▶ Energy cost savings



Source: KWA Contracting AG

Biomass heating in Günzburg

- ▶ Contractor: KWA Contracting
- ▶ Measures
 - ▶ installation and O&M of biomass heating plant and 1,7 km district heating grid to supply 9 municipal buildings
- ▶ Energy data
 - ▶ Heating capacity installed: 900 kW_{th}
 - ▶ Heat demand: 5.3 Mio. kWh/a
 - ▶ CO₂-reduction: 1200 t/a
- ▶ Start of services: 2008
- ▶ Advantages
 - ▶ Cost savings
 - ▶ Saving 475000 liters of oil



Source: KWA Contracting AG



Heat and cold supply to car component supplier in Schwaigern



Source: KWA Contracting AG

- ▶ Contractor: KWA Bioenergie Eifel
- ▶ Measures
 - ▶ installation and O&M of CHP unit, 930m district heating grid and 1.5 km district cooling grid
 - ▶ Sustainable biogas heat and cold supply
- ▶ Energy data
 - ▶ CHP unit capacity installed: 1021 kW
 - ▶ Heating capacity : 1050 kW_{th}
 - ▶ Cooling absorber capacity: 630 kW_{el}
 - ▶ Electricity generated: 6.8 Mio. kWh/a
 - ▶ Heat supplied : 8 Mio. kWh/a
 - ▶ CO₂-reduction: 6000 t/a
- ▶ Start of services: 2008

Heat supply from biogas plant to public buildings in Prüm

- ▶ Contractor: KWA Bioenergie Eifel
- ▶ Measures
 - ▶ installation and O&M of CHP unit and 4.5 km biogas pipeline
 - ▶ District heating grid installed by building operator
 - ▶ Sustainable biogas heat supply to school and public swimming pool
- ▶ Energy data
 - ▶ CHP capacity installed: 400 kW_{el}
 - ▶ Heating capacity installed: 420 kW_{th}
 - ▶ Electrivity generated: 3.4 Mio. kWh/a
 - ▶ Heat supplied to district heating grid: 2 Mio. kWh/a
 - ▶ CO₂-reduction: 11000 t/a
- ▶ Start of services: 2011
- ▶ Advantages
 - ▶ Highly efficient use of biogas
 - ▶ Energy cost savings



Source: KWA Eviva



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Conclusions

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Conclusions

- ▶ *Energy contracting* a professional solution...
 - ▶ to finance energy measures
 - ▶ to save money and time
 - ▶ for building operators/owners to concentrate on investments in core business and have specialists taking care of energy saving, efficiency and supply
- ▶ **Contracts**
 - ▶ Contracts are complex and need to be thoroughly examined
 - ▶ Performance contracting is difficult as changes or irregularities in future developments need to be well thought of



Thank you

Thank you for your attention!

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- ▶ Eviva strives for straight forward and client-tailored sustainable energy solutions