

# 1st Interregional Event DOSSIER





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## Introduction

The exchange of experiences is the key factor in the learning process of FINERPOL. This intense work of identification and sharing of best practices through permanent cooperation will project's objective and to produce the intended outputs and results.

The exchange of experience among partners is an interregional learning process. The typical activities supported under interregional cooperation projects are activities such as seminars, workshops, site visits, staff exchanges, peer reviews. The learning process is based on the identification, analysis and exchange of knowledge and practices in the policy tackled by the project.

Interregional cooperation projects need to analyse the experiences and/or practices exchanged within the projects and disseminate the most interesting findings.

The exchange of experiences process will benefit from the participation of partners representing entities with different experiences in the field of FI for Energy using ERDF funds, the partnership includes mainly MAs with competences both in the Management of ERDF funds and in the policies identified in the project, but also technical expert institutions allowing a good technical approach while ensuring the involvement of ERDF funds in the implementation of actions and a direct impact in policies. Local stakeholders groups, chosen by each partner, representing local bodies, banks, associations, companies, authorities,... will be involved in both Local and Interregional meetings and study visits to provide inputs to the Project.

### **1st Interregional Event of FINERPOL**

In this framework, the first Interregional Event took place in Extremadura (Spain) on May 23th and 24th 2016. It was organized by the Extremadura Energy Agency (AGENEX).

Representative examples of sustainability, efficiency and use of renewable resources in Extremadura were selected as study visits. Thus, the buildings visited were the Hispano-Luso Center Energy in Buildings "Red Building" and a Regional Government office building "Merida III Millennium".

During these visits experiences were analyzed and shared in different areas like testing and experimentation of energy efficiency measures in buildings, the application of sustainable building policies in buildings and the integration of renewable energies and passive and active measures for energy efficiency in the construction of a regional government administrative complex.

Within the framework of this event, took place the Workshop "NEW FINANCIAL INSTRUMENTS FOR REHABILITATION ENERGY" where stakeholders attended specific practices related to FIs, ERDF funding in EE and policy making.



## Event summary

**Date:** May 23th and 24th, 2016

**Location:** Extremadura (Spain)

## Agenda

### Monday, 23th may 2016

Time	Activity	Location
09:00	Welcome and Reception	Badajoz (Spain)
15:30	Study Visit I	Model building FEDER financed- Badajoz (Spain)
20:00	Sightseeing tour	Monumental downtown- Guide tour Badajoz
21:30	Consortium Dinner	

### Tuesday, 24th may 2016

Time	Activity	Location
10:00	Workshop "NEW FINANCIAL INSTRUMENTS FOR REHABILITATION ENERGY"	Mérida (Spain)
15:30	Study Visit II	Model building FEDER financed: III Millennium - Mérida (Spain)
16:30	Sightseeing tour	Monumental downtown- Guide tour Mérida
21:00	End	



## Study Visit I - Hispano-Luso Center Energy in Buildings "Red Building"

"Administrative building with several renewable energy installations and with several data monitored in Badajoz city"



May 23th, 15:30h-17:30h

Caceres Road, It is housed in the building of the Territorial Service of Environment of the Extremadura Government. The project and facilities were explained by Francisco Javier Márquez and Javier Ordoñez, Technicians of Extremadura Energy Agency.

### Project description

Hispano-Luso Center Energy in Buildings "Red Building" is a product of ALTERCEXA II Project and PROMOEENER-A, within the Operational Programme for Territorial Cooperation Spain-Portugal Cross-Border funded by ERDF and developed by the Extremadura Energy Agency. It was open to the public in February 2016.

This Interpretation Center aims to inform and raise awareness which are the indigenous energy resources and respectful with the environment in the border area, their applications in buildings and the attitudes necessary to promote savings and energy efficiency.

It is housed in the building of the Territorial Service of Environment of Extremadura Government in Badajoz in line with the target from administrations of promoting effective and sustainable use of resources in La Raya.

Building has saving measures and energy efficiency result of a previous phase. In it have been integrated facilities which allow operation with an approximate 70% contribution of renewable energy and currently has a sample of unique technologies of this type of energy.

- ✓ Photovoltaic solar production in self-consumption mode.
- ✓ Geothermal air conditioning to cover 100% heat and cold.
- ✓ Remote monitoring electricity consumption.



- ✓ Remote monitoring photovoltaic production.
- ✓ Remote monitoring thermal production.
- ✓ Energy-savings and efficiency measures.
- ✓ Signs and educational audiovisual material.

### **Photovoltaic solar production in self-consumption mode.**

The installation has 2 branches in series of 13 panels of 245 Wp each one. The installed capacity of 6.37 kWp for an expected generation of 7.97 kWh / kWp / year.



### **Geothermal air conditioning to cover 100% heat and cold.**

Geothermal Energy Installation has a geothermal exchanger with land made by 6 probes inserted into the ground 100 m deep. He exchanger serves to a geothermal heat pump water-water type (BCG), AQUA CARRIER SNAP 61WG / 30WG 020-090 with two compressors and reverse cycle manually from the outside by 4-way valve. The cold pump has a nominal capacity: 24-95 kW and heat capacity: 30-116 kW and is intended to cover 100% of a cold demand 23,4 MWh/year and heat: 60.4 MWh/year with accumulation 3000L.



### **Monitoring parameters**

This monitoring would allow instant viewing of:

- ✓ overall power consumption of the building.
- ✓ power consumption of air conditioning.
- ✓ lighting power consumption.
- ✓ electricity production generated by the PV system.
- ✓ geothermal box room network analysis



- ✓ energy consumed by the geothermal heat pump (GHP)
- ✓ energy consumed by the auxiliary elements
- ✓ energy provided by the GHP (heating and cooling system)
- ✓ GHP Flow temperature
- ✓ GHP Return temperature
- ✓ flow and return temperature wells
- ✓ storage temperature
- ✓ outside temperature
- ✓ representative temperature inside the building
- ✓ GHP Performance
- ✓ alarm Out of Service
- ✓ unexpected Stop Alarm System
- ✓ temperature max / min wells
- ✓ temperature max / min inside the building.



### **Originality and creativity**

The originality of the project is based on energy efficiency and savings facilities complemented with providing the utilities tools to be understood by the public.

On the other hand, the facility has the distinction of being pioneers in the region in several respects;

- installation of vertical geothermal capture is the first of its kind that is integrated into a public building in Extremadura and Alentejo.

- also photovoltaic solar production in self-consumption mode is one of the first of this type in the region due to the existing administrative barriers.

Another innovative aspect is the ability to monitor the operation of facilities, allowing to measure and study the beneficial effects of these solutions from anywhere.

This quality, coupled with the dissemination of the results is planned, undoubtedly enhance its

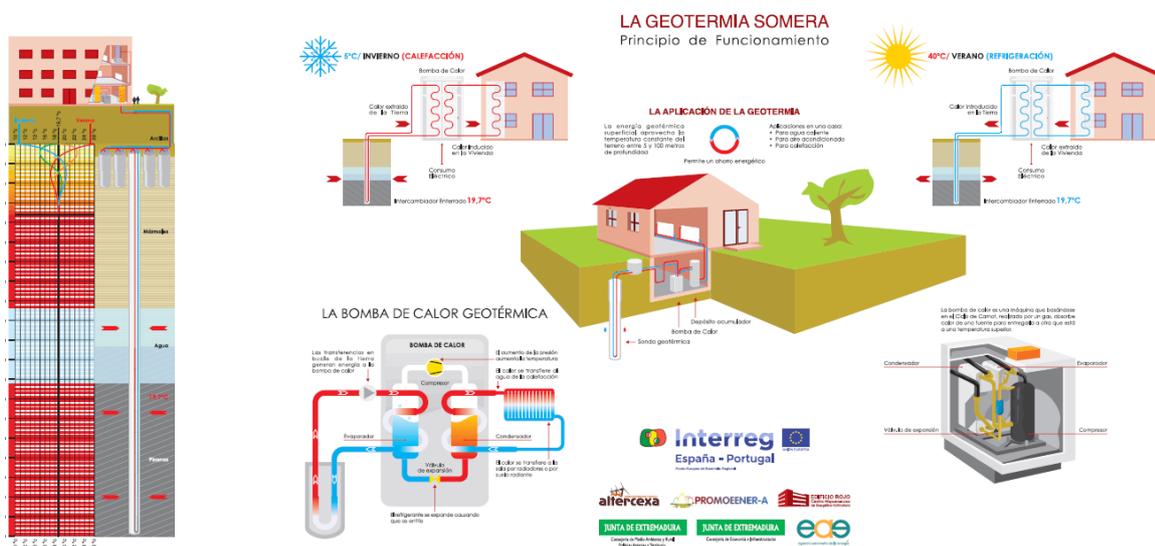


demonstrative character of installed energy alternatives.

Importantly, this energy interpretive center is the first that works in Extremadura and the neighboring Portuguese regions and is one of the first to be supported by their own functional facilities to reinforce the demonstrative and exemplary aspect of renewable energy.

Thus, the cross-border nature is one of the most innovative aspects, since taking advantage of its proximity to the Spanish-Portuguese border, aims to extend its dissemination through a Web adapted to Portuguese displaying content in both languages and to facilitate the visit of the center by groups from both countries

Didactic and explanatory contents of which is provided the Centre are interactive, they are designed so that visitors through their mobile devices (using the system barcode scanner) may complement explanations of the guide with videos, photos, diagrams and explanations that only are located on the official website.



## Results

The electric and thermal generation facilities integrated into the building are perfectly monitored and the first results collected from its implementation confirm the effectiveness of the solutions proposed by above expectations.



## Photos





## Workshop “NEW FINANCIAL INSTRUMENTS FOR REHABILITATION ENERGY”



May 24th, 10:00h-13:30h

Convention centre. Rio Avenue, 06800 Mérida Badajoz (Spain)

Extremadura Energy Agency organized an international workshop/table composed by stakeholders in order to exchange specific practices related to financial instruments , ERDF funding in Energy efficiency and policy .

This workshop fits into the project FINERPOL - Financial Instruments for Energy Renovation Policies, which aims to promote new policies, in order to give financial support to the activity of energy renovation of buildings, especially Financial Instruments (FIs) supported by ERDF funds and integrated with EC funding initiatives, such as EFSI (Juncker Plan), tools from the European Investment Bank EIB, or even from public-private partnerships.

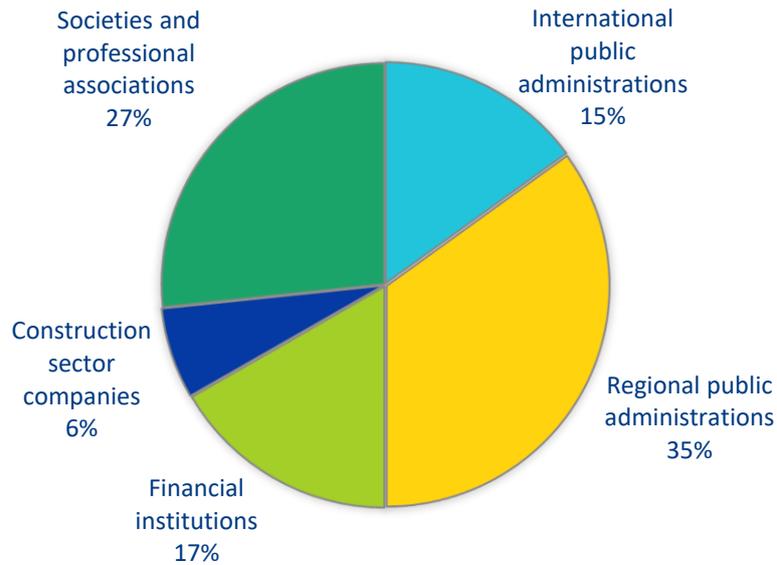
Among the speakers were included representatives of:

- Extremadura Government
- Extremadura Avante
- Extremadura Building Industry
- Extremadura Energy Agency, Agenex
- Administrations of Italy, Germany, UK, Greece and the Czech Republic.

With these instruments, the Regions seek to achieve the European Union environmental and economic targets for 2030, following the path marked by their Regional Strategies of Growth and Jobs (G&J).

The workshop was attended by more than 50 stakeholder with representation of different sectors: international public administrations, regional public administrations, financial institutions, construction sector.

The percentage distribution can be seen in the following image:



## AGENDA

 10:00- 10:30 Welcome attendees

 10:30 – 11:00 Introduction

**Olga García García**, *Director General of Industry. Ministry of Economy and Infrastructure of the Government of Extremadura*

 11:00 – 11:30 Case studies on Financial Instruments

Multiproduct Urban Development Fund under JESSICA Andalucía

**Víctor Macías Hernández**, *Investment GED JESSICA Andalucía Director*

 11:30 – 12:00 Coffee break

 12:00 – 13:00 Round table: Advantages and disadvantages of Financial Instruments / Grants

Moderator:

**Miguel Bernal Carrión**, *Director General of Extremadura Avante*

Participants:



- **Víctor Macías Hernández**, *Investment GED JESSICA Andalucía Director*

- *Community Funds Service of Extremadura Government*

- *Construction industry Extremadura representative*

- *Empresa Dirección General de Gobierno de Extremadura*

 **13:00 – 13:30 Presentation Technical visit- Model building FEDER financed**

**Esther Gamero Ceballos-Zúñiga**, *Head of Architecture, Quality and Accessibility Service. Department of Architecture. Ministry of Health and Social Policy*

 **13:30 Lunch**



Photos





## Study Visit II - Merida III Millenium

“Public-owned buildings as leading examples”



May 24<sup>th</sup>, 15:30h-16:30h

Regional Government of Extremadura office building, Merida. The project and facilities were explained by Bernardino Morillo, Technicians of DG Architecture and Housing, Government of Extremadura.

Merida III Millennium is a project of regional interest born in 2002 with two objectives: to regroup services and recover one of the most undervalued areas of Merida: the neighborhood “La Paz”. The aim was to develop urbanistically a marginal area and provide public services.

The most outstanding performance is the construction of a large building that houses six Regional Ministries on a built area of 62,975 meters square, of which 38,000 square meters are for administrative offices.

It has basement, ground floor and four stories high. In addition, a 10,100 square meters are intended to parking area, divided into two floors.

The project was awarded through an international competition where the emphasis was on designing a sustainable building and the main concerns were the high temperatures in the region of Extremadura and solar radiation. These issues were taken into account from the design stage of the plan through the analysis of different strategies in order to achieve greater number of gray areas, use natural ventilation, and the pursuit of efficient systems for cooling. Work began in 2007 and ended in 2012.



### Envelope



Regarding the east and west facade, these envelopes are made of double reinforced concrete wall with an intermediate chamber in which services are hosted - unheated premises - which allows a good insulation effect of that camera. While the insulation is inside, the chamber separates the outer environment of the inner area, so thermal bridges at the slab edges only affect unheated areas. However in the inner face of the façade, the insulation is placed with a radiant barrier in order to reduce thermal solar gain because they prevent heat flow into the building. The west side receives 60% of radiation (1239 kW hr/m<sup>2</sup>), so the insulation of this facade becomes very important.

The roof, of course, receives most of the insolation. For this reason, the strategy used is to place another additional cover consisting of photovoltaics panels for shading the roof.

### Air-ground heat exchanger

For pre-cooling in summer and preheating in winter the building has a heat exchanger air-ground to reduce the consumption of air-conditioning.

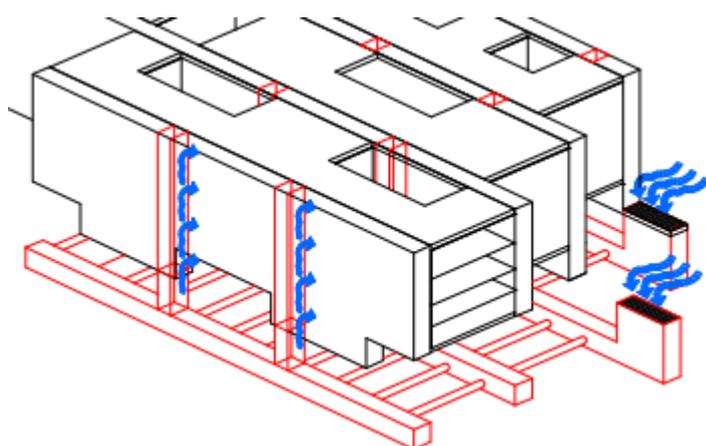


Ambient air is introduced through a buried duct system. When flowing through these channels, air temperature approaches the temperature of the surrounding ground. The temperature of the ground, according to studies, is stabilized to 9 meters deep at a temperature close to 20 ° C.

Except for the layers closer to the surface, ground temperatures vary very little over the year, as indicated. Thus, the flow of air through the ducts is cooled by the relatively cold ground surrounding these ducts during summer and in winter

relatively warm ground preheats the air before it enters the building. A set of fans is used to obtain the required air flow. The necessary air flows are 30,000 m<sup>3</sup>/h for each block.

The building consists of four blocks with two air conditioning systems each one. The proposed solution integrates two heat exchangers air-ground under each building, ie, use a total of eight exchangers.



The heat exchangers should be used for pre-cooling air when t outside temperature is above 14 ° C, and pre-heating when the outside temperature is below 10 ° C. It follows that the heat exchanger should be bypassed (not used) when the outside temperature is between 10 ° C and 14 ° C, since in these conditions there is no need in the building or heating or cooling.

The air-ground heat exchanger saves approximately 17% on cooling and 30% on heating. The total



savings for the four buildings are 280 MWh / year on cooling and 222 MWh / year on heating. All efficiency systems installed get 51% savings on heating and 18.5% on cooling compared to a reference building (that meets at least the rules).

About CO<sub>2</sub> emissions, the building presents significant savings compared to the reference building. The building saves a total of 136 tons/year on CO<sub>2</sub> emissions; 118 tons/year on heating and 18 Ton/year on cooling.

### **Control of the solar radiation**

Solar radiation control on the façades of the courtyards is performed here by design and automation of slats. This process was optimized by dividing the system into four groups of slats which have three subcircuits. The operation of each circuit is independent of the others and their sequences were calculated on the dates and times of highest incidence of radiation for each facade, in each seasonal period defined by solar mechanics relating to the latitude of Merida.



### **Use of natural light**

The Light Control System regulates artificial light depending on the amount of daylight available, ensuring a pleasant working environment and generating significant cost savings, as the excess light is automatically controlled. The control system reads the amount of light in the working plane (provided by natural light and artificial light) and controls the artificial light, so that it always has the same level of illumination.

The savings compared to non-dimmable electronic ballasts ranges from 25 to 55% in new facilities, as in this case. It requires no additional wiring is discreetly integrated into the luminaire.

### **Solar pipes**

The use of these items is another way to save energy through the use of natural light. Solar pipes are a natural lighting system that captures sunlight through domes located on the building's roof and transported several meters into the building along a pipe highly reflective to illuminate 16 remote meeting rooms. The rooms are spread over the four upper floors and illuminated by sun pipes grouped into two modules. Each module consists of a group of 8 pipes of 900 mm diameter.

### **Solar PV system**

The power produced by the modules is converted into alternating current with the same voltage and frequency as the grid to be injected in. In this case, the supply company must pay all the energy produced by the photovoltaic system. In Spain the new rules, in force since December 1998 about PV systems connected to a grid, incorporates a "special status" whereby all the energy produced by these systems is delivered to the grid and will be invoiced by the producer with a special fee, and all



conventional energy consumed from the grid will be invoiced by the company at the prevailing price.

### Photos

