



Project no. EIE/04/059/S07.38622

“ST-ESCOs”

Development of pilot Solar Thermal Energy Service Companies (ST-ESCOs) with high replication potential.

Intelligent Energy  Europe

Intelligent Energy – Europe (EIE)

Type of action: SAVE

Key action: Buildings Sector

Coordinator: CRES

ST-ESCOs Market Analysis: Spain

Project website: www.stescos.org



ST-ESCOS MARKET ANALYSIS: SPAIN

1.- Introduction

In the year 2004, the Renewable Energies have represented 6,5% of contribution in the consumption of primary energy in Spain, diminishing in 5 tenths to the contribution of the same ones in the year 2003, which was 7%. It is to say we are to a few levels slightly lower than in the year 1999, year in which there approved the Plan of Promotion of the Renewable Energies, with the aim to achieve, that in the year 2010, 12 % of the consumption of primary energy in Spain, it was coming from renewable sources of energy.

The mentioned Plan, it meditates as aim in the horizon of the **year 2010** for the Thermal Solar power in Spain, an installed surface of **4.800.000 m²**, being at the end of year 2004, with a total installed surface, of approximately 700.000 m².

During the year 2004, a whole of 90.000 m² has been installed of new solar collectors, totalising a surface accumulated of 670.000 m² installed.

The perspectives for the year 2005, they are coded in 150.000 m² of new installed collectors of Thermal Solar power, very far yet of the aims of the PFEERR, since we would need to install 796.000 m²/year, from the year 2006, to reach in the year 2010 the 4.800.000 m² installed foreseen.

Before this perspective, and in order to reach the aims for the year 2010, the Central Administration has decided to check during the year 2005, the Plan of Promotion of the Renewable Energies PFEERR 2000 - 2010, checking the aims of saying PFEERR, marking on the other hand, the guidelines of the political ones of Energetic Efficiency, and insisting on the idea of that the "more important impediment for the development of the Renewable Energies is the absence of political effective and binding, of management of the demand and of energetic efficiency".

2.- Potential market for Solar Thermal and for ST-ESCOS.

The predictable evolution for the Thermal Solar power in Spain, is going to meet favoured by diverse factors, some contemplated inside the Plan of Promotion of the Renewable Energies, since they are:

- The Europe's highest solar potential.
- The high capacity of reception of the existing market
- The great experience of the manufacturers
- The high technological reached maturity
- The effect reply of the trends of countries of European Union

As well as others not contemplated in saying PFEERR 2000-2012, and for that we wait stimulate of a decisive form, the sector of the Thermal Solar power, since they are:

- Review during the year 2005 of the PFEERR 2000-2010 (Review 2005 - 2010).
- Strategy of Saving and Energetic Efficiency 2004 - 2012: Development of a Plan of Action 2005 - 2007
- Transposition of the Board 2002/91/CE on Energetic Efficiency in Buildings or Technical Code of the Building (CTE).

Waiting for the entry into force of the CTE, for January 04, 2006, as well as the rest of happened, increases of manifest form this type of facilities.

In spite of the potential high place available lot, the surface ratio of captation of Thermal Solar power for every 1.000 inhabitants, was placing in 1999 in Spain in 8,7 m²/1.000 inhabitants, opposite to the 19,9 m²/1.000 inhabitants of the Europe of the 15.

For all this, the forecast for the year 2010, would increase this ratio of 8,9 m²/1.000 inhabitants, up to a ratio of 115 m²/1.000 inhabitants, which would allow to reach the 4.800.000 m² of installed surface.

The forecasts realized by the Institute for Diversification and Saving of the Energy (I.D.A.E.), in the year 1999, date of approval of the PFEERR, and for the horizon of the year 2010, they established the potential market, being based on the following considerations:

1. Supposing a solar contribution of 50%, considering that there should be no type of restriction, the potential market for the Thermal Solar power in Spain, it would place in 27.000.000 m², distributed of the following form:

Hotel sector.

For the Hotel Sector, these forecasts would place in 1.000.000 m², having in it counts the available seats in this moment, the degree of occupation of the same ones, as well as a solar contribution for the sector of 75%.

In this sector, the solar thermal plant are big size and can be performed by ST-ESCOs formula, if owners did not want to operate and maintenance the facility.

Residential sector.

In the Domestic Sector, corresponding to the existing park of housings, the forecasts would be of 20.000.000 m², removed of the following form:

- One-family Housings, 7.000.000 m²
- Multifamily Housings, 13.000.00 m²

For the same sector, and including the Domestic Sector of new construction, as well as other facilities, as swimming pools, residences, etc, the forecasts are:

- Collective Housings, including residences, colleges, etc, 300.000 m²
- Domestication of new construction, supposing that during the horizon of the PFEERR, 250.000 housings /year were constructed, 5.000.000 m²

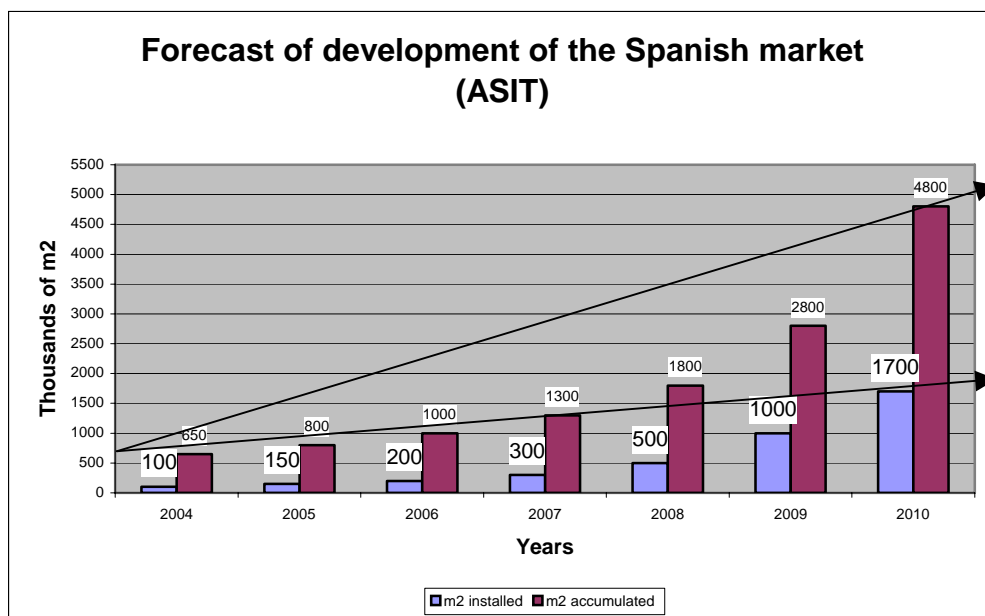
- Other applications, including swimming pools, and application of low temperature in the industry, etc, 500.000 m²

Difficulties to perform ST-ESCOs Contracts in Residential Sector, at first. Not target for our European project.

Industrial sector.

The Industrial Sector contemplated inside the PFEERR, it is going to have a specific limited weight, opposite to the Residential Sector and of Services, which it is the one that has a major level of expectations, the forecasts being able to be estimated in approximately 50.000 m² for the horizon of 2010.

The forecasts of development of the Spanish market, we can see them reflected in the following graph, in which we can see the trend of growth contemplated in the PFEERR, with growths of 65%, opposite to the current trend.



Very important possibilities for ST-ESCOs formulas for pre-heating water before entering into the boilers: canned food sector are very interested.

Public administration sector: public buildings, public hospital, swimming pools, etc, etc

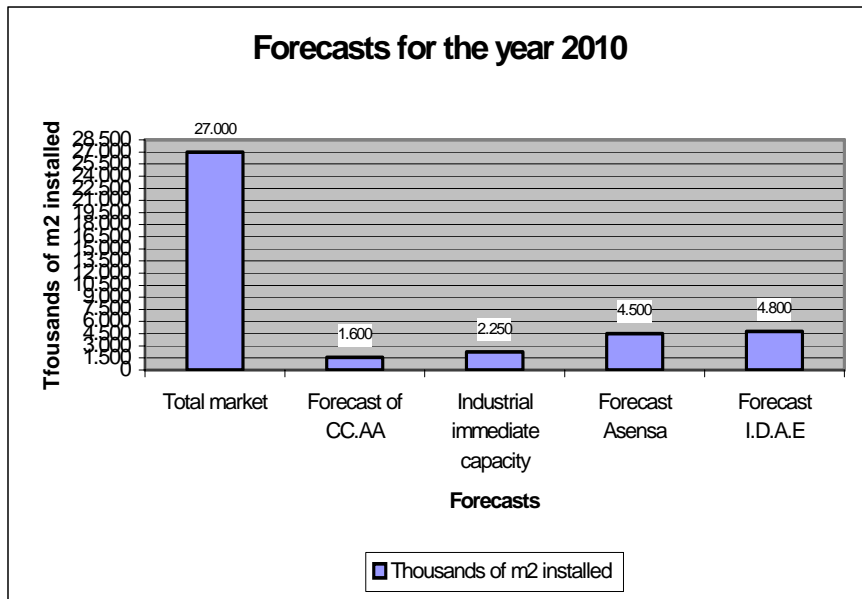
The potential for this applications, is according to our view point, the more important options to implement ST-ESCOs contracts.

The public building are needing to implement new methodology to reduce clearly costs and to post for the environment as opportunities.

2. Along the Horizon of the PFEERR, the industrial capacity of the Sector is established to three levels:

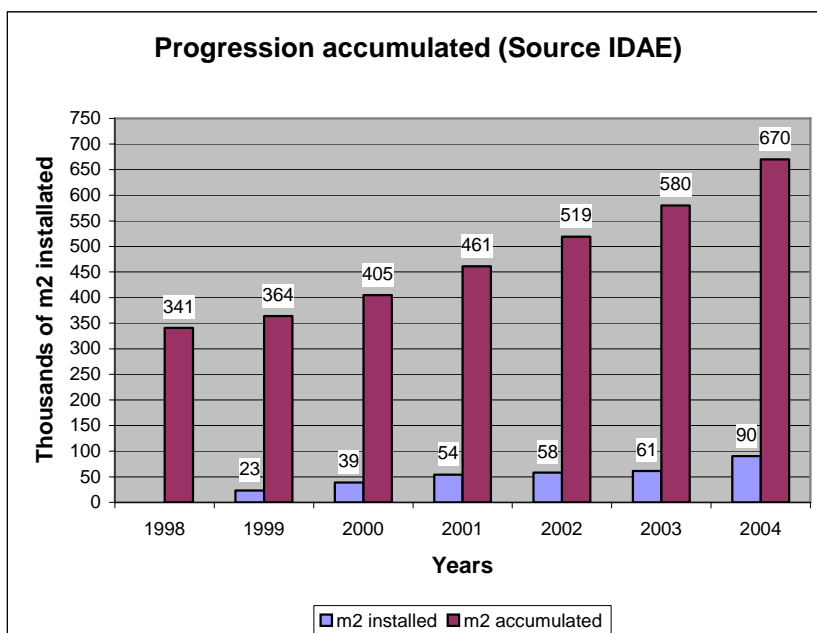
- Industrial Capacity with reference to 1999, 650.000 m²
- Industrial immediate Capacity 2.250.000 m² (it does not need additional investments, only to optimise the available equipment and to extend shifts), according to the National Association of the Solar Power and Alternatives (ASENSA).
- Capacity in the short term, 4.200.000 m² (it needs economic investment to extend the capacity of production).

3. The estimation of the Autonomous Communities is coded in 1.600.000 m², being Andalusia, with 1.000.000 m², the Community with major push.



3.- Evolution of the Solar Thermal energy in Spain.

The evolution of the solar thermal power in Spain, we can see reflected in the following graph:

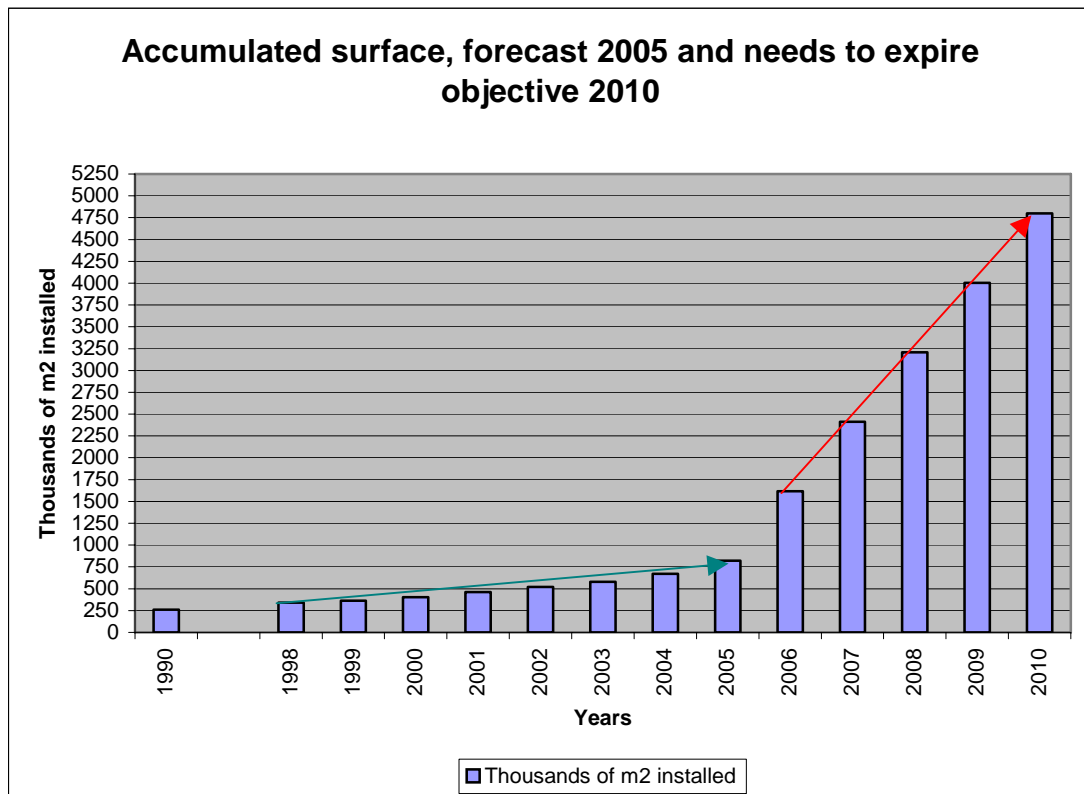


Departing from a situation in 1998 of 341.000 m² from solar installed panels (value accumulated of this year and previous), until the year 2004 with 670.000 m² from solar accumulated panels, from those who this year installed 90.000 to themselves m² new.

After an average of growth in the last 6 years around 15% (until the year 2003), during the year 2004, the market of the Thermal Solar power has experienced a growth around 50% with regard to the year 2003.

This degree of growth of 50%, it is below the estimated one in the PFEERR of 65%, to obtain the aims of the year 2010, coded in 4.800.000 m².

The perspectives for the year 2005, there is coded in 150.000 m² of new installed collectors of Thermal Solar power, which represents 66% of growth with regard to the year 2004, very far yet of the aims of the PFEERR, since we would need to install 796.000 m²/year, from the year 2006, to reach in the year 2010 the 4.800.000 m² installed foreseen.



This great growth, it should be obtained, with the measurements contemplated by the Administration for the year 2005:

- Review during the year 2005 of the PFEERR (2005 - 2010).
- Strategy of Saving and Energetic Efficiency 2004 - 2012: Development of a Plan of Action 2005 - 2007

- Transposition of the Board 2002/91/CE on Energetic Efficiency in Buildings or Technical Code of the Building (CTE) and his entry into force on January 04, 2006.

4.- Exploration of the future market in Spain

The Plan of Promotion of the Renewable Energies 2000-2010 (PFEERR), he contemplates an important takeoff in the use of the Renewable Energies in Spain, based fundamentally on the following aspects:

- Environmental.
- Energetic.
- Socio-economics.

With reference to the Environmental and Energetic aspects, of all it is known the benefits that for the society there bears the use of these technologies.

With reference to the aspects socio-economics, the development and use of the Thermal solar power, contemplated in the PFEERR, ride prepared the whole series of advantages, which are going to do that in the next years, the development and implantation of this technology, it manages to reach in the year 2010, the foreseen aims. Between these aspects socio- economics, we can stand out:

- Creation of qualified employment.
- Strengthening of the industrial fabric.
- Development of own technologies.
- Improvement of the competitiveness.

In Spain, the sector with major potential demand, he is in the Residential Sector and of Services, owed fundamentally to the high demand of housings of the first and second use, as well as, for the bet that the hotel sector is demonstrating.

Apart from these four revitalizing aspects of the use of the Thermal Solar power in Spain, a fifth factor is going to appear in scene, and is going to be a determinant, to reach the aims of the PFEERR.

This fifth factor, it is going to be the publication during the year 2005, and his entry into force on January 04, 2006, of the new Technical Code of the Building (CTE), as well, as all the legislation and regulation, that one should adapt to the same one, forcing for Law to the use of the Thermal Solar power in this sector.

For all this, the expectations of development and implantation of this technology in Spain, are optimistic, being the facilities designed by elements, those of major future, being estimated in 75% of the whole, the 25% remaining one, they will correspond to one-family facilities, that is to say, installation of compact teams.

5.- Prices of the Spanish market.

The prices of market of the Thermal Solar power in Spain, can estimate for two types of facilities type:

| Type of Installation | Estimated Unitary Price |
|--|-------------------------|
| Compact team, with two flat collectors and 1 tank of accumulation of 300 liters. | 2.500 €/Ud |
| ST installation for elements (valid for ST-ESCOs) | 550 €/m ² |

It is clear that for ST-ESCOs formulas, the cost per installation is the second one. And this is a reference in order to perform the different economical studies.

6.- Economically analysis for a ST-ESCOs plant

Based on the prices information provides before, then hereafter it can be seen a very detailed economical study for one “virtual” facility of 100 square meters.

Solar Thermal Energy: example of a 100 square meters installation for Hot water in an hotel

| | | | |
|-------------------------------|---|-----------------|-----------------|
| TOTAL GROSS INVESTMENT | | 55.000 €/100 m2 | |
| | | 550 €/m2 | |
| | | | |
| GRANTS (20%) | | 11000 € | |
| FISCAL DEDUCTION (10%) | | 5500 € | |
| NET INVESTMENT | | 38.500 € | |
| | | | |
| | | | |
| INCOMES | Unit power per m2 (kW) | 0,7 | kW |
| | Power (kW) | 70 | kW |
| | Work hours per year | 2350 | h |
| | Solar thermal energy produced | 165200 | kWh |
| | Total Energy demanded | 265000 | kWh- Gasóleo |
| | Solar fraction | 62% | |
| | | | |
| | Annual savings | 8.250 | €annual |
| | | | |
| | | | |
| EXPENSIVES | | 1.860 | € |
| | | | |
| | Total operation and maintenance costs | 360 | € |
| | Insurance and security | 640 | € |
| | Others (measuring, billing, relation ships with customers, etc) | 860 | € |

| | | | |
|------------------------|--------------------------------------|---------------|-------|
| CASH FLOW | | | |
| | ANNUAL | 6.390 € | |
| | | | |
| SINGLE PAY BACK | | | |
| | | | |
| | GROSS INVESTMENT | 8,6 | years |
| | NET INVESTMENT | 6,0 | years |
| | | | |
| COMMENTS | | | |
| | REF. PRICE FOR SELLING ENERGY | 0,0499 | €/kWh |

Comments onto the above:

- Gross Investment is about 50.000 euros
- Grants, according to the National Programmes are about 20%
- Fiscal deduction for investing in fixed actives devoted to improve our environment is about 10%
- Some financial entities, as banks or saving corporations, can load up to 100% of investment when it is done in RES. Many agreements are on the table to do that.
- Therefore, the ST-ESCOs company can look for the needed funds externally, not needed own funds.
- The Cash-flow we manage in the Region of Murcia, with the indicators producers the table is prepared, seems that annually it is obtained up to 6.390 €, which means an Internal Rate of return of 11,6%.
- The single Pay back is about 6,0 years (considering the grants and fiscal deductions)
- And the more important obtained ratio is that the fixed price for the solar thermal, kwh is about **4,99 cent€/kWh**.

External sources for funding:

- Some Banks and other "Saving corporations" are offering different financial products for RES, such as they provide up to a 100% financing if the Economical and viability study is adequately done."
- Grants programme are actually runned by the Industry Department as well as for the Regional Public Administrations. Maximum can be obtained is about 30%.

- The Grants funds are mainly increasing in the last few years. More that 10 Million euros were included in the Solar programme in 2005.

7.- Potential actors and ESCOs companies.

Manufacturers:

- Isofotón. www.isofoton.com
- Pasch – Solel. www.barcelona.pasch.es
- Saclima – Solahart. www.saclima.com
- Viessmann. www.viessmann.com
- Termicol. www.termicol.com
- Chromagen. www.chromagen.com
- Ecofotónica. www.ecofotonica.com
- Giordano Solar S.L. www.giordano-solar.com
- Promasol. www.promasol.com

Associations and Institutions:

- Asociación Solar de la Industria Térmica (ASIT). www.asit-solar.com
- Associació de Professionals de les Energies Renovables de Catalunya (APERCA). www.aperca.org
- Asociación de Productores de Energías Renovables (APPA). www.appa.es
- Centro Nacional de Energías Renovables (CENER). www.cener.com
- Instituto para la Diversificación y Ahorro de la Energía (I.D.A.E.). www.idae.es
- CIEMAT. www.ciemat.es
- ENERAGEN. eneragen@idae.es
- Agencias de Energía
- Institutos Energéticos.
- Asociación Empresarial de Energías Renovables y Ahorro Energético de la Región de Murcia (AREMUR). www.fremm.es
- Asociación Nacional de la Energía Solar y Alternativas (ASENSA). www.asensa.org

National installers:

Confederación Nacional de Empresarios Instaladores y Mantenedores(CNI).
www.cni-instaladores.com

Companies associated with CNI:

- Asociación Provincial de Instaladores y Mantenedores de Albacete (APIMA).
www.apima.info
- Agrupación de Industriales de Fontanería y Saneamiento de Alicante (AIIFS).
www.cni-instaladores.com
- Asociación Provincial de Calefacción y Aire Acondicionado de Alicante (APECAA).
www.cni-instaladores.com
- Asociación de Fontanería y Calefacción de Asturias (AFONICAZA).
www.cni-instaladores.com
- Gremi de Instalació, Ventilació i Aire Condicionat de Barcelona (GREMI).
www.cni-instaladores.com
- Asociación Provincial de Instaladores de Burgos (APROIMBU).
www.cni-instaladores.com
- Asociación Provincial de Empresarios Siderometalurgia de Ciudad Real (APES).
www.cni-instaladores.com
- Agrupación de Instaladores de Servicios para la Construcción de Lleida (AGRISEC).
www.cni-instaladores.com
- Asociación Madrileña de Instaladores y Mantenedores de Servicios Edificación (AMIMSE). www.cni-instaladores.com
- Asociación de Empresas Instaladoras de Menorca (FONGAME).
www.cni-instaladores.com
- Gremio Regional de Instaladores de Frío y Calor de Murcia (FREMM).
www.fremm.es
- Asociación Provincial de Instaladores de Sevilla (FEDEME).
www.fedeme.com
- Asociación Valenciana de Climatización y Frío Industrial (AVICLIMA).
www.cni-instaladores.com
- Asociación de Instaladores y Mantenedores de Vizcaya (AIMVI).
www.cni-instaladores.com

8.- Conclusions

- Many opportunities are presented for ST-ESCOs development in Spain.
- A necessary effort to increase the Total square meter installed is needed, and therefore the Support and Grants from the Industry Department are going to be maintained in the next years.
- Some fiscal deduction are possible for these kind of investments, meaning up to a 10%.
- The solar conditions in Spain are offering very attractive paybacks for this ST-ESCOs plants.

- A large list of potentials stakeholders are previously identified, and it will be in the WP2 where to be detailed.
- Many opportunities for the Public Administrations, i.e. the potential for this applications, is according to our view point, the more important options to implement ST-ESCOs contracts.
- The public building are needing to implement new methodology to reduce clearly costs and to post for the environment as opportunities.
- Economical study shows that ST-ESCOs in Spain has not economical and financial barriers, so far. And therefore ST-ESCOs project may be profitable in Spain.
- Procedures to follow and actors to address are a part of the works performed in WP2.