Energy Performance Contracting in Baden- Württemberg’s Public Buildings
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Webinar February 5, 2019
Intention of this presentation

- KEA- regional energy and climate protection agency in 2 minutes
- How we use EPCs in our Market and how we increase acceptance
- How to boost the market: INEECO project funded by the EIB ELENA progra
KEA’s Mission and Working fields

- **RE & EE concepts in buildings, neighborhoods**
- **Energy Master Planning (region, cities, neighborhoods)**
- **R&D innovative financing instruments**
- **market facilitation for energy services Contracting Initiative**
- **EPC / ESC facilitation**
- **Non-investive energy commissioning**
- **User behaviour programs**
- **Implement regional climate protection concept**
- **Consultants for policy makers, government**
- **Turnover €4M 33 employees (75% engineers, architects)**

**KEA**
KEA in the Regional Energy Service Markets

About our Region

- 1110 municipalities, 35 counties in Baden- Württemberg
- 38% of region are woods
- Average number of inhabitants: 10,000 / municipality
- Number of municipalities > 30,000 inh.: 45

Regional building sector action plan:

- Buildings eligible for energy services: 80,000 (380 Mm²)
- Average age of building fabric and infrastructure: 35 yrs
- Average age of HVAC: 25 yrs
- Potential for deep refurbishment: €250-300bn < 15 yrs
Our role in the energy service market

- 120 stakeholders
- Roadmap „10 steps to improve BW energy service market
- Permanent work process

Contracting Initiative

Competence Centre

KEA

EIB ELENA-Program InEECo 2015-18

Project Facilitation

- EESI Award 2009
- Best facilitator
Increasing acceptance for EPC (energy performance contracting)

- EPC can be a great tool to implement national & EU building strategies if...

- Regional Framework Conditions are respected:
  - **Rigid controlling on public investments:** Outcomes of projects into EE, de-carb, RE projects etc. are often controlled over time by administration and city councils
  - **Reluctance to financing tools** – only spend what you have
  - **Role of SMEs:** How are SME and handcrafts men included?

- **Design of Regional Energy Performance Contracting Solutions**
  - No **low-hanging fruits**- investments
  - SME ESCOs and/or subcontracts to regional SMEs
  - The **project satisfies the needs of building:** mix of energy and non-energy related measures when you touch the building anyway
  - Standardized contracts, tendering documents
  - Strong public promotion activities
Improve EPC to play a role in the energy efficiency strategies in buildings and neighborhoods

Advancement process of EPC into a tool for EU building strategy (2005-2018)
Financing is an important part of the services covered in an EPC. However, the complete hand-over of risks is the interesting part of EPC in comparison to business as usual construction projects:

- Investment cost risks
- Planning risk
- Energy management & performance risks
ESCO invests in EE improvements of public buildings on the basis of an EPC business model.

ESCO = Energy Service Company
EPC = Energy Performance Contracting
EE = Energy efficiency

Source: GIZ
EPC - average energy and cost savings since 2002: 70%+ cost savings!

Energy and Cost savings of 18 ESC- Projects from 2002-2014

- Energieeinsparung
- Kosteneinsparung
Public tendering process for EPCs (Backup slide)

Concept phase
Feasibility study, list of measures, decision making process of the public administration

Call for Tenders: References, experience in foreseen measures (Green ESPC, integrative concepts...)

Tendering Documents: ESPContract, procurement guideline, terms of rating, measure list

Evaluation & Negotiation phase, optimization of bids, last call, final rating and evaluation of bids → winner gets 1. Step of ESPContract (planning+design)

Evaluation II: Evaluation of 1. step results, small divergence of results → 2. step of ESPContract (construction and performance phase)
### EPC: Terms of Rating (back up slide)

<table>
<thead>
<tr>
<th>Terms of rating</th>
<th>KEA’s ESPC integrative</th>
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<tr>
<td></td>
<td>Net present value of savings in total and remaining with administration 40-50%</td>
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<td>Measures (Quality) 40%</td>
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<td>Carbon Footprint 10-20%</td>
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<td>Additional Terms</td>
<td>Avoided maintenance costs for existing installations are part of the saving</td>
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<tr>
<td>Measures Achieved</td>
<td>Integrative measure bundles with demand and supply side measures, Green ESPC, refurbishment measures without e-saving effects</td>
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**EPC- do not only consider energy savings…findings of IEA EBC Annex 61**

<table>
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<tr>
<th>Life Cycle Cost</th>
<th>Calculation</th>
<th>Variations and Values</th>
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<tr>
<td>1 Energy savings: effects</td>
<td>kWh savings x energy price</td>
<td>Fixed or flexible energy price; in DER it is expected to at least reduce by 50%</td>
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<td>from improving the e-performance</td>
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<td>Values: Germany office building stock 7-14€/m²yr</td>
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<td>of equipment by maintenance or</td>
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<td>replacement</td>
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<tr>
<td>2 Energy savings II</td>
<td>kWh RE replacing fossil x energy price (RE-fossil)</td>
<td>kWh replaced by RE; fixed or flexible energy prices;</td>
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<td>3 Reduced maintenance I</td>
<td>Maintenance costs for replaced, worn down equipment at the end of its</td>
<td>Average percentage value or end of life cycle value (graph LCC maintenance)</td>
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<td>life cycle as a percentage of the new investment value</td>
<td>Values applied at the market:</td>
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<td>- 0,25$/ft² in US; EU: - 2 to -4 €/m²</td>
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<td>4 Reduced maintenance II</td>
<td>Downsizing of investment in a DER bundle means reduction of investment</td>
<td>A component downsized by 30% reduces maintenance costs by 30%</td>
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<td>cost related maintenance</td>
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<tr>
<td>5 Reduced operation costs I</td>
<td>Building automation reduce operation workloads</td>
<td>Consider workplans and operation schedules individually</td>
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DER EPCs- first experience

- Business model integrating **biomass and energy savings** ➞ increased savings potential allows for non-energy related deep refurbishment:

**Municipality of PFINZTAL:**
- EPC based on biomass and micro grid co-funds the refurbishment of a wrecked swimming pool building
- Energy Baseline: 170 k€/a ➞ energy cost savings 75%
- Payback of 9 years for energetic measures (5 buildings with new micro grid, new lighting, hot water, building control, pumps, biomass boiler with wood and hot water storage)
- By increasing from 9 to 15 years: full refurbishment of public swimming pool
DER EPC: IEA Annex 61 Case study: Dormitory, Mannheim, Germany

Project Facts:
- Year of Construction: 1960
- Square Meters useful area: 4 buildings each 2667 m²
- EUI 120 kWh/m² yr heating; 33 kWh/m²yr el. Power
- Energy& Water Cost baseline: 304.500 €/yr
- Maintenance costs: 143.000 €/yr
- Investment Value: 1 780 000 €
- Annual Energy Cost Reduction: 101 800 €
- Payback Period – 19 years
- Energy Reduction Percentage: 67%
EIB’s ELENA program:
How to boost the market in the PUBLIC SECTOR

ELENA program implementation in our region:

• Co-funded by EIB, ELENA program (European Local ENergy Assistance)
• 4 years
• Targets accomplished:

• a) Investment of €43M in 4 years in approx. 43 EPC/ESC projects;
• b) guidelines and simplified tools for EPC in public buildings
• c) indirect: capacity building for a network of 24 facilitators,
• d) EPC market development in Baden- Württemberg by intense promotion activities
EIB’s ELENA program: How to boost the market in the PUBLIC SECTOR

- **What has been subsidized:** facilitation process including the signature of an EPC contract
- **Target group:** public buildings, municipalities, counties, public bodies,
- **Leverage factor:** 1:20
- The leverage factor is supporting projects which aim at medium to high level investments

**Case study:**
- Investment costs initiated by EPC project : 2.000.000 €
- Facilitation costs: 100.000 €*
- Leverage factor: 2.000.000 € / 20 =100.000 €
- The EIB subsidy: 90% of 100.000 €
EIB’s ELENA program: How to boost the market in the PUBLIC SECTOR

- Ineeco- Task force „Public information campaign“
- Target groups
  - Municipal decision makers, statal building management
  -ESCOs, handcraft companies, SMEs, municipal utilities
  -Facilitators in regional energy agencies and engineering companies
  -Funding entities
  -Associations of public bodies
- Core Messages:
  - Ineeco structure (brief)
  -Supported activities
  -Example calculations
  -Coordination with other grant programs
- Distribution path ways:
  -50% of activities are put in meetings on local level (decision makers)
  -E-mail, Ineeco - homepage
Questions?

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