M8

New Management Concepts in the Energy Market

Delivery Contracting

Performance Contracting

Energy Service Company - ESCO
1. Energy Service Models

1.1. The Question:

Can we simultaneously improve energy efficiency and economy of buildings?

- without (or only little) own investment capital?
- with guaranteed total cost or guaranteed savings?
- with innovative technologies?
- with individually compiled services
1. Energy Service Models

1.2. Energy Management Process

Energy Services / Third Party Financing as an Instrument in Municipal Energy Policy

1. Why energy services?

2. What exactly is an energy service?

3. Some Good Practice:
   - Small Community Building Pool, Kichbach, Austria
   - Refurbishment of Street Lighting: City of Laa, Austria
   - > 300 public buildings in Berlin: „Energy Saving Partnership“ (ESP), Berlin, Germany
   - Success criteria and recommendations

Source: Boris Papousek, www.grazer-ea.at
1. Energy Service Models

1.2. Energy Management Process

- **SUPPLIER (UTILITY)**
  - Primary energy
  - Conversion to electricity, district heating, heating oil

- **DELIVERY CONTRACTING**
  - Final energy
  - e.g. replacing boilers, fuel change, biomass heating, CHP plant, solar systems

- **PERFORMANCE CONTRACTING**
  - Useful energy
  - Energy service
  - Energy management system, thermal insulation, optimizing operations

Source: Boris Papousek, www.grazer-ea.at
1. Energy Service Models

1.3. What is Energy Service?

- **Techn. components**
  Producers, construction, operation & maintenance!

- **Know-How**
  Engineers, architects, consultants, innovation?

- **(Primary) energy**
  Electricity, gas, wood, fuel oil

- **Money**
  Equity capital, banks, leasing institutions, ...

**Energy Service Company (ESCo)**

Useful energy / savings at guaranteed prices

Source: www.grazer-ea.at
1. Energy Service Models
1.4. Types of Energy Service Contracts

Delivery Contracting
- Energy service company (ESCo) designs, constructs, operates and finances the energy supply facilities
- ESCo is responsible for purchasing of fuels (gas, ...)
- ESCo delivers useful energy (heat, electricity, compressed air) with guaranteed prices (all inclusive)
- Payments depend on actual consumption

Energy Performance Contracting
- ESCo designs, constructs, operates and finances energy saving measures in the building
- ESCo delivers energy services (tempered rooms, illuminated work areas, air exchange etc.) at fixed prices (Contracting - rate)
- ESCO guarantees max. energy consumption/cost and is financially responsible for deviations (bonus-malus)

Source: www.grazer-ea.at
1. Energy Service Models
1.5. Contracting - a Customized Service Package

Outsourcing of economic and technical performance risks
Operation & maintenance
Investment, financing
Service Package Contracting
Functional, performance and price warranties
Consulting, planning
Tendering, construction

Source: www.grazer-ea.at
1. Energy Service Models

1.6. Business Models (1/2)

Delivery Contracting

- **Overall energy costs**
  - fuel;
  - electricity;
  - maintenance;
  - repair (substitute investment);
  - personnel expenditure;
  - other

- **Energy price** (according to consumption)
  - costs relating to consumption (fuel, electricity)
  - price adjustment (oil, electricity index)

- **Basic or service price** (fixed)
  - investment and financing
  - costs relating to operation
  - risk
  - price adjustment (wage, maintenance index)

- **Annual costs**
  - (e.g. subsidies) or payment of the residual value to the contractor

- **Overall costs, contracting**
  - actual situation
  - investment
  - energy delivery contract
  - end of contract

Source: www.grazer-ea.at
1. Energy Service Models

1.6. Business Models (2/2)

**Performance Contracting**

<table>
<thead>
<tr>
<th>Present costs = baseline</th>
<th>Energy costs after refurbishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual costs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overall energy costs</td>
</tr>
<tr>
<td></td>
<td>fuel; electricity; maintenance; repair (substitute investment); personnel expenditure; other</td>
</tr>
<tr>
<td></td>
<td>Overall energy costs (new)</td>
</tr>
<tr>
<td></td>
<td>Saving investment</td>
</tr>
<tr>
<td></td>
<td>EPC contract contract ends</td>
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<tr>
<td></td>
<td>Service life of the investment</td>
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<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td>Pay to ESCo for</td>
</tr>
<tr>
<td></td>
<td>• pre-financing the investment</td>
</tr>
<tr>
<td></td>
<td>• increased comfort + added value (NEBs)</td>
</tr>
<tr>
<td></td>
<td>• maintenance and repair</td>
</tr>
<tr>
<td></td>
<td>• taking over risks</td>
</tr>
<tr>
<td></td>
<td>Financial advantage for facility owner</td>
</tr>
<tr>
<td></td>
<td>Q&amp;M cost</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accounting adjustments (yearly):</td>
</tr>
<tr>
<td></td>
<td>• energy price (reference prices from baseline)</td>
</tr>
<tr>
<td></td>
<td>• climate (outer temperature by # of “degree days”)</td>
</tr>
<tr>
<td></td>
<td>• changes in utilization of facility</td>
</tr>
</tbody>
</table>

Source: www.grazer-ea.at

**M6 ENERGY DISTRIBUTION: DISTRICT HEATING AND COOLING**

Urban Planners with Renewable Energy Skills
1. Energy Service Models
1.7. Advantages of Contracting Models (Client Perspective)

✓ Saving investment costs through third-party financing and (part-) repayment from savings;
✓ Eliminating deficiencies and increasing the value and comfort of the building;
✓ Shifting technical and economical risks to the ESCo;
✓ Warranted savings and energy prices;
✓ Focusing on the key business;
✓ One contact person for all matters (one face to the customer);
✓ Long-term increase in the revenue from the property

The objective is to create a win-win-win situation for all parties involved: financial advantage for supplier and consumer, while the environment benefits too.

Source:: www.grazer-ea.at
2. Examples of Energy Service Models
2.1. Refurbishment of Street Lighting (1/3)

• Total investment: 450,000 € (excl. VAT)
• The refurbishment measures included:
  ✓ Some 167 light points in the main streets, including masts, digging, wiring and switching units.
  ✓ Auxiliary services like removing of old installations, assembling of new street lights, protective earthing,
  ✓ Some 57 lamp posts are equipped with illuminated advertisement boards (size A0) to generate an income to the city

Source: www.grazer-ea.at
2. Examples of Energy Service Models

2.1. Refurbishment of Street Lighting (2/3)

- Financer (FIN) and customer (CUST) have concluded a financing lease agreement. The investment is repaid by the city over a contract period of 15 years.

- The new street lighting is planned and built by an ESCO by order of FIN (purchase contract). There is no direct contract relationship between ESCO and CLIENT.

- By renting out the advertising boards on the lamp posts, the city generates an additional income.

- Also, a part of the investment is VAT deductible by a contractual differentiation between “sovereign community tasks” and “income from rent and lease”. This accrues to about 5% (21,000 €) of the investment.

Source: www.grazer-ea.at
2. Examples of Energy Service Models

2.1. Refurbishment of Street Lighting (3/3)

Contracts:

- FIN
- purchase contract
- ESCO
- CLIENT

Cash flows:

- FIN
- total investment (450,000 €)
- ESCO
- client pays monthly rate
- CLIENT

Innovative aspect:

✓ contractual differentiation between sovereign community tasks and income from rent and lease ⇒ Cut down of the investment and additional income from renting for the community.

Source: www.grazer-ea.at
### 2. Examples of Energy Service Models


<table>
<thead>
<tr>
<th></th>
<th>Pool 9 F'hain</th>
<th>Pool 10 TFH</th>
<th>Pool 11 Steglitz/Z'dorf</th>
<th>Pool 12 BBB</th>
<th>Contracts in total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of properties</td>
<td>30</td>
<td>5</td>
<td>41</td>
<td>11</td>
<td>309</td>
</tr>
<tr>
<td>Cost baseline (Euro)</td>
<td>1 090 529 €</td>
<td>928 165 €</td>
<td>1 285 102 €</td>
<td>4 871 293 €</td>
<td>24 523 174 €</td>
</tr>
<tr>
<td>ESCo</td>
<td>MVV Energie / WFM</td>
<td>SFW</td>
<td>SFW</td>
<td>Landis &amp; Staefa</td>
<td></td>
</tr>
<tr>
<td>Contract term</td>
<td>10 years</td>
<td>10 years</td>
<td>12 years</td>
<td>10 years</td>
<td></td>
</tr>
<tr>
<td>Initial saving invest. (Euro)</td>
<td>939 243 €</td>
<td>552 195 €</td>
<td>920 325 €</td>
<td>7 925 683 €</td>
<td>23 210 183 €</td>
</tr>
<tr>
<td>Guarantied savings (%)</td>
<td>19,67 %</td>
<td>22,50 %</td>
<td>22,00 %</td>
<td>33,54 %</td>
<td>22,90 %</td>
</tr>
<tr>
<td>Guarantied savings client (%)</td>
<td>3,46 %</td>
<td>4,50 %</td>
<td>2,42 %</td>
<td>6,71 %</td>
<td></td>
</tr>
<tr>
<td>Guarantied savings client (Euro)</td>
<td>37 753 €</td>
<td>41 767 €</td>
<td>31 099 €</td>
<td>326 766 €</td>
<td>1 652 173 €</td>
</tr>
</tbody>
</table>

Source: Berlin Energy Agency 2002
## 2. Examples of Energy Service Models

### 2.3. Energy services – opportunities, risks and success criteria

<table>
<thead>
<tr>
<th>Decision criteria:</th>
<th>In house</th>
<th>Energy Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment costs</td>
<td>100 %</td>
<td>0 – 100 %</td>
</tr>
<tr>
<td>Economic and technical risks</td>
<td>Owner</td>
<td>Contractor</td>
</tr>
<tr>
<td>Optimal maintenance of facility (e.g. maximum consumption, efficiency)</td>
<td>only with a high owner commitment</td>
<td>Contractor’s own interest</td>
</tr>
<tr>
<td>Performance warranties</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Functional guarantees</td>
<td>only warranty period</td>
<td>over total contract period</td>
</tr>
<tr>
<td>Cost limits (eg investment, prices)</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Long-term contractual obligation</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Project co-ordination / know-how</td>
<td>building owner + engineer</td>
<td>Consultant + ESCO</td>
</tr>
<tr>
<td>Service package / outsourcing</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Size of the building / facility</td>
<td>any</td>
<td>Floorspace &gt; 2,000 m², Energy costs &gt; 20,000 € /a</td>
</tr>
</tbody>
</table>

Source: [www.grazer-ea.at](http://www.grazer-ea.at)
2. Examples of Energy Service Models

2.4. Conclusions and Recommendations

1. Energy services – delivered by ESCos - are a well proven instrument to successfully implement energy conservation measures. => We recommend to publicly call for tenders and compare offers to „in house“ solutions.

2. Project development and implementation requires a lot of effort and experience (functional tendering, awarding of contract, model contracts, ...). => To support the process, we recommend co-operation with an experienced consultant (eg energy agencies)

3. The European Community supports the energy service approach, eg:
   
   ≫ The energy end-use efficiency and energy service directive will (hopefully) come,
   
   ≫ www.Eurocontract.net supports market implementation in 9 European member states.

   ≫ Could your buildings profit from Energy Services?

Source:: www.grazer-ea.at
3. Energy Centers as Partners

3.1. Actors

Local & regional Energy Agencies

- Best knowledge about local needs and conditions
- Influence on local energy policy & decision-making
- Better opportunities to implement change at local level

=> 380 Energy Agencies in Europe.

Source:: www.grazer-ea.at
3. Energy Centers as Partners
3.2. Tasks of Energy Centers

- Raise competence & increase knowledge
- Build networks and contacts
- “Learn from each other” – share experiences
- Think Global, Act Local
- Prioritised areas:
  - Energy efficiency
  - Renewable energies (sustainable use of energy)
  - Transport and mobility
- Key Themes
  - Buildings
  - Education
The UP-RES Consortium

Contact institutions for this module: **Aalto University**

- **Finland**: Aalto University School of science and technology  
  www.aalto.fi/en/school/technology/
- **Spain**: SaAS Sabaté associats Arquitectura i Sostenibilitat  
  www.saas.cat
- **United Kingdom**: BRE Building Research Establishment Ltd.  
  www.bre.co.uk
- **Germany**:  
  AGFW - German Association for Heating, Cooling, CHP  
  www.agfw.de  
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  www.uni-augsburg.de/en  
  TUM - Technische Universität München  
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- **Hungary**: UD University Debrecen  
  www.unideb.hu/portal/en