

**PRO-ENERGY**  
**“Promoting Energy Efficiency in Public Buildings  
of the Balkan-Mediterranean Territory”**

**WP3:** Joint Regional Analysis, Strategy and Framework”

**DELIVERABLE NUMBER: 3.2.1**

**TITLE OF DELIVERABLE:** Good Practices’ identification at regional/national/international level

**PARTNER IN CHARGE:** Cyprus Energy Agency – CEA

Greece  
Development Agency of Evia S.A.  
11/2020

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## 1. Definition of criteria for selecting good practices on energy efficiency interventions and overall methodology and tools

"What is a "good practice"? why it is important? How it can choose and assessed?" are some of the questions that this part is about to answer regarding good practices on energy efficiency interventions.

According to the Knowledge Forum of FAO - UN<sup>1</sup>, "Good Practice is simply a process or a methodology that represents the most effective way of achieving a specific objective" or another way of defining a good practice is "one that has been proven to work well and produce good results, and is therefore recommended as a model". The essence of identifying and sharing good practices is to learn from others and to re-use knowledge. The biggest benefit consists in well-developed processes based on accumulated experience<sup>2</sup>.

The criteria<sup>3</sup> that can be used for the identification for an initiative as a good practice are:

- Effective and successful (produce tangible results)
- Improvement of the environment (protecting the environment)
- Improvement in the socio-economic environment of the area / region.
- Socially acceptable (not offend or disturb social attitudes)
- Technically practicable (usable by people in their everyday life)
- Cost effectiveness (affordable alternative of other practices)
- Inherently participatory (common participation of stakeholders, community, partners)
- Replicable and adaptable
- Innovation
- Preservation / sustainability (economic development, social development, and environmental protection)

*But what is the aim of a Good practice?*

First, it aims at evolving become better as improvements are discovered. Moreover, it aims at following a standard way of doing things as well as at maintaining quality as an alternative to mandatory legislated standards and can be based on self-assessment and benchmarking<sup>4</sup>.

Regarding the identification of good practices, their aim is to highlight several local / regional / national / European / International good practices related to the energy efficiency interventions in public buildings.

This collection will be achieved via desk research – and/or field research if necessary- according to a specific template, described below.

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<sup>1</sup> Food and Agriculture Organization of the United Nations, <http://www.fao.org/knowledge/goodpractices/gp-definitionsandcriteria/gp-definitions/en/>

<sup>2</sup> Identifying and Sharing Good Practices, [SDC Knowledge Management Toolkit](#) (2004)

<sup>3</sup> Food and Agriculture Organization of the United Nations, <http://www.fao.org/knowledge/goodpractices/gp-definitionsandcriteria/gp-definitions/en/>

<sup>4</sup> [http://en.wikipedia.org/wiki/Best\\_practice](http://en.wikipedia.org/wiki/Best_practice)

## 2. Identification of good practices in relation to energy efficiency interventions (focus on public buildings and behavioural change).

### 2.1 Good Practice - #1

<p><b>Name of the building:</b></p> <p>Technical University of Crete (TUC), Greece</p>
<p><b>Title of the good practice</b></p> <p>Green University Strategy for TUC</p>
<p><b>Does this practice come from a European funding program?</b></p> <p>The practice came from Interreg Europe/ Rebus Project</p>
<p><b>Short Summary of the practice</b></p> <p>Creation of a Green University which shall act as an "open lab" for research and technology according to sustainable development. In addition, a series of energy refurbishment interventions have taken place in order to increase energy efficiency scores of the institution and deteriorate relevant costs. Energy reduction measures focused on two directions, namely:</p> <ul style="list-style-type: none"> <li>- Analyze energy data in order to assess potential savings and</li> <li>- Implement actions towards energy saving direction.</li> </ul>
<p><b>Detailed information on the practice</b></p> <p>The idea of a "Green University" emerged as a necessity in the TUC community, both because of the economic impasse caused by the economic crisis in Greece but also because of the capacity and the will to sustainably transform the Campus.</p> <p>TUC's Sustainable Development Plan aims at measurable results, promoting the creation of an "open lab" for research and technology in sustainable development.</p> <p>This process will raise awareness in the TUC community and in the local society.</p> <p>The TUC Campus is one of the best in Greece, with modern lecture halls and research facilities.</p> <p>TUC's operational budget for 2015 was approx. 60% lower than 2008, corresponding to 1.2 mn €.</p> <p>Energy related expenses for 2012 were 762 k €, which corresponded to 30% of the institution's total OPEX (operating expenses).</p> <p>Furthermore, freshmen students increased by 25% in 2014 and by 15% in 2015. Given the cumulative effect of the students increase on the OPEX, it has been estimated that the problem would intensify in the next 5 years, so it was urgent to deploy a plan for energy saving and cost reduction.</p> <p>As a result, a viability action plan was introduced, focusing on the mid-term target to decrease energy consumption by 20%.</p> <p>The plan included actions towards Reduction of energy and water consumption, paper usage reduction and recycling.</p> <p>Energy reduction measures focused on two directions: that of measuring and analyzing energy consumption data in order to come up with potential savings and that of undertaking immediate actions towards energy saving and establishing quick wins.</p>

The total procurement and installation cost for the acquired equipment – including, among others, measure devices, heat pumps, upgraded lighting equipment, air conditioning units, new doors and windows, amounted to 470,000 €, while maintenance costs equal to 5.500 €/year.

The cooperation among the University's Administration, the Institution's Technical Services, the staff (professors' personnel and supporting employees) and the students has been a sine qua non parameter for the project's successful implementation.

### Evidence of success

- Minimized heating oil expense from 133,389 € in 2012 to 44,135 € in 2014.
- Reduced electricity consumption from 4,350 MWh in 2012 to 3,702 MWh in 2014.
- Total energy expenditure decreased by 17.6% from €762,668 in 2012 to €628,352 in 2014.

### Challenges encountered

The successful implementation of the Green strategy was based on the cooperation among the involved stakeholders (Administration, Technical Service, staff and students).

To this purpose, a series of means have been used in order to increase the users' awareness and to provide them with proper guidelines for energy saving. The relevant toolkit included Web campaigns, banners, student contests etc.

### Potential for learning or transfer

- Energy saving targets: Aiming at reducing the total energy consumption by 20%, all parties involved made a bid to minimize oil consumption and reduce electricity consumption.
- Simple and feasible actions: Public awareness, Upgraded lighting equipment, Reconstruction of student residence, new water heaters, heat pump for DHW supply and solar thermal utilization, new air-conditioning units, thermally interrupted aluminium windows with low thermal transmission glass, new heat pumps, automatic control system of central air-conditioning units.
- Transferability: The TUC strategy can be easily replicated. The engagement of everyone involved is of major importance. Building a database is also crucial. All actions related to monitoring the action plan are applicable to every public building.

Creating databases-Innovation in monitoring: Electricity consumption is being recorded, using a software that produces an energy map depicting energy consumption of all its main units.

### Further information

<https://www.interregeurope.eu/policylearning/good-practices/item/1235/green-university-strategy-for-tuc/>

<https://www.interregeurope.eu/rebus/>

### Photo



## 2.2 Good Practice - #2

### Name of the building:

Centre of Architecture and Municipal Library, City of Thessaloniki, Greece

### Title of the good practice

Energy upgrade of the Centre of Architecture and the Central Municipal Library Buildings

### Does this practice come from a European funding program?

The practice came from Interreg Europe/ Support Project, while project implementation was funded through EU structural funds.

### Short Summary of the practice

The good practice consists of implementing a series of energy refurbishment actions in the Centre of Architecture as well as the Municipal Library in Thessaloniki.

### Detailed information on the practice

The project was implemented the period between March 2015 – October 2016.

It refers to the renovation and energy refurbishment of two (2) municipal buildings in the City of Thessaloniki in Central Macedonia, namely the Centre of Architecture – which is a mainly office building – and the central Municipal Library. The total heating area for both public building equals to more than 5,000 sq. meters.

In particular, the implemented actions aiming at improving the buildings' energy efficiency include:

- The replacement of the window frames with new pieces of increased efficiency
- The installation of roof and wall insulation in order to upgrade temperature conditions within both buildings
- The replacement of old technology light bulbs with LED lighting combined with the installation of occupancy sensors
- The full replacement of HVAC systems, along with the installation of HVAC controls

The Municipality of Thessaloniki is the main beneficiary of the project, since the buildings remain at its disposal.

The construction budget amounted to 1,680,350 €. The implementation was financed by the National Strategic Reference Framework 2007-2013 (the program under which EU structural funding is being implemented in Greece).

### Evidence of success

According to the energy study and the relevant energy audits, the energy savings are estimated at approximately 366 MWh per year and the CO<sub>2</sub> reduction at approximately 258 tns per year.

### Challenges encountered

Such projects depend on funding sources, which are directly relevant to regional policies and state programs. The Operational Programs (OP) provide opportunities to use these funds in line with the pertinent OP policies.

### Potential for learning or transfer



The project is integrated to the implementation of the Sustainable Energy Action Plan of the Municipality. The overall intervention constitutes a good practice for similar intervention at other public buildings, since the municipal building accumulates important public activities.

Furthermore, the constant interaction with citizens may lead to spreading energy efficiency awareness to general public.

**Further information**

<https://www.interregeurope.eu/policylearning/good-practices/item/1812/energy-upgrade-of-the-centre-of-architecture-and-the-central-municipal-library-buildings/>

**Photo**

I. Photo of the Centre of Architecture	II. Photo of the Municipal Library
	

## 2.3 Good Practice - #3

<p><b>Name of the building:</b></p> <p>3<sup>rd</sup> Primary School of Rethymno, Greece</p>
<p><b>Title of the good practice</b></p> <p>Use of Internet in the 3<sup>rd</sup> Primary School of Rethymno</p>
<p><b>Does this practice come from a European funding program?</b></p> <p>Intelligent Energy Europe Programme of the European Union / EURONET 50/50 MAX</p>
<p><b>Short Summary of the practice</b></p> <p>The students implemented a wide range of activities, from homework during the lessons, such as creating subjects paintings and posters promoting energy saving, up to extracurricular activities, such as educational trips to waste treatment facilities and participation in thematic energy saving events.</p> <p>The school showed excellent performance in raising the awareness of the students and teachers, as well as that of the wider society, on the importance and methodology of energy saving, by intelligently using popular social networking tools such as Blogging, YouTube and Pinterest in order to convey the message of efficient energy saving to the general public.</p>
<p><b>Detailed information on the practice</b></p> <p>The main goal of this action was to raise energy awareness of participating students and teachers.</p> <p>To this point, energy teams were set up and energy inspections have taken place, using the EURONET 50/50 MAX methodology and equipment.</p> <p>The members of the energy teams recorded the state of play of their school regarding energy consumption and identified problematic issues.</p> <p>Having understood the energy consuming peculiarities of their school building, the participating students started thinking about the best ways to promote the message of energy saving and improve energy consumption habits of the building users.</p> <p>Moreover, having realized that a significant change in the energy output of the school can be achieved with cost-effective ways, they took their promotional campaign one step further by using all means available to them (mainly popular Internet applications and social media) to raise public awareness on energy-saving issues.</p> <p>Within this very framework, the set of materials and tools that have been used, include – among others:</p> <ul style="list-style-type: none"> <li>• A thematic YouTube video comprising of students' drawings and accompanied by appropriate informative text. <b>YouTube link:</b> <a href="https://youtu.be/xzQqKuqC1n8">https://youtu.be/xzQqKuqC1n8</a></li> <li>• A Pinterest account where among other educational posts one can access thematic information tables, relevant to the protection of the environment and energy saving. <b>Pinterest link:</b> <a href="https://qr.pinterest.com/iliasteacher/">https://qr.pinterest.com/iliasteacher/</a></li> <li>• Thematic posters and essays regarding environmental protection and energy saving tactics displayed on the school corridors to raise awareness of non-participating parties. All the materials were published on the participating class' website. <b>Class website link:</b> <a href="http://iliasfarmakisefimerida.weebly.com">http://iliasfarmakisefimerida.weebly.com</a></li> </ul>



Involved acting parties included a member of the teachers' personnel as well as – on students' part - energy teams comprising of students from classes D2 and E2 of the 3rd Primary School of Rethymno (academic years 2014 – 2015, 2015 – 2016).

Moreover, the Regional Authorities of Crete, involved students' families and the non-participating in the energy teams pupils shall also be considered as additional project stakeholders.

Last but not least, it is noted that in other types of public building the methodology is very similar, although specific purpose and use of the building needs to be strongly considered when establishing the energy team and planning optimization measures.

The 50/50 methodology can help local authorities demonstrate their role in energy saving and in reaching local climate & energy targets.

### Evidence of success

The following table depicts energy savings achieved during the year 2015, when the EURONET 50/50 MAX program was actively implemented in the 3<sup>rd</sup> Primary School of Rethymno:

Year of program implementation	Energy savings achieved			
	<i>in kW</i>	<i>in %</i>	<i>in EUR</i>	<i>in t CO2</i>
<b>2015</b>	1,424	13.92	156.64	0.66

### Challenges encountered

One of the challenges encountered was the fact that a great variety and combination of information sessions (either in the form of indoor sessions or external educational visits) and creative activities were necessary to keep the interest and motivation of the students and their focus on program's objectives.

Once the students, however, realized the importance of the project, they tackled it passionately, thinking of creative ways to achieve energy saving in the school building, as well as to promote the message of energy saving outside their school.

In addition, a further challenge was the development of promotional tools concerning the raise of environmental awareness using a limited budget.

The participants involved, however, showed great ingenuity and flexibility in finding clever and cost – effective ways to streamline their environmental campaign by making use of social media platforms, thus spreading their message beyond their institution's environment.

### Potential for learning or transfer

As presented above, there were significant energy savings achieved by this school during the project's implementation. However, the best practice so far was the way that involved energy teams spread the message of energy saving using a variety of on-line tools and media, expertly exerting their enthusiasm and creativity along the way.

Various actions of the energy teams, who are using appropriate internet tools, constitute a good communication model that other schools could replicate to promote the concept of energy saving to the wider audience. Hence, the case of the 3rd Primary School of Rethymno has been included as a best practice in the EURONET 50/50 MAX methodology guidebook, thus enhancing transferability of project's results.

In addition, the 50/50 methodology can be implemented in any public building, provided that its energy bills are covered from municipal budget (therefore achieved savings mean savings both for the Local Authorities and the building itself).

The methodology for calculating energy and financial savings is very simple (yet includes all important aspects, like weather conditions in a given year) and can be applied to any kind of buildings. The calculations

can be based on the data gathered from invoices or energy meters, so no sophisticated energy monitoring systems are necessary.



Large part of the methodology is focusing on capacitating building users to optimise energy use. A lot of useful methodological and educational material is gathered on the project website. The model contract on the 50/50 implementation (signed between the local authority and the building manager) is available on-line and can be adapted to different local conditions.

#### Further information

<http://www.euronet50-50max.eu/en/>

<http://3dim-rethymn.reth.sch.gr/>

#### Photo

Photo of the public building	Photo of the energy team
	

## 2.4 Good Practice - #4

<p><b>Name of the building:</b></p> <p>Nursing Home in Zochcinek, Poland</p>
<p><b>Title of the good practice</b></p> <p>Thermo-modernization of public buildings in the Poviato of Opatow - Nursing Home in Zochcinek</p>
<p><b>Does this practice come from a European funding program?</b></p> <p>The practice came from Interreg Europe/ Enerselves Project</p>
<p><b>Short Summary of the practice</b></p> <p>Thermo-modernization of public buildings in the Poviato of Opatow: House of Social Assistance in Zochcinek, building A, B and 5.</p>
<p><b>Detailed information on the practice</b></p> <p>The practice concerns the modernization of four buildings of the Nursing Home in Zochcinek, Poland.</p> <p>Building "A" was established in 1992. Due to the fact that external walls do not meet the requirements in the field of thermal standards, their insulation is planned by gluing styrofoam boards. In the case of walls in the attic, it is planned to protect the wool with PE foil.</p> <p>The ceiling under unheated attic is planned to be insulated with mineral wool and secured with PE foil. As part of thermo-modernization projects, it is planned to replace the window frames in the basement with a new one on PVC profiles. As part of the planned works, the construction of a gas absorption heat pump and central heating installation is also planned.</p> <p>As a result of thermal modernization, the facilities will be supplied from the gas installation.</p> <p>Building "B" comes from 2002. The building is planned to replace the oil boiler and replace the central heating system, replace the CWU installation and the construction of new heat storage tanks, external insulation of external walls by gluing polystyrene boards and replacement of window frames for new ones on PVC profiles. Building "5" was created in 1994.</p> <p>Due to the fact that the ceiling under an unheated attic does not meet the requirements in the field of thermal insulation, it is planned to be insulated with mineral wool and protected with PE foil. In addition, it is planned to perform the modernization of the heating system.</p> <p>According to the project, about 1 mn Euro was allocated to construction works. The works were co-financed from the funds of the Regional Operational Program of the Świętokrzyskie Voivodeship for the years 2014-2020, Measure 3.3 "Improvement of energy efficiency in the public and residential sector"</p>
<p><b>Evidence of success</b></p> <p>Construction works are being carried out as part of this task.</p> <p>Performed, among others insulating ceilings, external walls, window carpentry has been replaced.</p> <p>Works related to the installation of photovoltaic panels, heat pumps and the installation of a gas installation are in progress.</p> <p>Additional effects: significant reduction of carbon dioxide emissions (66%) and an increase in the share of renewable energy sources in the overall balance of energy demand, reaching 10.2%.</p>

### Challenges encountered

In the course of the contract, there were doubts of contractors whether for installation of gas heat pumps and other construction works outside the outline of the building should apply 23% VAT rate and whether for works within the building should apply an 8% VAT rate.

### Potential for learning or transfer

The described investment, which will be implemented under the project called "Thermo-modernization of public buildings in the Poviát of Opatów", shows that thermomodernization should be approached comprehensively, interfering with both in the central heating installation, installation for preparing hot tap water, window and door woodwork, insulation of walls or ceiling, but taking into account social factors.

The Social Welfare Home in Zochcinek supports people in need, supports families, strives for a dignified standard of living, and acts as a center of cultural activity.

The area organizes events and events covering the residents of not only the inhabitants of the village of Zochcinek or the Opatów Commune, but also the whole of the Opatów district.

The thermo-modernization carried out will contribute to achieving the desired ecological and economic effects and will significantly improve the standard of living of the charges of the center and the staff.

### Further information

<https://www.interregeurope.eu/policylearning/good-practices/item/877/thermo-modernization-of-public-buildings-in-the-poviat-of-opatow-nursing-home-in-zochcinek/>

### Photo



## 2.5 Good Practice - #5

<p><b>Name of the building:</b></p> <p>Municipal Public Building in Tivoli Municipality, Italy</p>
<p><b>Title of the good practice</b></p> <p>Energy refurbishment of public building according to environmental minimum criteria.</p>
<p><b>Does this practice come from a European funding program?</b></p> <p>The practice came from Interreg Europe/ Support Project. In addition, the refurbishment project was funded by structural EU funds.</p>
<p><b>Short Summary of the practice</b></p> <p>Energy efficiency interventions on public building. Pilot project to define invitation to tender "Product specification" to Environmental Minimum Criteria.</p>
<p><b>Detailed information on the practice</b></p> <p>The practice was born as eligible projects under the Call for proposals "Energia Sostenibile 2.0" Por Fers Lazio 2014-20 Asse 4, Azione 4.1.1. and it was made by the Tivoli Municipality and Regione Lazio gave technical support.</p> <p>As outcome of Energy audit and cost/benefit analysis, that was made by the Water Resources and Soil Protection Department of Regione Lazio, the following interventions were defined:</p> <ul style="list-style-type: none"> <li>• Heating and lighting system: replacement of existing boiler with modular condensing one, fitting thermostatic valves on radiators, replacement of lamps with LED lightning system;</li> <li>• Intervention on the building envelope: replacement of windows;</li> <li>• Intervention for renewable energy production: fotovoltaic modules installation;</li> <li>• Further interventions: electric and thermic consumption monitory system, external display and remote monitory system of fotovoltaic plant.</li> </ul> <p>Regione Lazio supported the Tivoli Municipality for the drafting of technical and administrative documents required to conform the invitation to tender to CAM (environmental minimum criteria) in accordance to Directives 2004/17/EC and 2004/18/EC, as implemented in national law D.M. 11/10/2017: Special Terms of Contract and "Product specification" .</p> <p>The intervention has been able to guarantee 50% of reduction of energy cost estimated in € 20.444,00 per year.</p> <p>Sources and amount of funding: The project's budget was 536.858,00 Euros, it was financed by EU structural funding under the Regione Lazio's call "Energia Sostenibile 2.0" Por Fers Lazio 2014-20 Asse 4, Azione 4.1.1.</p> <p>Human resources: Tivoli Municipality and Regione Lazio technical office.</p>
<p><b>Evidence of success</b></p> <p>The monitoring results confirmed the estimated energy saving:</p> <ul style="list-style-type: none"> <li>- Upgrade of the building from category F to B.</li> <li>- Global energy performance ratio KWh (mq x year) reduced from 204,00 to 85,03.</li> <li>- Heating consumption m<sup>3</sup>/year reduced from 35.04 to 20.33.</li> <li>- Illumination and electric consumption KWh/year reduced from 39.359 to 10. 949</li> <li>- Energy production KWh/year 8.010</li> </ul>

- Primary Energy equivalent consumption KWh (conversion factor =2,17) from 85.409 to 23.759, reduction of 72%.

### Challenges encountered

The intervention has fostered a positive relation between different public administration: Regione Lazio supported the local municipality's lack of Knowledge

### Potential for learning or transfer

The main success factors of the practice (which can be transferred to other contexts) can be thus synthesized to (a) good use of EU funding, as the two steps call helped the small municipality to programme first feasibility studies (Energy audit included) and then (b) the realization of works adequate to new environmental law.

### Further information

<https://www.interregeurope.eu/policylearning/good-practices/item/2367/energy-refurbishment-of-public-building-in-according-to-environmental-minimum-criteria/>

### Photo

#### I. Photo of Tivoli



### 3. Annex

#### 4. References