ESCo Market Development: Business Models, Innovations and Lessons Learned

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Grazer Energieagentur & IEA DSM “Competitive Energy Services”
Outline + Key Messages

1. Two basic business models (in most) ESCo markets: Energy Performance C. (EPC) and Energy Supply C. (ESC) What are their market shares?

2. EPC vs. ESC: (Typical) product properties and limitations

3. ESC: a good and robust business model for Renewables, CHP or heat recovery

4. Integrated Energy Contracting (IEC) – A new ESCo business model to combine savings and (renewable) supply

5. EPC: Market development is demand side driven!

6. Comprehensive building refurbishment – the future?

7. Some lessons learned
Two Basic ESCo Products: ESC and EPC

German ESCo market: ~ 1,600 Mio €/a [Prognos 2009]

Energy Supply-Contracting (ESC)

Energy Performance Contracting (EPC)

Market shares?
German ESCo market: ~ 1.6 Bio €/a [Prognos 2009]

Energy Supply-Contracting
~ 90 %

Energy Performance Contracting
~ 10 %

Sources: [Prognos 2009], [VfW 2009]
## ESC vs. EPC: Typical Market Properties

<table>
<thead>
<tr>
<th>Feature</th>
<th>ESC</th>
<th>EPC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>End-use markets</strong></td>
<td>Residential, Industry, Commerce, Public …</td>
<td>only Public Buildings, Hospitals, (industry)</td>
</tr>
<tr>
<td><strong>Efficiency potentials</strong></td>
<td>15 – 20 % (limited scope of service)</td>
<td>20 – 25 % (30 – 50 %)</td>
</tr>
<tr>
<td><strong>Project Size:</strong></td>
<td>&gt; 20,000 €/a</td>
<td>&gt; 150,000 €/a (ESP Berlin: 1,88 Mio €/a)</td>
</tr>
<tr>
<td><strong>Share in ESCo market (in Germany 2008)</strong></td>
<td>~ 90 %</td>
<td>~ 10 %</td>
</tr>
<tr>
<td><strong>Business model</strong></td>
<td>M Wh</td>
<td>Savings („N Wh“) =&gt; Baseline problems =&gt; high transaction cost</td>
</tr>
</tbody>
</table>

Source: [Bleyl 2009]
**CO₂ + Energy Cost Savings in 50 ESCo Projects (Germany)**

The diagram illustrates the relationship between CO₂ savings and cost savings for 50 ESCo projects in Germany. The projects are categorized into three types: EPC, ESC, and Integrated EC. The data is sourced from Bleyl [2012].

- **EPC** projects tend to have higher CO₂ savings compared to cost savings, often ranging from 0% to 30%.
- **ESC** projects show a broader range of CO₂ and cost savings, with some projects achieving high savings in both categories.
- **Integrated EC** projects exhibit a distribution similar to ESC but with a slight emphasis on higher cost savings.

The diagram uses circles to represent the projects, with the size of the circle indicating the project's total cost savings. The distribution of projects suggests a correlation between CO₂ savings and cost savings, with some projects achieving significant savings in both areas.
What is Energy Supply Contracting (ESC)?

- Supply of useful energy (heat, steam, electricity …) from Renewables
- Business model: MWh delivered
- ESC is not discussed a lot …
- Good Business model for Renewables, CHP or Heat Recovery …

Source: after [Bleyl 2008]

Solar Supply-Contracting => MWh_{Solar}

Energy Supply Contracting (ESC) => MWh

Fuel
Integrated Energy-Contracting: A new ESCo business model

1. Building on simpler ESC model
2. Expand scope of service to complete building (HVAC, user motivation, building shell)
3. Quality assurance replaces EPC savings guarantee

Source: after [Bleyl 2008]
Energy Performance Contracting (EPC) – Business Model

Contracting rate for:
- Implementation of EE-measures
- Operation & maintenance
- Prefinancing of investment
- Taking over risks

Cost after EE-measures

EE-investment

Total energy cost (after EE-measures)

- fuel
- electricity
- maintenance
- repair (substitute investment)
- personnel
- other

Accounting adjustments (yearly) for:
- energy price (reference prices from baseline)
- climate (outer temperature by # of "degree days")
- changes in utilization of facility

Contribution to EE-investment to ESCo
- E.g. subsidies or payment of residual value

Cost savings for facility owner

O&M cost

Time

Market development driven by Energy Agencies for proposals from market facilitators

Present state = baseline

Present cost = baseline

Total energy cost

EPC contract ends

Contract

Service life of investment

EE-investment

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Comprehensive Building Refurbishment (deep retrofit ...) ESCo models – the Future?

Source: after [Bleyl 2009]
1. Successful market development - in particular for EPC - was demand side driven, meaning (pot.) ESCo customers defined their needs and goals for energy service packages and put out request for proposals on the market. Studies or IGAs are not sufficient to create projects.

2. To foster market development, the role of independent market and project facilitators as mediators between ESCOs and their (potential) clients has proved to be of great value (e.g. energy agencies). This facilitator role requires more active players and deserves better support + financing!
3. Efficiency markets need "educated" customers to demand energy efficiency (services) in the market. Still many educated customers will require facilitators to support them.

4. It requires new organizational routines, in particular on the customer side (e.g. with regard to procurement practices, interdisciplinary co-operations between different departments and project engineers or long-term cross-budgetary financial management.)

5. And the decision of the building or business owner to tap into energy efficiency resources (either voluntarily or forced by regulations) remains a basic requirement – independent of the implementation model.
6. EE often is not the driving force / not a stand alone business case but a (beneficial) side effect.
   Listen better to the “real” needs expressed by customers, build strategic alliances with e.g. security, automation, DR ... to incorporate energy efficiency goals or minimum performance standards early on in the project development.

7. High priority on **concrete projects** in the end-use sectors of public institutions, tertiary sector, trade and industry as well as housing.
   Optimize investment decisions according to **project (or better life) cycle cost** and to ensure the results on a long-term basis.
   => ESCo models have a substantial advantages to offer.
8. Financing is not necessarily the core business of ESCos. Their core competence usually lies in technical, economic, and organizational matters of an energy service package. ESCos should serve as finance vehicle, not necessarily as financiers.

   But: Payments to ESCo must be secure

9. Energy-Contracting is a flexible and modular energy service package. This also implies the ESCo customer may define – depending on his or her own resources – what components of the energy service will be outsourced and which components he carries out himself.
10. ESCo models offer integrated solutions for project life cycle (planning, construction and operation & maintenance), **ESCo is interdisciplinary approach** (technical, economical, financial, organizational and legal aspects) to achieve **guaranteed performance and results** of the efficiency technology deployed => great, but complex **products**! (too complex?)

11. This **integrated and multidimensional approach opens up solutions**, which are not achievable through a standard, disintegrated implementation process (e.g. life cycle cost optimization across investment and operation budgets, integrated planning or performance guarantees over the complete project cycle …)
Lessons learned (6/6)

No easy solutions for Energy Efficiency!
Many obstacles root in the fragmented nature and small units of end-use energy conservation potentials and must not be attributed to Energy-Contracting models.

On the way to better developed energy service markets strong efforts on all levels of policy framework, capacity building and concrete market development remain to be done.

In Norway, Europe, India ...
IEA-DSM, Task XVI: “Energy Efficiency and Demand Response Services”

Proposal for
Extension of Task Work Plan
ExCo, Nov. 3-4th 2011, South Korea

Jan W. Bleyl, Graz Energy Agency Ltd, Austria
Thank you!

Questions welcome.
And ideas for further co-operation.
## In-House vs. ESCo (outsourcing) implementation

### Decision criteria (checklist)

<table>
<thead>
<tr>
<th>Decision criteria</th>
<th>in-house</th>
<th>Energy service (outsourcing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financing of investment</td>
<td>100 % owner</td>
<td>0 – 100 % owner</td>
</tr>
<tr>
<td>Technical + economic risks</td>
<td>Owner</td>
<td>ESCo</td>
</tr>
<tr>
<td>Optimization, operation &amp; maintenance</td>
<td>Requires motivated personal</td>
<td>in the own interest of ESCo</td>
</tr>
<tr>
<td>Guaranteed results (e.g. savings)</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Functional guarantees</td>
<td>only warranty period</td>
<td>Over contract term</td>
</tr>
<tr>
<td>Price guarantees (e.g. heat price)</td>
<td>No</td>
<td>Yes („all inclusive“)</td>
</tr>
<tr>
<td>Longterm contractual obligation</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Transaction cost for ESCo project</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Know-how + Competition of ideas + optimization</td>
<td>Owner (+ consultant)</td>
<td>Owner (+ Consultant) + ESCo</td>
</tr>
<tr>
<td>Project specifications</td>
<td>(generally) detailed</td>
<td>(commonly) functional</td>
</tr>
<tr>
<td>Service package / Outsourcing</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Size of building / facility</td>
<td>Any</td>
<td>Energy cost: ESC: &gt; 20.000 € /a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPC: &gt; 100.000 € /a</td>
</tr>
<tr>
<td>Life cycle cost (LCC)</td>
<td>(generally) higher</td>
<td>(generally) lower</td>
</tr>
</tbody>
</table>
Energy Services – Hotspot Berlin

Mini-CHP works in many cases… with more and more customers

ESC business model recommended for CHP, renewables or heat recovery (whenever energy can be measured directly)

- CHP Lindenhof: 20 kW_{el} / 46 kW_{th}
- CHP Pulvermühle: 50 kW_{el} / 95 kW_{th}
- CHP Bremer Höhe: 18 kW_{el} / 42 kW_{th}
- CHP Ostseeplatz: 34 kW_{el} / 78 kW_{th}

- CHP BSR: 50 kW_{el} / 95 kW_{th}
- CHP Stadt & Land: 50 kW_{el} / 95 kW_{th}
- CHP BIM: 34 kW_{el} / 78 kW_{th}
- CHP Lindenhof: 20 kW_{el} / 46 kW_{th}
Lessons learned (2/7)

3. Contracting to an ESCo is a strategic “make or buy” decision of the (potential) client. Outsourcing to an ESCo competes with in-house implementation and has substantial implications on the outsourcing institution. This decision implies either trusting one general contractor (ESCo) versus contracting to individual subcontractors (Planning, HVAC, Electric …)

4. Outsourcing requires new organizational routines, in particular on the customer side (e.g. with regard to procurement practices, interdisciplinary co-operations between different departments and project engineers or long-term cross-budgetary financial management.)