"INOGATE Technical Secretariat & Integrated Programme in support of the Baku Initiative and the Eastern Partnership energy objectives"

BUILDING PARTNERSHIPS FOR ENERGY SECURITY

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What is Energy Performance Contracting (EPC) ?

- EPC is about reducing operative expenses by saving energy in existing buildings
- A typical EPC project is delivered by an Energy Service Company (ESCO) and consists of the following main elements:
  - **Turnkey Service**
    The ESCO provides all of the services required in a comprehensive project
  - **Comprehensive measures**
    The ESCO tailors a comprehensive set of energy efficiency measures to fit the needs of a particular facility
  - **Energy savings Guarantee**
    The ESCO provides a guarantee that the savings produced by the project will be sufficient to cover the cost of project financing for the life of the project
  - **Project financing**
    Normally the Client will finance the project. Some ESCO:s can arrange for long-term project financing
Project process, part one

Initiating the Project

- Client engaging an EPC consultant
- Feasibility study on one typical building, Pilot Project
- Preliminary budget for the total portfolio of buildings; cost-benefit analysis, LCC
- Decision-making

Preparations

- Setting up of project organization
- Procurement procedure
Project process

Project process, part two

Phase 1
Project Development
- Energy audit
- Proposals energy saving measures
- Verification level use of energy, baseline
- Strategy for control systems
- Strategy for verification
- Strategy for operations & maintenance
- Cost budgeting
- Revision of total project budget

Phase 2
Project Implementation
- Design engineering
- Implementation of energy saving measures
- Documentation
- Inspection
- Training operations & maintenance staff

Phase 3
Project Follow up
- Savings monitoring
- Recalculations related to changes in buildings and use of buildings
- Monthly energy-reports
- Annual reports; verification use of energy
- Bonus/Fine statement
- Guarantee inspection

- Decision-making
Energy efficiency measures are normally carried out in the following building systems:

- Heating
- Ventilation
- Air Conditioning
- Lighting
- Climate Control and Communication Systems
- Water supply
- Building envelope improvements: insulation
# Results in some EPC projects

<table>
<thead>
<tr>
<th>municipality</th>
<th>Number of buildings</th>
<th>Built up area</th>
<th>Contract amount</th>
<th>Annual savings heating and el</th>
<th>Reduced CO₂ emission</th>
<th>Annual savings water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karlstad municipality</td>
<td>156</td>
<td>321 910 m²</td>
<td>7 800 000 EUR</td>
<td>10 %</td>
<td>2 000 tons</td>
<td>15 %</td>
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<td></td>
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<td></td>
<td>753 000 EUR</td>
<td>41 600 EUR</td>
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<td></td>
<td>5 679 000 KWh</td>
<td>23 013 m³</td>
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<tr>
<td>Lund municipality</td>
<td>98</td>
<td>303 910 m²</td>
<td>14 800 000 EUR</td>
<td>29 %</td>
<td>4 800 tons</td>
<td>11 %</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>1 245 000 EUR</td>
<td>13 000 EUR</td>
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<td></td>
<td>14 471 000 KWh</td>
<td>11 416 m³</td>
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<tr>
<td>Laxå municipality</td>
<td>10</td>
<td>26 719 m²</td>
<td>2 200 000 EUR</td>
<td>31 %</td>
<td>156 tons</td>
<td>11 %</td>
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<td></td>
<td>120 000 EUR</td>
<td>17 200 EUR</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>1 380 000 KWh</td>
<td>16 195 m³</td>
</tr>
<tr>
<td>Halmstad municipality</td>
<td>187</td>
<td>349 773 m²</td>
<td>9 000 000 EUR</td>
<td>21 %</td>
<td>5 400 tons</td>
<td>11 %</td>
</tr>
<tr>
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<td></td>
<td>1 200 000 EUR</td>
<td>17 200 EUR</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>12 734 000 KWh</td>
<td>16 195 m³</td>
</tr>
</tbody>
</table>
Payback period of an EPC Project

Example

- Investment; the total cost of an EPC Project: 900 000 EUR
- Annual energy saving (avoided KWh. X energy price EUR/KWh): 90 000 EUR
- Payback period: Ten Years
Cash-flow calculation of an EPC Project

EXAMPLE OF CASHFLOW IN AN EPC PROJECT

Legend:
- Depreciation
- Interest
- Total saving
- Impact on earnings during lifecycle
How to verify annual energy savings in an EPC Project

Example: first year of follow up

- Used energy before Project, as per energy meters (baseline): 30 770 MWh
- Actual used energy during the first year, as per energy meters: 24 670 MWh
- Adjustments due to changes in use of buildings and in climate: 370 MWh
- Adjusted used energy for the first year of follow up: 25 040 MWh
- Energy saving; avoided MWh: 30 770 - 25 040 = 5 730 MWh
- Energy price: 105 EUR/MWh
- Value of the avoided MWh during the first year of follow up: 601 650 EUR

Referens: Example of a transparent calculation methodology to verify guaranteed savings
EPC Procurement and contracting model Agreements

Procurement of EPC contracts in the Swedish public sector is done by following the Swedish Public Procurement Act.

Swedish Public Procurement Act

Either of the following three procurement procedures are normally followed:

- Open procedure
- Selective procedure
- Negotiated procedure
EPC Procurement and contracting model Agreements, cont.

General Conditions of Contracts normally used in EPC Contracts in Sweden

- General Conditions of Contracts for design and construct contracts for building, civil engineering and installation works
- General Conditions of Contract for Work in Property Management and Facility Management

Set of agreements in EPC Contracts normally used in Sweden, “Guaranteed savings” model

- Principle Agreement
- Agreement regarding Phase 1, Project Development
- Agreement regarding Phase 2, Project Implementation
- Agreement regarding Phase 3, Project Follow up
Laws, regulations, guidelines in EU to facilitate EPC/ESCO

European legislation
- European standard EN 15900:2010

EU programmes and other measures
- Energy Performance Contracting Campaign
- Covenant Mayors
- Intelligent Energy Europe
  - European Energy Service Initiate
  - European Energy Service Initiative towards the EU 2020 energy saving targets
  - Transparence project

Financing
- Multi-annual Financial Framework
- Project Development Assistance
- European Energy Efficiency Fund
Laws, regulations, guidelines in Sweden to facilitate EPC/ESCO

- Energy certificates for buildings
- Subsidy scheme for public buildings, KLIMP
- Subsidy scheme for public buildings, OffRot
- Market instruments:
  - CO₂ taxes
  - Green certificates
  - Electricity tax for energy incentive companies
- VA PFE; tax relief on electricity tax
- Procurement guidelines for EPC
- Procurement models
For more information please visit

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