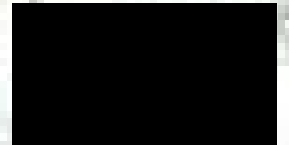


USAID-HELLENIC AID ENERGY COOPERATION
Athens, May 20, 2008

Plans for Project Design
Markos Damasiotis



EE targets in Europe

- Concerning Energy Efficiency the European Directive 2006/32/EC sets in countries-members, an indicative target of 9% of energy saving for the next 9 years and also obliges the countries-members to develop Energy Efficiency Action Plans (in Greece under completion)



Size of the building sector

- In EU countries, building sector consumes 40-45 % of the energy consumption of the country and produces approx. 20% of CO2 emissions.
- During last 30 years energy consumed increased by approximately 30%
- Design EE Programs in building sector is crucial for the achievement of Energy Efficiency Targets

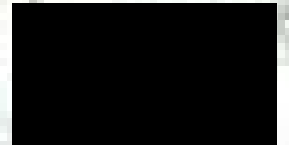


EE in Buildings

Elements of Program Design

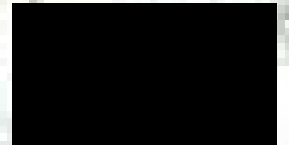
Kind of measures

- **Institutional (set of regulations, national targets, operation of ESCOs...)**
- **Technical (elaboration of codes, methods of measurements and certification, labeling...)**
- **Fiscal and Financial (subsidies, tax exemptions, bank loans,...)**
- **Quality of products and services through norms, certification and technical guidelines**
- **Demonstration projects**
- **Information – Capacity Building.**

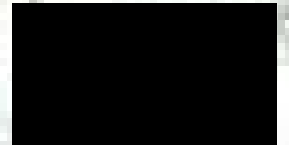


Energy Regulations

- **Regulations on Energy Efficiency in Buildings:** in EU countries there is a need for the implementation of the Directive 2002/91 of the European Parliament and of the Council on the “Energy Performance of Buildings”. Such kind of regulation sets as obligatory the energy design of buildings, specific energy consumption limits (per climate zone) materials properties and performance and calculation methodologies for Heating/Cooling/Lighting.

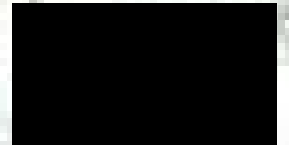


- **Energy Regulations fix, among others, a maximum annual energy consumption in buildings in kWh/m² (in France for example TR 2005 sets a maximum level at 85kWh/m²)**



Certification – Labeling

- **Existence of certification methods for issuing certificates that verify energy performance in buildings according to specific codes.**
- **Depending on the certification a building can be categorised and have a label**



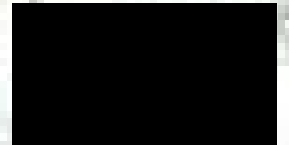
For example in France the different label codes

- Label HPE (high energy performance): 10% less energy consumed than in RT 2005
- Label THPE (very high energy performance): 20% less energy consumed than in RT2005
- Label HPE ENR : HPE & biomass or heating network
- Label THPE ENR: 30% less energy consumed than in RT2005 + (solar hot water and wood or heating network) or (solar hot water and heat) or PV or Heating Pump. Solar collectors should cover at least 50% of the SHW needs and the PVs should cover a production of 25 kWh/m²



In Portugal codes...

- **The RCCTE DL80/2006 that concerns all household buildings and small service buildings, without air conditioning systems, or with air conditioning systems with output of less than 25kW.**
According to this code, it is obligatory to use thermal solar panels for heating sanitary hot water.
- **The RSECE DL79/2006 that concerns large service buildings (greater than 1,000 or 500 m²), small service buildings with air conditioning systems with output of more than 25kW and households with air conditioning systems with output of more than 25kW.**
- **These codes are both for new buildings, for renovating and for extensions of existing buildings.**



Energy Classification and Certificate of Emissions of buildings in Portugal

CERTIFICAÇÃO ENERGÉTICA
E DO AMBIENTE
EDIFÍCIOS

Nº CER 1224-147/2007

**CERTIFICADO DE DESEMPENHO
ENERGÉTICO E DA QUALIDADE DO
AR INTERIOR**

TIPO DE EDIFÍCIO: EDIFÍCIO HABITAÇÃO UNIFAMILIAR / FRACÇÃO AUTÓNOMA DE EDIF. MULTIFAMILIAR
Morada / Situação:

Localidade: _____ Freguesia: _____
Concelho: _____ Reg.º: _____
Data de emissão do certificado: _____ Validade do certificado: _____
Nome do perito qualif.: _____ Número do perito qualif.: _____
Imóvel descrito na: _____ Conservatória do Registo Predial de: _____
sob o nº: _____ Art. matricial nº: _____ Fracção autón.: _____

Este certificado resulta de uma avaliação técnica do edifício no âmbito ambiental, por um perito devidamente qualificado para o efeito, em relação aos requisitos previstos no Regulamento de Classificação de Consumo Técnico de Edifícios (RCEE) Decreto-Lei 55/2016 de 1 de Abril, classificado o imóvel em relação ao seu consumo energético. Este certificado poderá ser reclassificado periodicamente, de acordo com a evolução da tecnologia aplicada à energia nos edifícios, assegurando a respetiva eficiência energética e sustentabilidade, quer no que respeita ao desempenho ambiental, quer no que respeita à qualidade do ar interior.

1. ETIQUETA DE DESEMPENHO ENERGÉTICO

INDICADORES DE DESEMPENHO

Necessidades anuais globais estimadas de energia útil para climatização e águas quentes: kWh/m².ano

Necessidades anuais globais estimadas de energia primária para climatização e águas quentes: ktep/m².ano

Valor limite máximo regulamentar para as necessidades anuais globais de energia primária para climatização e águas quentes: ktep/m².ano

Emissões anuais de gases de efeito de estufa associadas à energia primária para climatização e águas quentes: Toneladas de CO₂ equivalentes por ano

CLASSE ENERGÉTICA

2. DESAGREGAÇÃO DAS NECESSIDADES NOMINAIS DE ENERGIA ÚTIL

Necessidades nominais de energia útil para:	Valor estimado para as condições de conforto técnico de referência	Valor limite regulamentar para as necessidades anuais
Aquecimento	kWh/m².ano	kWh/m².ano
Arrefecimento	kWh/m².ano	kWh/m².ano
Preparação das águas quentes sanitárias	kWh/m².ano	kWh/m².ano

NOTAS EXPLICATIVAS

As necessidades anuais globais estimadas de energia útil compreendem a soma global e da quantidade de energia, por todo o ano, consumida por m² de área útil do edifício, ou fracção autónoma, para manter o edifício nas condições de conforto técnico de referência e para a produção de água quente sanitária, incluindo as necessidades de aquecimento, arrefecimento e água quente sanitária, bem como as necessidades de energia elétrica para os sistemas de ventilação mecânica, incluindo os sistemas de ventilação mecânica com recuperação de energia, bem como as necessidades de energia elétrica para os sistemas de climatização e águas quentes sanitárias.

As necessidades anuais globais de energia primária estimadas e o valor limite regulamentar para as necessidades anuais globais de energia primária para climatização e águas quentes, são expressas em ktep/m².ano.

As emissões anuais de gases de efeito de estufa associadas à energia primária para climatização e águas quentes, são expressas em toneladas de CO₂ equivalentes por ano.

Os valores de CO₂ equivalentes incluem a quantidade anual estimada de gases de efeito de estufa que podem ser libertados em resultado da utilização de uma quantidade de energia primária que, nas condições técnicas de referência, para o edifício, assegure o fator de cobertura de 0,025 toneladas equivalentes de CO₂ por ktep.

A classe energética resulta da soma das necessidades anuais globais estimadas de energia primária para climatização e águas quentes, bem como das necessidades de energia elétrica para os sistemas de climatização e águas quentes sanitárias, e é expressa em classes de A+ a G, de acordo com o fator de cobertura de 0,025 toneladas equivalentes de CO₂ por ktep.

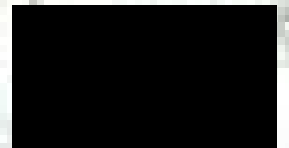
Para mais informações e esclarecimentos, consulte a legislação em vigor e a documentação técnica de referência.

Desenho e aprovação: **Ministério do Ambiente e do Clima**

Desenho e aprovação: **República Portuguesa**

Construction permits / Diagnosis of Energy Performance

- Construction permits: extra coefficient of construction is applied, provided the construction has high energy performance (in relation to predefined standard) and renewable energy installations are applied.
- “Diagnosis of energy performance” (DPE) is obligatory for any selling of existing buildings and for any type of rental contract. The DPE is a document which includes the quantified consumed or estimated energy for a standard use of the building. It is accompanied by recommendations for improving the energy performance of the building, including the replacement of equipment.

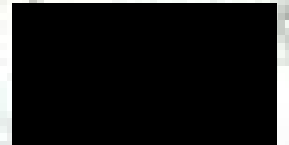


ESCOs

An ESCO is a single firm that manages and coordinates all phases of an energy project and provides many types of services.

Typical services provided by most ESCOs:

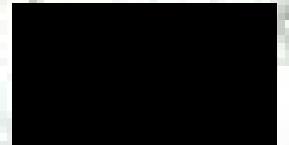
- Energy audit
- Construction management services, including preparation of performance specifications, project design and project commissioning
- Project financing
- Project monitoring and guarantee of energy savings
- Equipment maintenance and effective operation



The concept of ESCOs financing mechanism

In a power purchase agreement, the ESCO maintains ownership of the generating assets and sells commodity (e.g., electricity, steam, hot water) to the customer. The contract specifies a guaranteed price and/or amenity output level that must be met by the ESCO, so it can be considered performance-based.

E



Third Party Financing

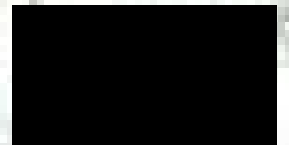
- TPF is a contractual agreement in which a third part (so called Third Financier) is participating in an investment realization further than provider and end-user (beneficiary user) in various ways.
- TF usually provides the capitals for the measure implementation for the energy service supplied and charges the beneficiary user a fee equal to a part of the energy saving which is achieved based on the energy improvement measure.
- The most common types of TPF Contacts are:
 1. Energy Performance Contracting (EPC)
 2. Leasing of the equipment



(Guaranteed) Energy Performance Contract (EPC)

EPC is a funding or operational leasing supplied by an ESCO or by an equipment manufacturer. The special point of this contract is the guarantee which offers (the provider) to the beneficiary user that through the installation and use of the new equipment will save energy

The mechanism of EPC is based mostly on the TPF scheme



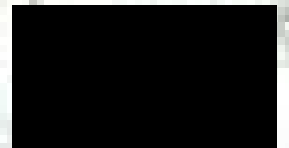
Other elements of EE Program

- Labeling of domestic electric appliances
- Certification – standardization of materials / equipment
- Training / information (general public, technicians, civil, mechanical, electrical engineers, architects, decision makers, ...)
- Demonstration pilots



Financial / Fiscal tools for Energy Efficiency interventions in buildings

- **Tax incentives; for thermal insulation, appliances for regulating heating and RES domestic technologies and heat pumps, contributing to energy saving**
- **Subsidisation of pre-studies**
- **Subsidisation of studies**
- **Subsidisation of the works (€/m²) with a limit of certain percentage of total cost**
- **Bank loans**
- **Third Party Financing**



Solar technologies are very suitable for EE in buildings

- **Specific incentives for incorporation of solar technologies in buildings (active solar for heating and cooling and photovoltaics)**



The successful solar experience of Greece

- High solar radiation, climatic conditions and morphology of the country
- Successful marketing campaigns
- Legislative support and incentives at early stage
- Broad dissemination of the technology (advertisements, information brochures, demonstration projects, etc.)
- Public acceptance
- Continuous effort from the manufacturers for better and cheaper products
- Easy access of solar thermal products.
- Competitive feed in tariffs for domestic pv pannels (450€/MWh for interconnected system and 500€/MWh for islands)



Thank you for the attention!

Markos Damasiotis

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