Deep Energy Retrofit & Energy Performance Contracting: The Belgian Experience

Annex 61 Technical Day
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How deep will it go?
> A EUROPEAN CONSULTING FIRM AND SERVICES PROVIDER, SPECIALIZED IN ESCO & EPC/EPPP MARKETS

- Strategic advice on operational & financial models
- Set-up of public/private TPF/ESCO
- Investment plan development
- Market development

- Business & financial plan development
- Project financing
- Set-up of dedicated investment funds

MANAGEMENT CONSULTING

FINANCIAL ENGINEERING

ESCO & EPC/EPPP MARKETS

CONTRACTING ASSISTANCE

- Investment plan implementation
- Contracting & tendering assistance & management (project facilitation)
- M&V assistance & management
- TPF/ESCO/funds management
- Gap analysis & follow-up

SUBSIDIARIES
- Belgium
- France

CUSTOMERS
- National and regional governments
- Public building owners
- Private building owners
- Financial institutions
- Investment funds
- Public & private TPFs/ESCOs
**How Much Energy Savings Can Pay for Themselves?**

<table>
<thead>
<tr>
<th>Energy savings alone (could) pay for themselves to reach target *</th>
<th>GRENELLE 2020 (40%*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment funding amounts to 130 Billions € with 60-70 Billions € in EPC/EPPP</td>
<td>* Energy consumption</td>
</tr>
<tr>
<td>Need to implement a multi-year/technical investment plan with appropriate structure</td>
<td></td>
</tr>
<tr>
<td>* Rhones-Alpes simulation based on 60 public buildings including schools, offices, hospital and social housing.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Energy savings alone do not allow to reach target *</th>
<th>GRENELLE 2050 (75%*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To reach 50-75% energy reduction rate, additional funding is needed (30-50%)*</td>
<td>* Energy consumption</td>
</tr>
<tr>
<td>EPC &amp; emerging EPPP market practices have a limited role regarding large refurbishing</td>
<td></td>
</tr>
<tr>
<td>Need for new financial/operational models: public-private TPFs/funds, public TPFs/funds</td>
<td></td>
</tr>
<tr>
<td>* CDC simulation based on 15 public buildings including schools, offices, hospital and social housing.</td>
<td></td>
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</tbody>
</table>
> **FINANCING FACTOR 4 IN PUBLIC BUILDINGS: CASE STUDY RHÔNES-ALPES**

**Energy efficiency investments**

- Maintenance: 24,000,000 €
- Heating: 3,500,000 €
- Electricity: 3,000,000 €
- Various Behaviors: 500,000 €
- Various: 11,000,000 €

**Yearly energy savings**

- Maintenance: 83,971 €
- Heating: 34,850 €
- Electricity: 104,012 €
- Various Behaviors: 312,905 €
- Various: 577,697 €

42 millions € investment
1,14 million € savings/year
-38% energy consumption
-60% GHG emissions

Payback time of almost 38 years!

Is the market ready to finance/contract that? Which business model will emerge?
Comprehensive refurbishment (building structure above 50% of overall costs of the project)

- 75% Energy savings level
- 50% + Building structure (insulation, windows...)
- 25% + Renewable energy (Biomass, geothermal, advanced heat pumps, CHP...)
- HVAC & electrical installations
- Regulation & building management systems

Payback time:
- 10 years
- 15 years
- 20 years
- 30 years
- 40 years

> The strategic playground?
Emerging market practices

EPPP (dedicated project ESCOs & funded TPF)

Belgian DNC model

Public ESCOs & funded TPF companies

Public/private ESCOs & funded TPF companies

Emerging market practises EPPP (dedicated project ESCOs & funded TPF companies)

Fedesco model

Current Practises

HVAC regulation & retrofits

Building Refurbishment (building structure & HVAC)

Market to develop

Energy savings level

Contract duration 10 years 15 years 20 years 30 years 40 years

> THE STRATEGIC PLAYGROUND?

HVAC retrofits

Building Refurbishment (building structure & HVAC)

Current Practises

HVAC regulation & retrofits

Market to develop

Emerging market

Market to develop
The Belgian ESCO & EPC Market

• < 2005
  – A few not so very succesfull attempts for EPC

• > 2006
  – Emergence of Fedesco, one of the first national public ESCO’s in Europe
    • Initially with “program method”, now with EPC
    • Implementing a 150 million € nvestment program in federal buildings

• 2008
  – Start of Fedesco knowhow transfer > Led to the creation of the Fedesco Knowledge Center (acting today as EPC project facilitator)

• 2010
  – Creation of BELESCO, the Belgian ESCO Association

• 2011
  – Start of development of the “smartEPC” model

• 2012-2013
  – Increase in EPC projects emerging
Some of the issues with EPC & Deep energy retrofit

• Who wants to sign a contract for 30 years anyway?
• How to guarantee and measure energy savings & quality of comfort?
• How to assure the performance of overall maintenance of the installations and the building?
• How to stimulate deep retrofit measures, without becoming input rather than output driven?
• How to disconnect PBT from contract duration?
• How to assure return to customer by ESCO of installations and buildings of sufficient quality at the end of the contract
Origin of smartEPC

> Pilot project in 11 Belgian federal public buildings

> Stakeholders =

- Tenant & facility manager: federal Building Agency
- Occupant: mainly Finance FPS
- Owner: real estate company ‘Fedimmo’ (Befimmo)
- Facilitator & TPFCo: Fedesco
Following specific stakeholder needs:

✓ **not all buildings** in the pool **until the end**

✓ include **overall maintenance** (more than only maintenance of energy saving measures)

✓ optimal **comfort**

✓ manage complex **legal and organisational context**

✓ easy and cheap **large scale reproducibility** afterwards in other pools
Why a new contract?

> Existing EPC or maintenance contracts turned did not fit the needs

- Often older contracts (designed in the ‘90 and ’00)
- Often adapted to national practices, context, legislation and public tendering law
- Often complex through evolution and numerous changes throughout the years
- Or too simple
- We wanted to integrate the role of the EPC facilitator (and of a third party mediator)
- We needed a toolbox, not just a contract
Why a new model?

> **Existing EPC models did not meet stakeholders’ requests**

- Focused mainly on energy performance
- Maintenance issues
  - Use of classic “input-driven” maintenance
  - Conflict with existing maintenance plans
- Little attention to Non Energy Benefits
  - User Comfort
  - Health & productivity
- No solution for “owner/tenant” split-incentive
- Limited means to stimulate financial savings after or during the contract
- Complex award criteria with insufficient drivers for global financial optimization by the ESCO
The road to this new model

No limitations of existing EPC-contracts, procedures, ...

International know-how transfer (via IEA and European projects, analysis of foreign EPC-contracts)

Out-of-the-box thinking

=  

Completely new EPC-contract
Key design principles

- Intelligent information concept
- Time saving and user-friendly do-it-yourself concept
- Optimal steering of the ESCO
- Integration of complex conditions of owner/tenant/occupant relation
Basics

Payments (€)
- Fixed price
- Bonus/penalty
  - Comfort performance
- Bonus/penalty
  - Energy cost savings
- Bonus/penalty
  - Increased building value

Performances
- Basic project requirements
  - (>= values tender documents)
- Comfort performance
  - (>= values offer)
- Energy cost savings
  - (>= values offer)
- Increased building value
  - (>= values offer)

EPC-project year 1...n

(year n (end))
Main quantitative award criterion

Guaranteed minimal “actualized” net cost

- Annual fixed price (investment, interests, maintenance, PM…)
- Annual energy cost savings
- Increased building value at end of project
Zooming in on optimal maintenance

Payments (€)
- Fixed price
- Bonus/penalty Comfort performance
- Bonus/penalty Energy cost savings
- Bonus/penalty Increased building value

Performances
- Basic project requirements (>= values tender documents)
- Comfort performance (>= values offer)
- Energy cost savings (>= values offer)
- Increased building value (>= values offer)

EPC-project year 1...n

year n (end)
Performance based maintenance
(we use NEN 2767 but can be another similar scheme)
### How to calculate building value?

<table>
<thead>
<tr>
<th>Id</th>
<th>Element</th>
<th>Locatie</th>
<th>Hoofdel</th>
<th>Eenheid</th>
<th>Vervangingswaarde</th>
<th>Conditiescore</th>
<th>Restwaarde%</th>
<th>Restwaarde</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-100</td>
<td>Regelkasten; 3-4 regelringen regelkast</td>
<td>Kelder</td>
<td>1</td>
<td>stuk</td>
<td>2.000</td>
<td>3</td>
<td>25%</td>
<td>500</td>
</tr>
<tr>
<td>20-101</td>
<td>Warmte distributie; water; convectors met thermostaatkraan</td>
<td>Niveau 0</td>
<td>127</td>
<td>stuk</td>
<td>6.500</td>
<td>2</td>
<td>50%</td>
<td>3.250</td>
</tr>
<tr>
<td>20-102</td>
<td>Warmte distributie; water; radiatoren met kraan</td>
<td>Niveau 1</td>
<td>135</td>
<td>stuk</td>
<td>7.000</td>
<td>2</td>
<td>50%</td>
<td>3.500</td>
</tr>
<tr>
<td>20-103</td>
<td>Luchtbehandeling; lokale mechanische ventilatie; dakventilator</td>
<td>Dak</td>
<td>5</td>
<td>stuk</td>
<td>3.500</td>
<td>6</td>
<td>3%</td>
<td>105</td>
</tr>
</tbody>
</table>

...  

| TOTAAL | 5.200.000 | 2,8 | 30% | 1.520.000 |
Building value

Replacement value element \times \text{Rest value \%} = f(\text{condition score}) = \text{Rest value element}

\text{Building value} = \sum \text{Rest value elements}
What’s the importance of BV?

Financial savings after the contract
What’s the importance of BV?

> The financial savings after the contract come from measures with a longer life cycle.

Investment (E + M)

OPEX

CAPEX

Measured BV

Net Cost

Increased BV

Only Net Cost needs to be paid for during the contract.

Increased BV delivers energy saving after the contract.
This can stimulate “deep renovation”
In particular “measures” whose condition scores stay high:

- Higher increased Building Value (with low Net Cost) to deliver high savings after the contract.
For more kWh, CO₂ & € savings

> without having to increase the duration of the contract
Conclusion

**smartEPC-contract generates new EPC opportunities**

- **Buildings that have to leave pool earlier**
  e.g. pool 10 years, exit building A after 5 years
- **Buildings where owner ≠ tenant**
- **Performance based deep energy retrofitting**
  - incl. insulation measures...
- **Performance based retrofitting of buildings with major comfort problems**
  - e.g. Sick Building Syndrome
- **Replacement of conventional maintenance contracts**
Ongoing & planned smartEPC projects

> Fedimmo
  • 11 federal buildings

> City of Ostend
  • 6 municipal buildings

> Province of Brabant Walloon
  • <158 provincial buildings on 30 sites

> 2 EU pilot projects in major Belgian cities
What is smartEPC?

> **A “TOTAL CONCEPT” for EPC projects**
  - Integrating the EPC project facilitator role

> **An innovative MODEL for Energy, Maintenance and Comfort Performance Contracting**
  - A 100% performance driven technical, operational, financial and organizational model

> **A highly standardized and quality driven CONTRACT and set of TENDERING DOCUMENTS, plus annexes**
  - Public version is compatible with public tendering law
  - Using a “licence” model for optimized contract transaction cost

> **A TOOL for financing long term investments in energy efficiency and building value**

> **A BRAND**
  - around which to build a hopefully growing community of customers, facilitators and ESCOs
THANK YOU FOR YOUR ATTENTION

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