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MEDITERRANEAN BUILDING RETHINKING FOR ENERGY EFFICIENCY IMPROVEMENT

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Europe in the Mediterranean

MED Strategic Project MARIE

(Mediterranean Building Rethinking for Energy Efficiency Improvement)

Presented by: **Thanos Papotis**, Production & Management Engineer (EUROCONSULTANTS S.A.), Technical Consultant of ANKO

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BEE RES 2014 Conference
TEI of Western Macedonia, Kozani, 1-3 June 2014

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PEEBPE
Promotion of Energy Efficiency in Buildings & Protection of the Environment

The MARIE Project – Basic Data

Project Acronym: **MARIE** → "**M**editerr**A**nean Building **R**ethinking for **E**nergy **E**fficiency **I**mprovement"

"to promote the principles of energy efficiency in buildings implementation"

- ✓ A Strategic Project of the **2007-2013 MED Programme**
- ✓ Project Start: **April 2011**
- ✓ Project End: **December 2014**

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- ✓ MARIE Project Web-site: **http://www.marie-medstrategic.eu**
- ✓ MARIE Platform: **http://www.marieapp.eu**

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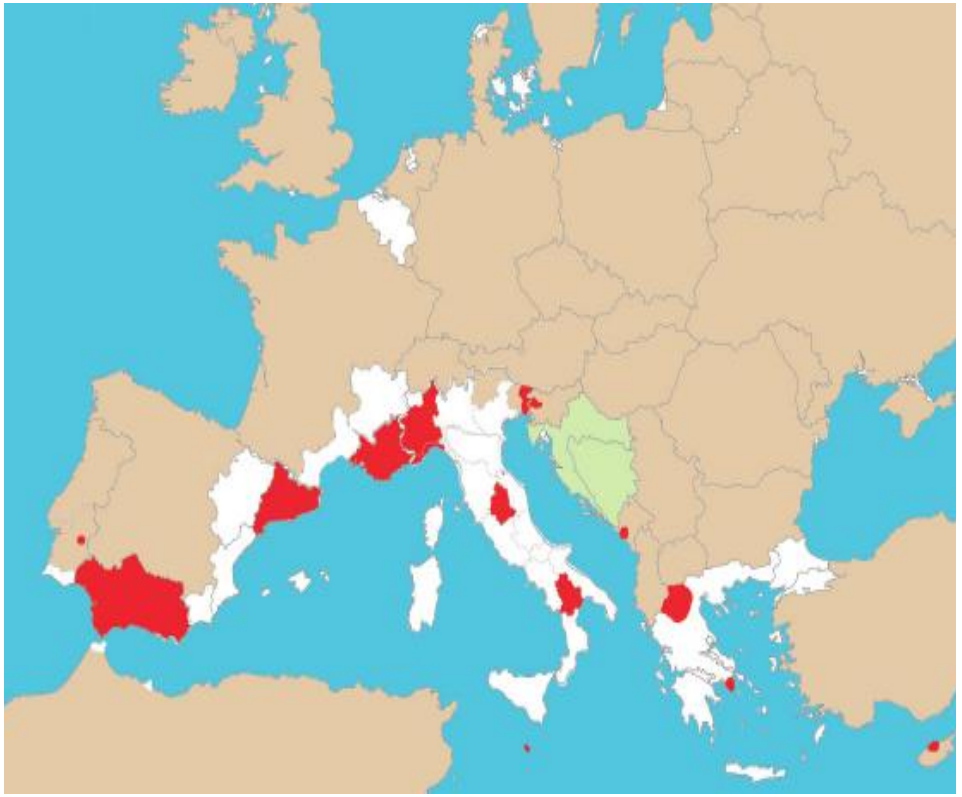
MARIE Project Partners

Zone MED
Zone IPA
Zone MARIE



23 Partners from **9** European countries from the MED area (Spain, Portugal, France, Italy, Slovenia, Greece, Malta, Cyprus, Montenegro)

Lead Partner: Government of Catalonia, Department of Territory and Sustainability

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MARIE Project Partners

- ✓ The different nature & scale of Partners offers a comprehensive coverage of the Med Space and it will permit direct capitalization in at least 13 Med Regions / Areas / Countries:
  - Andalusia & Catalonia (Spain)
  - Provence Alpes Côte d'Azur (France)
  - Liguria, Piedmont, Friuli Venezia, Basilicata, Umbria (Italy)
  - Primorska (Slovenia)
  - Alentejo (Portugal)
  - Western Macedonia (Greece)
  - Bar Municipality (Montenegro)
  - Malta,

which account for a population of **~ 30 millions of inhabitants**

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Why a MED Project in Energy Efficiency?

- ✓ The achievement of **EU2020 energy efficiency objectives** in EU Med countries will depend on the strategic investments in Med space of European funds

- ✓ The energy consumption trend in MED regions buildings is higher than the EU average and against the EU2020 targets

- ✓ Considering the difficulties for MED countries to reach in 2020 the EU objectives, the 23 MARIE partners have agreed to work together in developing the **Mediterranean Building Energy Efficiency Improvement Strategy (MEDBEES)** in order to intensify, motivate and facilitate the public and private efforts to that direction

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Conclusions From Data Compiled So Far

1) The MARIE Zone building stock is large: **> 10 million buildings** and **> 30 million homes**

2) The building stock is ancient & energy inefficient: majority of buildings constructed **before 1980**, without insolation, and prior to inclusion of effective energy efficiency criteria in building regulations

3) In residential buildings, final energy consumption varies **from 90 kWh/m² to 150 kWh/m²** (useful area) and space heating is always the most significant energy requirement varying from **40% to 65%** of total consumption

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Conclusions From Data Compiled So Far

4) 30 - 40% of the people living in Med regions spend more for heating than for rent!

5) The current energy efficiency refurbishment rates in the MARIE regions ranges from **0.12% to 0.26%**. This rate is **2-3 times lower** than the average energy refurbishment rate in north-western EU countries. This very slow refurbishment rate in the Med area further demonstrates the need for urgent policy action

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Main Barriers Identified

- ✓ Incomplete, unshared, unstable, spread or asymmetric information on energy efficiency issues
- ✓ Lack of detailed information on the characteristics of the building stock
- ✓ Lack of awareness among users on the benefits of energy efficiency investments in the long run
- ✓ Unclear, unstable and short-term oriented legislative framework
- ✓ Incapacity of conventional financial instruments

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Main Barriers Identified

- ✓ Lack of motivation for energy efficiency in users: the issues of aesthetics, bigger space, fashion and updating, well-being, reducing noise are the most important motivations for refurbishment → As a consequence, there is a distortion between public policies (EE focus only) and consumer behavior

- ✓ Lack of technical skills and know how at all levels of the supply side

- ✓ Poor integration of european, national, regional and local policies, and of the related administrative bodies, regarding energy efficiency and renewable energy sources

MARIE Project Basic Goals

- ✓ "to promote the principles of energy efficiency in buildings implementation in the MED area by building a new Energy Renovation Strategy (MEDBEES) around the Mediterranean"

- ✓ *"to establish the socio-economic conditions for energy efficiency improvement in the Med building stock in the framework of EU policy objectives, overcoming **barriers** and creating sustainable development opportunities in the MED area"*

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Specific Objectives

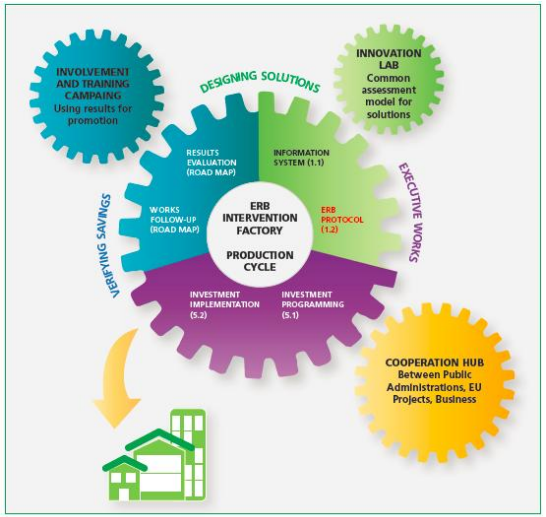
- ✓ Adaptation & update of integrated urban and regional regulations for sustainable energy renovation of existing buildings
- ✓ Innovation of financing models for energy renovation of existing buildings, based on public-private synergies and the integration of funding sources
- ✓ The improvement and innovation in the supply of materials, products and services adapted to the current needs of energy renovation of existing buildings

The MEDBEE Strategy

- ✓ In order to achieve these objectives it has been defined a MARIE strategy: the Mediterranean Building Energy Efficiency Strategy (MEDBEES), comprising 5 Strategic Lines and 14 Strategic Measures

- ✓ First Draft of the MEDBEES: approved by all MARIE partners on 21st November 2012 in Brussels

- ✓ Each Strategic Measure is associated with one or more Pilot Actions to define and validate their content and their suitability



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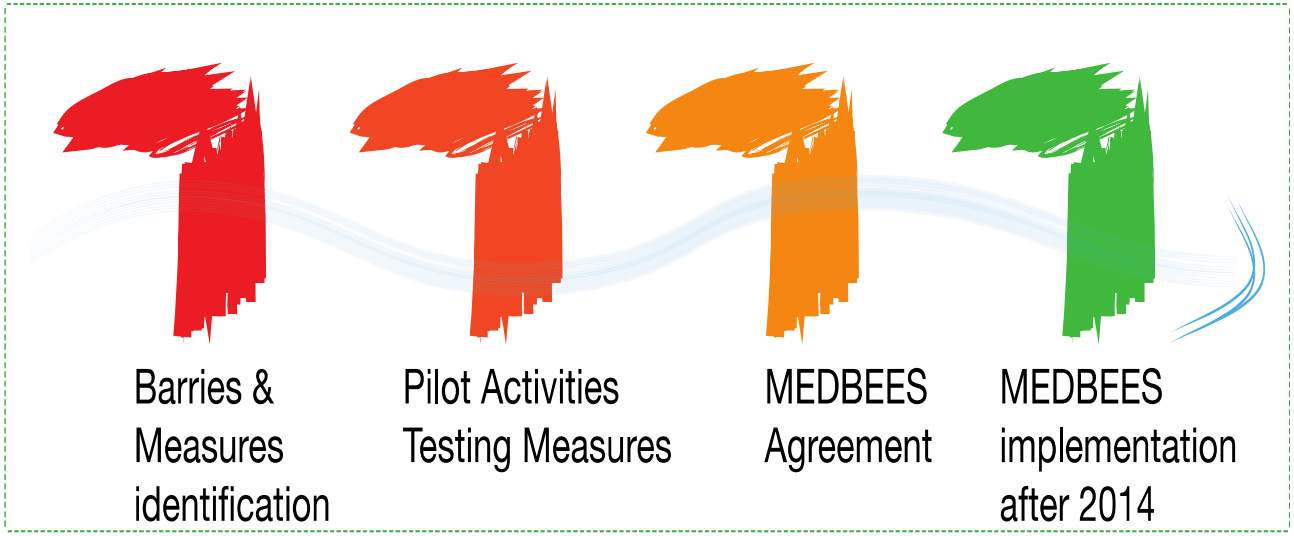
The MEDBEES Construction Process



- ✓ The final Document of MEDBEES will be addressed to policy makers and public and private organizations from all the MED regions, cities and countries that are working to improve energy renovation in buildings

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The MEDBEE Strategy

5 STRATEGIC LINES	
Strategic Line 1:	DEVISING TOOLS FOR ENERGY RENOVATION OF BUILDINGS
Strategic Line 2:	MARKET ACTIVATION FOR ENERGY RENOVATION OF BUILDINGS
Strategic Line 3:	COMPETITIVENESS AND INNOVATION IN BUILDING ENERGY EFFICIENCY
Strategic Line 4:	BUILDINGS' ENERGY EFFICIENCY PUBLIC GOVERNANCE
Strategic Line 5:	ECONOMIC RESOURCES FOR ENERGY RENOVATION OF BUILDINGS

The MEDBEE Strategy

Strategic Line 1:
DEVISING TOOLS FOR ENERGY RENOVATION OF BUILDINGS

- Strategic Measure **1.1.** Information on Buildings Energy Consumption
- Strategic Measure **1.2.** Protocol for Energy renovation of buildings

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The MEDBEE Strategy

Strategic Line 2:

MARKET ACTIVATION FOR ENERGY RENOVATION OF BUILDINGS (ERB)

- Strategic Measure **2.1.** Activate ERB Demand Through Communication and Publicity Plans
- Strategic Measure **2.2.** ERB Supply Activation and Professionals Skills Development
- Strategic Measure **2.3.** Business Cooperation

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The MEDBEE Strategy

Strategic Line 3:

COMPETITIVENESS AND INNOVATION IN BUILDING ENERGY EFFICIENCY

- Strategic Measure **3.1.** Renewable Resources Quota
- Strategic Measure **3.2.** Innovation in Energy Related Products and Equipment
- Strategic Measure **3.3.** Local Services Platforms for Energy Renovation of Buildings
- Strategic Measure **3.4.** Research & Development Initiatives

The MEDBEE Strategy

Strategic Line 4:
BUILDINGS' ENERGY EFFICIENCY PUBLIC GOVERNANCE

- Strategic Measure **4.1.** Alignment of Regional Legislation and Policies to EU Objectives
- Strategic Measure **4.2.** Local Management Integration
- Strategic Measure **4.3.** Experiences and Policy Sharing

The MEDBEE Strategy

Strategic Line 5:

ECONOMIC RESOURCES FOR ENERGY RENOVATION OF BUILDINGS

- Strategic Measure **5.1.** Assignment of Resources Through Regional Investment Programs

- Strategic Measure **5.2.** Implementation of Financial Mechanisms for Mobilization of Resources

  ✓ ANKO is the Responsible Partner for the development of SM 5.2.

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MARIE Pilot Action 2.1: 'Third Party Financing Mechanisms'

- ✓ In the framework of MARIE project WP4 (ANKO: WP4 Coordinator), there are four Pilot Actions implemented
- ✓ In Greece (Region of Western Macedonia), there is one Pilot Action implemented: PA 2.1: "Third Party Financing (TPF) Mechanisms"
- ✓ Scope of PA 2.1.: "To test and evaluate innovative financial mechanisms for energy conservation investments in buildings of the Med area, based on:
  - the Third Party Financing (TPF) approach
  - the Involvement of Energy Service Companies (ESCOs)"

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MARIE Pilot Action 2.1 – The Case of ANKO

Selection of Buildings

- ✓ 2 buildings in the Western Macedonia Region finally selected for the implementation of PA 2.1:
  - The Hospital of “Mpodosakeio” (Ptolemaida)
  - The Administrative Building of West Macedonia Region (ZEP Kozani)
- ✓ 2 different types of buildings: offices building and hospital

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MARIE Pilot Action 2.1

In order to collect all the information needed a one-page questionnaire in GR&EN was prepared and distributed

Building Data for energy efficiency

- Contact person
- Position
- Telephone number/email
- Type of building (eg. gyms)
- Is building rented ?(Y/N)
- If rented, it it registered in the national registry of real estate (Y/N)?
- Building's Owner
- Building's User(in case he is different than Owner
- Total area of building (m2)
- Number of floors
- The roof is flat or tilted
- Building's Address
- Was it built before 1980(Y/N)?
- Has renovation ever took place(Y/N)?
- Operation hours of building:
- Energy Use
- Yearly energy consumption (euro or kWh)-if known
- RES application in/on building(Y/N)?

Please fill in whatever is available or can be available for the energy auditing:

Construction License	☐	Electricity bills for the last 3 years	☐
Building Contract	☐		
Drawings	☐	Heating bills for the last 3 years	☐

Please mention the energy problems observed in the building (if any) or describe preferable energy interventions

- Comments

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The Hospital of “Mpodosakeio” (http://www.mpodosakeio.gr)

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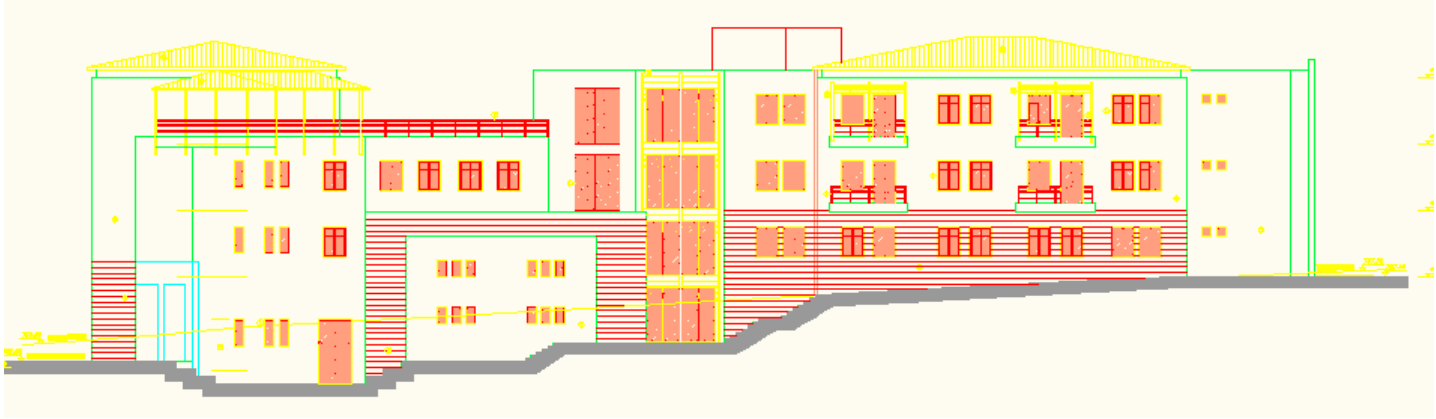
The Hospital of “Mpodosakeio” (http://www.mpodosakeio.gr)

- Ptolemaida
- 20,000 m²
- 5 floors (A Basement-B Basement) A, B, C: Floors
- Flat roof
- Built after 1980
- 24-hours operation
- No refurbishment
- Heating: District heating
- All documents available (Construction License, Building Contract, Drawings, Electricity and heating bills for the last 3 years)

The Administrative Building of West Macedonia Region

(http://www.pdm.gov.gr)



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The Administrative Building of West Macedonia Region

(http://www.pdm.gov.gr)

- ZEP Kozani
- 11,200 m2
- 3 floors & basement
- Tilt roof
- Built after 2000
- No refurbishment
- 7.00-17.00 operational hours
- Heating: District heating
- All documents available (Construction License, Building Contract, Drawings, Electricity and heating bills for the last 3 years)

MARIE Pilot Action 2.1 – State of the Art (end May 2014)

- ✓ Preliminary energy audits to the 2 selected buildings concluded
- ✓ Cost/benefit analysis of possible investment solutions to the 2 selected buildings concluded
- ✓ Setting up of the specifications of the Call for the selection of an Energy Service Company (ESCO) concluded
- ✓ Eligibility criteria: only ESCOs registered in the Greek Registry for ESCOs (www.escoregistry.gr), maintained by the competent department of the Ministry of Environment Energy and Climate Change
- ✓ Tender Procedure for ESCO selection on-going → Submission of Proposals Date: 19th May 2014

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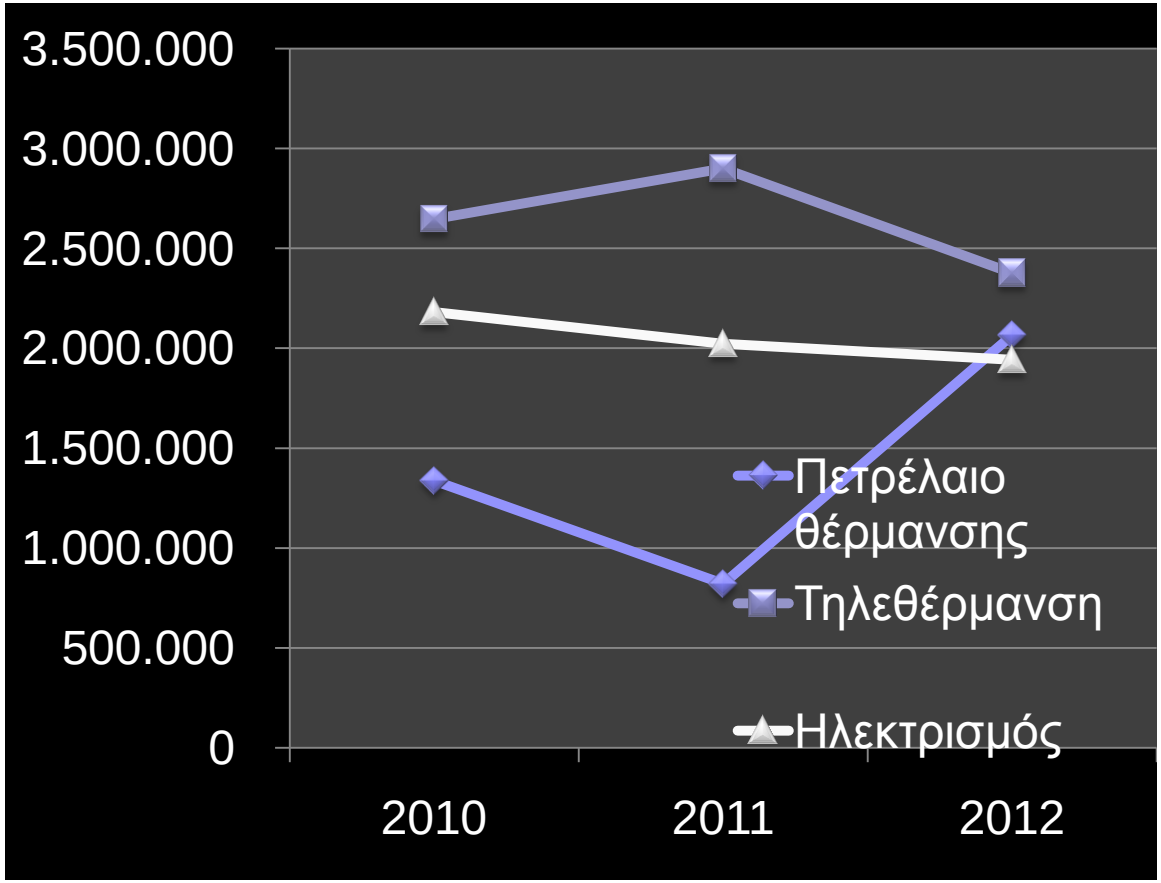
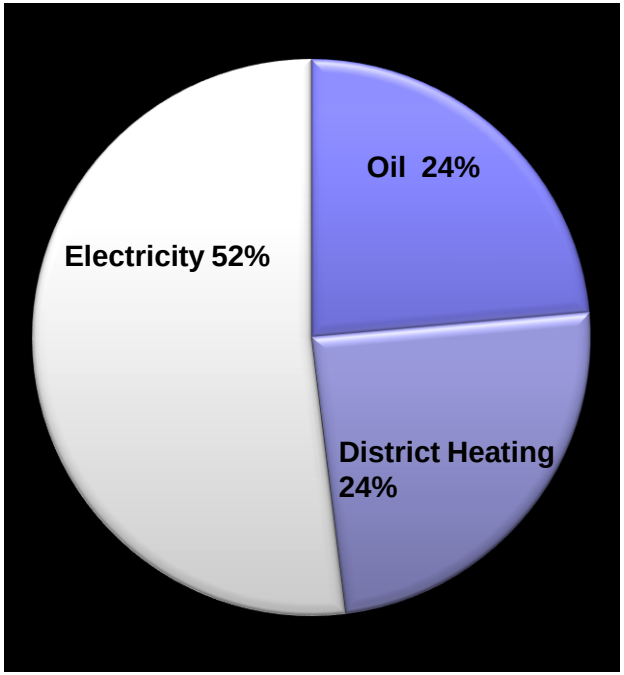
Data analysis for the Hospital of “Mpodosakeio”

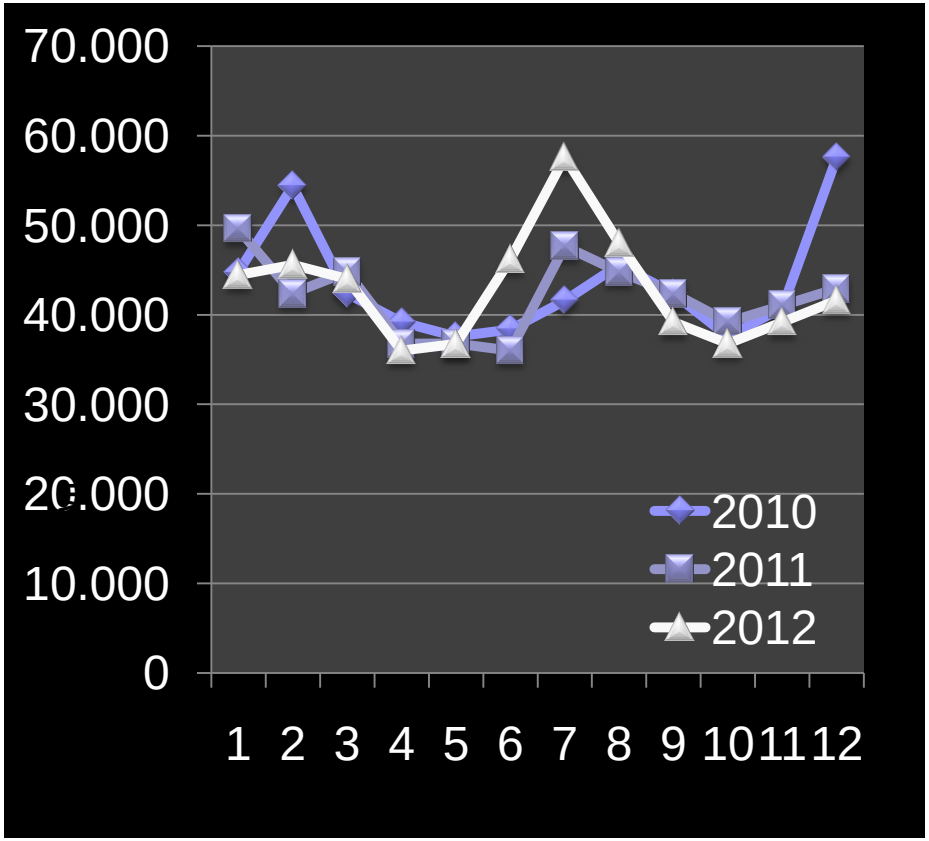


Consumptions of oil, district heating and electricity for 2010, 2011, 2012

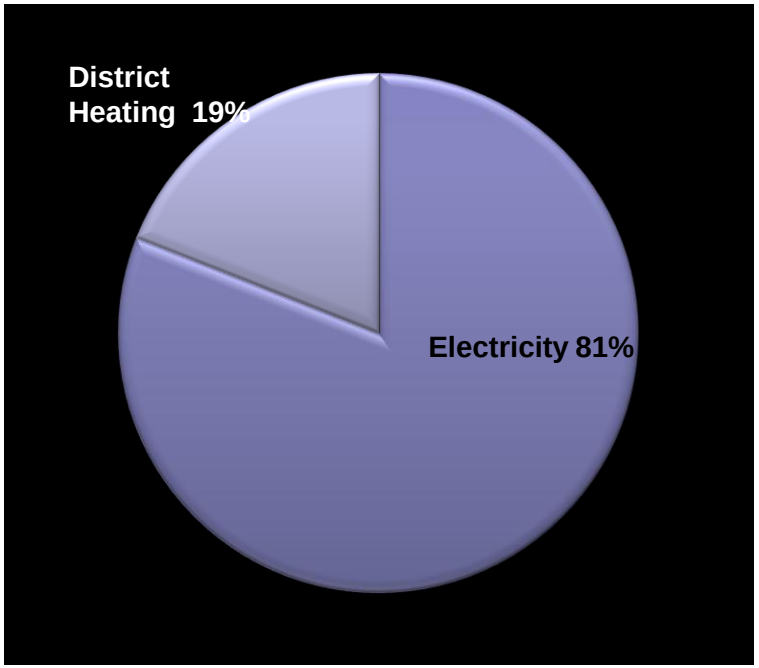


% of operating expenses according to consumptions

Data analysis for the Administrative Building of West Macedonia Region



Electricity consumption 2010, 2011, 2012



% of operating expenses according to consumptions

Conditions for the selection of Energy Efficiency Measures

- ✓ The Energy Efficiency Measures (EEM) proposed are indicative and non-obligatory
- ✓ The measures pay off in short term
- ✓ The interventions are economically feasible and of relatively low cost
- ✓ The economic benefit can be presented even during the MARIE project's duration (end December 2014)
- ✓ The measures applied, will be chosen by the selected ESCO
- ✓ Data provided by the buildings' users

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Evaluation of proposed EEM / Cost-Benefit Analysis

The Hospital of "Mpodosakeio"

a/a	EEM	Investment cost (euro)	Life-cycle duration (years)	IRR	NPV (euro)	Payback	Evaluation
1	Energy saving light bulbs	-12,000	10	16%	4,002	6 years	😐
2	BMS	-290,000	10	100%	1,635,314	1 y & 1m	☺
3	Thermostats compensation	-10,400	20	75%	65,312	1y & 2 m	☺
4	New oil central heating	-24,000	25	83%	185,303	1y&2 m	☺
5	Roof Insulation	-257,450	30	19%	283,025	7.5 years	😐

Evaluation of proposed EEM / Cost-Benefit Analysis

The Administrative Building of West Macedonia Region

a/a	EEM	Investment cost (euro)	Life-cycle duration (years)	IRR	NPV	Payback	Evaluation
1	Energy saving light bulbs	-6,720	10	16%	2,318	6.5 years	😐
2	BMS	-162,400	10	34%	215,071	3.5 years	☺
3	EE windows (N-E) &(N-W) faces	-110,400	30	NA	-93,080	NA	☹
4	Air tightness	-125	5	2,237%	10,987	2 months	☺

MARIE Pilot Action 2.1 – Next Steps (June 2014)

- ✓ ESCOs' Evaluation & Final Selection – Signing of an Energy Performance Contract (EPC) with the selected ESCO for the first time in Greece (June 2014)
- ✓ Definition of TPF - Final selection of EEM - Financial Scheme
- ✓ Supply, Installation & Operation of equipment (June-December 2014)
- ✓ Upon completion of the Pilot Action, Energy Performance Certificates (EPCs) will be issued for the 2 selected buildings
- ✓ Evaluation & Presentation of the Pilot Action results in Western Macedonia – Greece (October-November 2014)

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Energy Efficiency in the Region of Western Macedonia

- ✓ Looking at the general guidelines of the next programming period 2014–2020, **energy efficiency** and **climate change** issues are basic priorities of the Western Macedonia Regions' development policy

- ✓ As MEDBEE Strategy Measures go with these basic priorities, they have been included in the new Regional Operational Programme (ROP) of Western Macedonia Region

- ✓ The endorsement of MARIE measures is supported by the work of the relevant thematic working group "Development of a modern European Energy Region", that has been set up by the General Directory of Programming Development of the Region, along with 9 more, for the preparation of the new ROP 2014 – 2020

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Energy Efficiency in the Region of Western Macedonia

- ✓ The year 2014 can be characterized as **energy savings year** for the Region of Western Macedonia

- ✓ Three energy efficiency projects are being implemented within the Region:
  - ❑ two strategic projects under the MED Programme: MARIE and PROFORBIOMED (www.proforbiomed.eu) projects
  - ❑ one co-financed project of the INTERREG Greece-FYROM Programme 2007-2013: the PEEBPE project (www.peebpe.eu)

- ✓ The Region of Western Macedonia may achieve a leadership position in Greece, by proposing innovative solutions, guidelines and financial tools for energy savings in buildings

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Thank you
for your attention!

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