Renovation of public buildings through energy performance contracting in Italy

Dario Di Santo, FIRE

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FIRE: the association for energy efficiency

Do you need a hand in energy management?

The **Italian Federation for the Rational use of Energy** is a no-profit association founded in 1987 that promotes energy efficiency, supporting energy manager, ESCOs and other companies dealing with energy.

Besides the activities directed to its **members**, FIRE operates under an implementing agreement with the Ministry of Economic Development to manage the **Italian energy manager network** since 1992.

In order to **promote energy efficiency** FIRE cooperates and deals with public authorities, energy technology and service companies, consultants, medium and large consumers, universities and associations to **promote best practices** and **improve the legislation**.

FIRE manages SECEM - an accredited body - to certify the Energy management experts according to the standard UNI CEI 11339.

[www.fire-italia.org](http://www.fire-italia.org)
FIRE: the association for energy efficiency

Some members of FIRE:

Our members represent both the supply and the demand side of energy efficiency services and solutions.

Around 400 members, almost equally divided between organisations and professional.
FIRE: the association for energy efficiency

Besides being involved in many **European projects**, listed next, FIRE implement surveys and market studies on energy related topics, **information and dissemination campaigns**, and **advanced training**.

Some of FIRE **clients** over the years: Ministry of Environment, ENEA, GSE, RSE, large organizations (such as **Centria**, **ENEL**, **Ferrovie dello Stato**, **FIAT**, **Finmeccanica**, **Galbani**, **H3G**, **Poste Italiane**, **Telecom Italia**, **Unioncamere**), universities, associations, energy agencies and exhibition organizers.

[www.fire-italia.org](http://www.fire-italia.org)
SECEM, European System for Certification in Energy Management, is a certification body created by the FIRE.

SECEM was the first body to offer third-party certification for Energy Management Experts (EMEs) according to UNI CEI 11339 and is accredited according to the ISO/IEC 17024 standard.

In Italy two standards were developed in order to promote the qualification of energy efficiency operators: UNI CEI 11339 for EMEs was issued in 2009, UNI CEI 11352 for ESCOs was published in 2010. A new standard for energy auditor is presently under preparation.

Both the mentioned standards are recognized from the national legislation within the energy audit obligations for large companies introduced by the EED directive and the white certificate scheme.
Some basic aspects related to EPC and the main stakeholders in Italy

**EPC:** First EPC contracts appeared in the last 90ties in the public sector, mainly on public lighting. Since then their use has been extended to heating and cooling facilities, internal lighting and, more recently, building renovation. However, their use remains limited.

**ESCOs:** Since 2010 in Italy exist a technical standard for the certification of ESCOs. An improved version was issued in 2014, requiring the implementation of at least one EPC as minimum requirement for the certification. Presently there are 940 certified ESCOs.

**Public administration:** One of the main barriers for EPC remains the lack of resources and know-how of many medium and small authorities. Interesting examples from hospitals and ELENA projects.
Some basic aspects on EPC in Italy

- **Incentives**: The main Italian schemes are designed to be compatible with EPC and the possibility to finance both ESCOs or the end-users. This is true for Conto termico, Ecobonus (tax deductions) and white certificates.

- **Measurement and verification (M&V)**: FIRE made available the IPMVP protocol in Italian and is promoting its use also for EPC the public sector.

- **Tenders**: Presently it is possible to use different approaches for EPCs: service contracts, concessions, other forms of PPPs.

- **Facilitators**: Apart from the guarantEE project attempt to create a facilitator network, some agencies have been operating with success in such role (e.g. AESS, IRE Liguria, etc.).
Some data about ESCOs and EPC

ESCOS' revenues per sector
Source: FIRE on ENEA's data

Average registered capital

Most ESCO have been created in the last ten years and have a low registered capital and low capitalisation.

Turnover, EBITDA, profits bln € (2013)

EE turnover <1 bln €

Source: ENEA 2015, CESEF 2015.
Some data about ESCOs and EPC

Source: FIRE on CESEF data.

ESCOs activities cover many sectors and provide a wide range of solution.
Some data about ESCOs and EPC

Source: FIRE in GuarantEE market report 2016.

Usage of guaranteed energy performance contracts in PA

- 50% Yes, not EPC
- 40% Yes, EPC
- 10% No

EPC is seldom used presently.
Most contracts are supply contracts with some basic form of guarantee, but no link between ESCO's fee and EE.

Source: FIRE.
Some data about ESCOs and EPC

Source: FIRE on Transparense data.

### How many EPC projects has your organisation started in the last 24 months?

<table>
<thead>
<tr>
<th>Projects Range</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1--5</td>
<td>36%</td>
</tr>
<tr>
<td>6--10</td>
<td>45%</td>
</tr>
<tr>
<td>11--20</td>
<td>19%</td>
</tr>
<tr>
<td>20+</td>
<td>0%</td>
</tr>
</tbody>
</table>

### What is the most common overall value (investment outlay) of the EPC projects you are involved in?

- Less than 200,000€: 19%
- 200,000€ - 500,000€: 36%
- 500,000€ - 1,000,000€: 45%

### What is the most common annual energy saving (that is guaranteed or shared)?

- Less than 5%: 73%
- 5-15%: 18%
- 16-30%: 9%

### Over the last 3 years, has the market for EPC in your country seen:

- Major Growth (+6% and higher): 10%
- Slight Growth (+1 to +5%): 20%
- Little Change (0%): 10%
- Slight Decline (-1% to -5%): 0%
Some data about ESCOs and EPC

Source: FIRE in GuarantEE market report 2016.

Critical aspects

- Problems on measurement and verification of performance: 80%
- Inadequate preparation of administrative structure: 60%
- Lack of baseline on energy data: 20%
- Procurement issues: 10%

M&V and insufficient know-how about EPC are the main barriers for the growth of such contracts. Source: FIRE.
Service contract

Example of project implemented under service contract and financed through conto termico and structural funds.

Renovation of three hospitals and two local health units.


<table>
<thead>
<tr>
<th>OBIETTIVO</th>
<th>Targets</th>
<th>Criteria</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Quality</td>
<td>Enhancements related to buildings' aesthetics and functionality</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Items: aesthetics, materials, durability and maintenance requirements of works</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Energy saving</td>
<td>Improvements of building envelope and plants</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>Work development and execution</td>
<td>Organisation of the ESCO during project implementation</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Involved resources (number, skills, etc.), safety measures, interferences with hospitals' activities</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Management</td>
<td>Management performance over years</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plant management: enhancements with respect to base</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>M&amp;V: enhancements with respect to minimum requirements</td>
<td>10</td>
</tr>
</tbody>
</table>

Sommano punti per elementi qualitativi 65

Targets:
- Quality
- Energy saving
- Work development and execution
- Management

Criteria:
- Enhancements related to buildings' aesthetics and functionality
- Improvements of building envelope and plants
- Organisation of the ESCO during project implementation
- Management performance over years
- Plant management: enhancements with respect to base
- M&V: enhancements with respect to minimum requirements

Expected results:
- Involved resources (number, skills, etc.), safety measures, interferences with hospitals' activities
- Expected results
Service contract


Structure of the EPC fee (base, tender threshold, awarded fee, over and under performance behaviour.)
## Results

<table>
<thead>
<tr>
<th>Ospedale di</th>
<th>interventi</th>
<th>EPI [kWh/m³-a]</th>
<th>Energy saving (%)</th>
<th>CAPEX (k€)</th>
<th>Cost reduction (k€)</th>
<th>Riduzione [kgCO2/a]</th>
<th>PBT (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Benedetto del Tronto</td>
<td>Building envelope. Heating system.</td>
<td>7.60</td>
<td>77</td>
<td>4600</td>
<td>358</td>
<td>771000</td>
<td>13</td>
</tr>
<tr>
<td>Urbino</td>
<td>Building envelope. Heating system. CHP.</td>
<td>15.44</td>
<td>79</td>
<td>3150</td>
<td>218</td>
<td>813825</td>
<td>15</td>
</tr>
<tr>
<td>Pergola</td>
<td>Building envelope. Heating system.</td>
<td>12.40</td>
<td>79</td>
<td>2180</td>
<td>110</td>
<td>315000</td>
<td>20</td>
</tr>
<tr>
<td>Petritoli</td>
<td>Windows. Roof insulation. Boiler. Lighting. Solar thermal.</td>
<td>20.9</td>
<td>(riscaldamento 49.8% elettricità 32.4%)</td>
<td>370</td>
<td>39.8</td>
<td>127730</td>
<td>9.3</td>
</tr>
<tr>
<td>Sant’Elpidio o a Mare</td>
<td>Windows. Roof insulation. Boiler. Lighting. Solar thermal.</td>
<td>19.4</td>
<td>(riscaldamento 33.9% elettricità 47.4%)</td>
<td>370.4</td>
<td>32</td>
<td>120384</td>
<td>11.6</td>
</tr>
</tbody>
</table>
ELENA PPP with concession of services.

Source: 3L project: less energy, less cost, less impact, Provincia di Padova.

<table>
<thead>
<tr>
<th>Target</th>
<th>Involved local authorities</th>
<th>Buildings/lighting points</th>
<th>CAPEX</th>
<th>Energy saving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edifici Pubblici</td>
<td>1</td>
<td>86</td>
<td>26,3 mln €*</td>
<td>47%</td>
</tr>
<tr>
<td>IP</td>
<td>16</td>
<td>20,356</td>
<td>8,7 mln €</td>
<td>80%</td>
</tr>
<tr>
<td>Edifici Pubblici</td>
<td>19</td>
<td>72</td>
<td>11,1 mln €</td>
<td>35%</td>
</tr>
<tr>
<td>Edifici Pubblici</td>
<td>32</td>
<td>125</td>
<td>5,0 mln €</td>
<td>&gt;20%</td>
</tr>
<tr>
<td>IP</td>
<td>23</td>
<td>14,880</td>
<td>6,5 mln €</td>
<td>&gt;50%</td>
</tr>
</tbody>
</table>

Main data about the project, which involved many municipalities in Provincia di Padova. The action was financed by the EIB’s ELENA programme. Duration 15 years. Energy not included.

57,6 mln €
Main data about the project, which involved many municipalities in Provincia di Padova. The action was financed by the EIB’s ELENA programme, with a high leverage. Despite complexity good results delivered. Duration 15 years. Energy not included.
PPP with project financing through EEEF

Source: Deutsche Bank, FIRE’s webinar on EEEF, 2016.

Example of complex project implemented under PPP and financed through an EEEF project bond.

**Descrizione**

**Partners:**
- Progetto ISOM S.p.A (project SPV)
- University Hospital S. Orsola Malpighi (grantor of concession)

**Measures:**
- Upgrade of entire fluids’ production and distribution system of the hospital
- Including a tri-generation plant for the combined production of cooling, heat and power (CCHP)

**Results:**
- Reduction of CO2 emissions of 14,136 t p.a., approx. 31% compared to baseline

**Ubicazione**

Bologna, Italy

**Struttura**

- Manutencoop Facility Management
- Siram
- Sinloc

**Caratteristiche dell’investimento**

**Key data:**
- Total project volume: € 41m (equity provided by Manutencoop Facility Management, Siram, Sinloc and Iter Cooperativa Ravennate)
- EEEF funded volume: € 32m via a project bond structure
- Duration of financing: 20 years

**Highlights:**
- Largest energy efficiency upgrade in Italy under a Public Private Partnership (PPP) framework
- Complex energy efficiency upgrade of the hospital - won the ‘CESEF Energy Efficiency Award 2015’ in the Financial category
Some lessons learnt

- **Complexity**: Despite the impressive results delivered, PPP contracts are usually complex and not well understood by many public officers. Compared to Consip (central purchasing body) procurements, PPP is more complex and more data and longer times are required. Complexity is the main barrier to PPP use.

- **M&V**: Municipalities often don’t know well their energy consumption and don’t have (reliable) energy audits on which to build the tender process. Standard defined degrees days are often inadequate due to climate change. IPMVP is being requested, but it is sometimes difficult to apply. Reliable maintenance costs are seldom available.

- **Market**: It is still small, but developing. ESCOs are requested to present more challenging proposals.

- **Results**: Economic and financial plans are often inadequate. Effective results are usually much higher than tender thresholds, meaning that there is space to improve proposals and procedures.
What can we do together?

FIRE can be a partner for many activities:

- carrying out surveys among energy managers, ESCO, EGE, companies with ISO 50001, etc.;
- implementation of market and sectoral studies;
- guides and analysis on incentive tools and policies;
- information campaigns and behavioral change;
- dissemination campaigns;
- energy audits and feasibility studies;
- training courses on energy management and its tools (ISO 50001, energy audits, EPC, IPMVP, LCCA, feasibility studies, etc.), policies and incentives, solutions for energy efficiency, cogeneration, etc;
- European projects (e.g. Horizon2020), international cooperation, and much more...

Get in touch!

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