



REPORT

on status quo of EPC markets in the region of Catalonia

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Prepared by
ICAEN

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Conditions of EPC implementation

Potential of EPC implementation in respective city/region

Due to current economic situation in Catalonia, the EPC model is viewed as a main way to implement energy efficiency improvements in buildings and the industry in order to obtain savings and improve and update facilities.

As efficiency of the majority of buildings is quite low, EPC has a big potential for its implementation in Catalonia, and mainly in the greater area of Barcelona.

The EPC potential for public buildings (for those of Generalitat of Catalonia) it was identified by ICAEN as a 60% of the whole number of buildings. This should be achieved within a period of 3 years (2012-2014), and with an average savings of 20%. That means achievable global savings of 12% in energy at the end of 2014 for the specific case of Buildings of Generalitat. Considering that the current energy consumption of those buildings is about 1.000 GWh/y, by 2015 energy savings would be of 120 GWh.

Due to barriers, it has been very difficult to start the EPC implementation process, so we are delayed in our initial 2011 targets.

Projecting those numbers to a city or regional level, the EPC potential for Catalonia can be considered as a 60% for the whole public buildings (including councils, city halls and others).

Existing Energy Efficiency Documents for the city/region

All documents related with Energy Efficiency & Esco's for the Catalan region, are published in the Icaen's web under section Tools & Services (Eines i Serveis) and subsection Energy Service Companies (empreses de serveis energètic) <http://www20.gencat.cat/portal/site/icaen/>

Main documents:

- Catalan Public Buildings Energy Efficiency Plan. Approved on August 30th, 2011. Scope: only for buildings of Catalan Government (Generalitat), not for council or municipal buildings.
- Directive 2012/27/UE (25 October) of European Commission, on energy efficiency.
- Decret 21/2006 criteris ambientals i d'ecoeficiència en els Edificis.(environmental and eco-efficiency criteria in Buildings). Catalan Efficiency Directive.

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- 2010 Catalan version of the EVO's IPMVP (International Performance Measurement and Verification Protocol).
- *A Best Practice Guide to Measurement and Verification of Energy Savings* (Australasian Energy Performance Contracting Association, 2004)
- *ASHRAE-Measurement of energy and demand savings*. ASHRAE's property. This document is not available at ICAEN's web. Given link: www.ashrae.org
- Literature review of uncertainty of Analysis Methods (Texas Commission on Environmental Quality, 2004)
- Technical & Administrative clauses document for a guaranteed energy savings contract model (EPC), with its annexed documents.

The only documents which are about EPC are the Technical & Administrative Clauses which we have developed for our tendering process. Others have something or a lot to see with EPC as is the case for example of the M&V protocol.

Potential target groups and buildings for EPC implementation

ICAEN has been committed and concerned for the development of an EPC model for public and private buildings since the end of 2007, when the contact with main international ESCO companies began.

Public sector

- Performed a pilot in tendering process for **two** public buildings during the first 5 months of 2013.
 - One building is the Catalan National Archive, 12.615 m².
 - The other is a Sport complex: CAR (High Performance Centre), 28.000 m² distributed in different buildings + 94.000 m² of external surface.Both buildings are located in Sant Cugat del Vallès within the greater Barcelona's area.
- By the second half of year 2013, it'll be tendered **2** more buildings under the energy service model with guaranteed performance (EPC): one Penitentiary complex (Justice Department), mainly focussing in retrofitting the heating system and a Hospital district (10 buildings, representing an area built of 33.800 m² of a total area of the complex of 102.121 m²).
- Right now Icaen is developing (preparing) a tendering in EPC model for a pool of buildings. During 2014 is expected a tendering for at least **30** pools of public buildings.

Private sector

EPC model has been timidly introduced and recently applied in some private companies (geriatrics, in an office building of enterprise association, some industries,...) This is being carried out by few esco companies which have the EPC as a part of its core business.

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Attitude of the local/regional authorities to EPC

Local and regional authorities see the EPC projects as an opportunity for retrofitting and refurbishment of its installations with no investment.

For those public bodies who buy energy through aggregated purchase, as they get best price of primary energy (electricity, gas, oil), they see EPC as the best tool to accomplish big savings.

Other public authorities who still don't have aggregated purchase for energy, have no clear idea if using the Energy Supply Contract model (ESC), or EPC model. Normally they are driven by companies who offer very competitive prices for the thermal energy, as the ESC model is easier to be applied in the current national administrative law (LCSP, Llei de Contractes del Sector Públic)

Detected some distrust and reticence in following the Performance model, mainly due to a lack of knowledge and understanding the EPC model

Barriers in EPC implementation

Legal

Service contracts in Spain are limited to a maximum period of 4 + 2 years, and normally EPC projects needs an average period of 10 years to recover investments of the energy conservation measures (ECM).

Supply contracts are now cut due to current economic situation. Investments are prohibited to be carried out. (At least at Catalan level)

Current legislation impossibilities mixed contracts (Works & Services contract) as a solution to implement EPC in public sector. Solution at this fact has been identified as a Service Contract with special administrative nature.

At the Administration.

Spanish and Catalan tender documents don't considerer the EPC model, and it's difficult to be incorporated in the current state of tender documents, as savings are not considered by Catalan or Spanish Administration as a service.

Is needed an effort by the Administration of Spanish and Catalan governments for the development of this model, in order to incorporate EPC into the Law of Public Contracts (LCSP).

To make this change to happen is a hard barrier to overcome.

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Technical.

There is lack of knowledge, experience and expertise in applying the EPC model (Energy Performance and verification of the guaranteed savings), precisely because there is very few use up to now of this contract model in Catalonia and the majority of companies haven't available trained and skilled technicians.

Measure and Verification protocol is a must in EPC implementation. Most technicians of all Esco companies operating in Spain have been trained in M&V through IPMVP EVO protocol, and are certified CMVP. But for what we have seen, to have a course of 3 days in M&V doesn't mean the acquirement of abilities and expertise.

Since this perspective the barrier to beat is transfer expertise through practical and specific training by the hand of those who have the expertise and experience.

Catalonia has few but some human resources with the ability to accomplish this fact. Barrier is how to make it to happen.

Market barriers:

The market in Spain and Catalonia is split in two main different views or interests: ones giving support to ESC model, identified as P1 to P5 from IDAE (**majority of companies**) and others who try to implement the EPC (**few companies**).

The majority of companies have much more interest in the ESC model for obvious reasons: they already know it, it's easier to be implemented (it's the model implemented during last 15 years), have less risk for companies: both technical and economic, ...

To make companies go for the EPC represents an additional effort for the majority of companies, as they have to change the way they have been doing things up to now and this creates a resistance for obvious reasons.

One way to change this tendency (Inertia), is through an EPC tendering process by the government in all their public buildings tendering.

Financial barriers

Mistrust of the banking system in this new EPC model. Needed training (in finance protocol!)

Current economic situation have created few flexibility in Banks.

Lack of knowledge of current Finance protocols, as the IEEFP (International Energy Efficiency Financing Protocol) developed by EVO. An attempt to train main banks and local finance entities was done two years ago. It was not enough commitment by all entities and participants.

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Position of the EPC implementation

Existence of basic instruments for EPC

ICAEN has developed a tender documentation for an EPC tendering process.

This documentation consists in an administrative tender document and a technical document. The technical tender document has additional or annexed documents: annex 1, energy performance guaranty, annex 2, a model for the Measurement and Verification Plan, annex 4, Reference table to establish a proposal with a given base line for the whole period.

Standard EPC contract will be based on the former document.

It has been considered to develop the following tools to facilitate EPC implementation:

- M&V Guide for the Catalan market.
- Specific training by those who have implemented real EPC projects.

Existence of EPC (Energy Services Companies)

Survey of existing ESCOs

Main Esco companies firstly contacted to learn about the EPC model, where the following: Honeywell, Schneider, Johnson Controls, Siemens.

Other companies that operate as an Esco: Ameresco, Atrian, Istem, Ferroser, Self energy, Acciona, Clece, Cofely, Dalkia, Elecnor, Emte, Grup Soler, Arnó, Imtech, Rubatec, Enertika, Saufer, Ortiz Construcciones y proyectos, San José Tecnologías, Valoriza, among others.

Scope of ESCO experiences

Some of the former companies have had experiences in Spain on improving energy efficiency through guarantying energy savings

- Implementation of ECM in Tyssen Museum in Madrid by Honeywell. Guaranteed savings. Achieved savings much bigger than guaranteed.
- Measures implemented in a geriatric hospital. Guaranteed savings by Atrian company.

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- Improvement of energy efficiency in Fan system of a Pneumatic Collections Station. Guaranteed ROI. By Schneider Electric.

Ability to compete

All companies have ability to compete. If not they will make alliances in order to give the best of each one and accomplish the objectives.

Negotiation procedure is only up to 100.000 euros (VAT excluded), so this would probably only be applicable for some limited projects, as for those that only would scope on managing (control). In this way we will try to start projects.

ESCO associations or other institutions

ACTECIR (Catalan Association of Technicians in Energy, Air Conditioning and Refrigeration). A non profit organization, gathering at Catalan level professionals and technicians in the fields of Air Conditioning (heat & cool), ventilation, Refrigeration and Energy.

This entity is the one which was subcontracted by Icaen to develop our current technical EPC model and its corresponding tendering documents.

CEEC (Cluster of Energy Efficiency of Catalonia) A non profit companies association gathering companies which activities include the offer, promotion or development of products and services related to the energy efficiency in the following sectors: buildings, mobility, public services, industry and training

The CEEC is an entity through which collaboration between companies and associated entities from fields as research, technological, institutional, industrial, information and business, its purpose is to foster the energy efficiency.

This group was founded and created by Icaen.

ANESE, (National Association of Energy Service Companies). A non profit organization which main objective is to organise the market of Energy Services in Spain, as it's seen with a high projection and a business opportunity for the Spanish companies

Initiated its activity on January 2010. Has more than 130 associated companies of different fields as: consulting, engineering, maintenance, installers, manufactures and financial services.

AMI, (Association of Global Maintenance companies & energy services). Has 19 companies associated, including 2 main Spanish utilities.

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Financing and banking sector in relation to EPC projects

There are knowledge of the existence of EPC projects model by the majority of banks and local finance entities, but this knowledge is superficial.

Main banks participated in the last Esco event that took place in Barcelona on February 2012, in which were discussed the role of banks to give support to the EPC process implementation.

Under current conditions it is very difficult to get bank loans and with this new model to the banking system situation is even further compounded to get loans.

Existence of programmes for support of EPC

At current situation there aren't any programs, at Spanish level, neither for the Catalan market, to incentive EPC projects.

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EPC projects

Realized projects

Project developed by Honeywell.

Title: Improvement of energy efficiency in the Air Conditioning & Ventilation Systems.

Sector: Private

Customer: Fundación Colección Thyssen Bornemisza

Type of building: Museum, 15.000 m² conditioned

Description of Measures (ECMs): Retrofit of 3 Chillers, 3 cooling towers, 3 air handler units (fans with better efficiency & VSD), VSD on primary and secondary pumping circuits, VSD in condensation pumps and a new control and management system.

Contract Period: 2 years (2012 & 2013) under which savings have to be demonstrated. Otherwise subject to penalty. Customer didn't need financing.

Year of Installation: 2011.

Investment Volume: 600.000 €.

Baseline (kWh): 1.864.591 kWh/year

Baseline (€): 149.944 €/year.

Savings (%) 29% guaranteed. (minimum required by customer: 20%)

Savings (kWh): 551.611 kWh/year

Savings (€): 42.000 €/year

Project under development by Schneider.

Title: Improvement of energy efficiency in a solid waste pneumatic collection plant

Sector:

Customer: URBASER

Type of building: Industry.

Description of Measures (ECM): VSD regulation on 4 motor fans.

Contract Period: 2012 - 2017

Year of Installation: 2012

Investment Volume: 68.900 €

Baseline (kWh): 472.717 kWh

Savings (%): Guaranteed 20%. At June 2013 real achieved 37,2%

Savings (kWh):175.922 kWh.

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Project under development by Atrian:

Title: EPC project, guaranteed savings

Sector: Health

Customer: Parc Sanitari Pere Virgili (within the Catalan Public Hospitals)

Type of building: two urban buildings of 6 and 7 floors and about 5.000 m² each

Description of Measures (ECM): management of energy by: awareness, training and advising in the rational use of facilities: boilers, chillers lighting, laundry,... Enthalpy recovery of air renovation, Control system for the on/off of fan coils when windows are closed/open in rooms, Optimization of boilers

Year of installation: 2013

Contract Period: 3 years.

Investment Volume: 50.000 Euros

Baseline (kWh): 1,75 GWh/year

Baseline (€): 160.000 €/year

Savings (%): 7,5%

Savings (kWh): 131.000 kWh/year

Savings (€): 12.000 €/year

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Prospective projects

- in general – volume, type of sector, financing, forms of guarantees for savings

Public sector.

Project prospected by ICAEN for the Sports department:

Title: Energy Service improvement in a Sports Centre (CAR).

Sector: Tertiary

Customer: Presidency Department of Catalan Government.

Type of building: various buildings of different use: sports, office, college,...

Description of Measures (ECM): lighting, HVAC measures: heating, (boilers retrofitting from oil to natural gas), Improvements in air distribution and in AHUs (ventilation improvements), improvements on water pumping, Improvements in Swimming pools, improvement to save water use, and update or refurbishment of the control & management system.

Contract Period: 10 years.

Investment Volume: 1.200.000 Euros

Baseline (kWh): 2010, 3.467.358 kWh_{elec}, 5.292.378 kWh_{oil}.

Baseline (€): 2010, 367.921 € (electricity) + 365.175 € (oil)

Savings (%): 40%.

Savings (kWh): 799.751 kWh_e & 2.525.008 kWh_{oil}.

Savings (€): 84.862€ (electricity) & 174.226€ (oil).

Project prospected by ICAEN for the Culture Department:

Title: Energy Service improvement in an Archive Building (ANC).

Sector: Tertiary

Customer: Culture Department of Catalan Government.

Type of building: Building for Archiving antic and old documents & films.

Description of Measures (ECM): lighting, HVAC measures: heat & cool production (2 boilers and one chillers retrofitting), Improvements in air distribution and in AHUs (ventilation improvements), improvements on water pumping, Improvement to save water use, and update or refurbishment of the control & management system.

Contract Period: 7,5 years.

Investment Volume: 300.000 Euros

Baseline (kWh): 2011, 1.615.636 kWh_{elec}, 1.480.873 kWh_{nat.gas}.

Baseline (€): 2011, 183.543 € (electricity), 70.490 € (natural gas).

Savings (%): 25%.

Savings (kWh): 237.623 kWh_{elec}, 380.986 kWh_{nat.gas}.

Savings (€): 26.995€ (electricity), 18.135€ (natural gas).

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