Deep retrofitting via EPC

Factor4, Johan Coolen
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Guaranteed profit

Plus® projects
Guaranteed profit with energy efficiency

Higher productivity

Comfortmeter® surveys
Comfort measurement campaigns
Comfort measures

Independent advice

Development of smartEPC®
(first EPC contract in Belgium)
EPC facilitator
Measurement & verification of energy savings

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General

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<th>Project</th>
<th>Objective</th>
<th>Pilot EPC projects</th>
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<td>Transparence</td>
<td>Increasing professionalism and transparency of ESCo industry, including EPC Code of Conduct</td>
<td>city of Ghent</td>
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<tr>
<td><a href="http://www.transparense.eu/be">www.transparense.eu/be</a></td>
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<tr>
<td>EESI 2020</td>
<td>Promotion of EPC and EPC-facilitation in Europe</td>
<td>city of Antwerp</td>
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General concept Belgian EPC-contract

No limitations of existing EPC-projects, procedures,…

International know-how transfer via IA and European projects, analysis of foreign EPC-contracts.

Out-of-the-box thinking

= Completely new EPC-contract

General concept Belgian EPC-contract

Payments (€)

- Fixed price
- Bonus/Penalty ~ Comfort performance
- Bonus/Penalty ~ Energy cost savings
- Bonus/Penalty ~ Increased elements value

EPC-project

Year 1…n

Performances

- Basic project requirements (≥ value tender documents)
- Comfort performance (≥ value before contract)
- Energy cost savings (≥ value after)
- Increased elements value (≥ value after)

Year n (End)
Selection criterion ESCO

Maximal net-cost saving = actualised value of:
+ Annual guaranteed energy cost savings
- Annual remuneration ESCO (investment, maintenance,...)
+ Increased elements value at end of project

During project

✓ Payment ESCO = Fixed price + Bonus/Penalties
  where Bonus/Penalties ~
  • comfortscore,
  • energy saving
  • increased elements value at end project

✓ ESCO: maximal decision autonomy
  as long as basic project requirements are fulfilled:
  functionality, safety, legal standards, etc.
**ESCO 100% technical responsible** for whole building
- Installation: HVAC, lighting, elevators, alarm systems, sanitary equipment, tubes, cables,....
- Building envelope: windows, solar protection, roof, gutters,....

**ESCO 100% financially responsible**
- During project: fixed price for maintenance & replacement costs
- End of project: increased elements value
  - Elements value (EUR)
  - Maintenance condition of elements (evaluation via Dutch norm NEN 2767)
  - Price of the new element
Optimal maintenance

Advantages

☑ ESCO will **minimise long term building cost**, e.g.
   More focus on preventive maintenance and measures with long technical lifetime (high quality equipment,...), as...
   - Cost future replacement investments in project
   - Increased elements value at end

☑ ESCO 100% responsible, **less follow-up cost by building owner**, e.g.
   No input control required of maintenance
   No ‘discussions’ about necessity replacement investments

Optimal comfort

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<th>Performances</th>
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<td>Fixed price</td>
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<td>Comfort performance (&gt;= value before contract)</td>
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<td>Bonus/Penalty ~ Energy cost savings</td>
<td>Energy cost savings (&gt;= value offer)</td>
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EPC-project

Year 1...n

Year n (End)
Optimal comfort

Conventional EPC-contract
For each building/space:
- Space temperature in summer: <26°C
- Relative humidity >40%
- Illuminance level >500 lux
- ...

Disadvantages
Low reliability
- Methodological problems
  e.g. Measured summer comfort ~ outside temperature measurement period
- Critical comfort aspects not valued
  e.g. Customer-friendliness of ESCO, user control HVAC,...
- Non-critical comfort aspects overvalued
  e.g. comfort 300 lux = comfort 500 lux

Disadvantages (continued)
No incentive to perform better
Low cost efficiency because....
- Expensive measurement/logging campaigns
  - 5-10k incl. reporting (<-> 1,5k via Comfortmeter incl. reporting)
- Inflexible/hard targets
  e.g. with same cost much higher overall comfort possible by
  - Underperforming comfort target x
  - Over performing comfort target y
Optimal comfort

Via online comfort survey tool: www.comfortmeter.eu
Time: ± 40 respondents every 3 years,
55 questions, 11 themes, 10'/respondent
± 55% respons

Comfort score +1% -> 0,2% productivity increase

e.g. Potential improvement comfort score by ESCO in ATHF = +3,2%  
⇒ employee productivity increase = + 90.000 €/year  
>>> energy saving potential in ATHF = + 9.000 €/year !
Optimal comfort

Advantages new EPC-contract
• ESCO more focused on higher comfort and **employee satisfaction**
  When surveyed comfortscore ➤
    ➞ Bonus ESCO ➤
    ➞ Reputation ESCO ➤
  (and vice versa...)
• Performance based **deep retrofitting** of buildings with major comfort problems (e.g. Sick Building Syndrome)
• **Minimal comfort guaranteed** via conventional comfort requirements (=backup)
• **Lower cost**
  – Cost comfort ❏ as ESCO will financially optimise
  – Cost comfortmeter surveys < comfort logging temperature etc.

Conclusion

The best of both worlds....

**Specialised expertise ESCO**

+  
**The same motivation as building user/owner**

**Building cost** (a) ❏

**Comfort and employee satisfaction** ➤

(a) = energy + maintenance + investment
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