# TEESCHOOLS

# Transferring Energy Efficiency in Mediterranean Schools

**PRIORITY AXIS:** Fostering Low-carbon strategies and energy efficiency in specific MED territories: cities, islands and remote areas

**OBJECTIVE:** 2.1 To raise capacity for better management of energy in public buildings at transnational level

https://teeschools.interreg-med.eu/

**DELIVERABLE NUMBER: 3.3.5.**

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# 1. INTRODUCTION

As any activity, energy renovation has its related costs, which vary according to the depth of the refurbishment, i.e. number and complexity of implemented energy efficiency (EE) measures. Therefore, any decision on energy renovation of a building must carefully evaluate these costs and ensure financing, in order to reap the benefits after the implementation.

The aim of this document is to present the possibilities for financing EE projects in the public sector and more specifically in schools. For that purpose, the most common financing models will be briefly presented in chapter 2. In chapter 3, available financing models in participating countries will be presented and, based on the Project partners' feedback, a comparative analysis of availability, acceptability and usage of different financing models will be provided. Chapter 4 describes the established methodology for determination of optimal financing model for participating schools, which is based on both analysis of available and acceptable financing models (chapter 3) and on the results of energy audits performed in schools that are participating in the project. Based on that methodology, optimal financing model for each participating school will be recommended.

# 2. ANALYSIS OF FINANCING MODELS FOR EE PROJECTS IN THE PUBLIC SECTOR

In this chapter, a very brief general (not country related) overview of possible financing models for EE in public buildings is given. The chapter ends with comparative analysis of models according to criteria which include: legal aspects, statistical treatment on public debt, complexity of implementation and other identified influencing factors. Pros. and cons. of each model are clearly marked.

## 2.1. OWN FUNDING

Traditional financing of projects in cities and municipalities relies dominantly on the use of own budget. One of the financing challenges facing municipalities, more often for smaller municipalities rather than larger ones is the insufficient revenue base with which to fund projects (not only EE projects, but also other development projects as well). An insufficient revenue base, which may be the result of a small number of tax-paying commercial businesses and/or high-income residents, can reduce the availability of adequate funds for capital investments. Municipalities depending on revenue transfers from regional or national governments often have limited revenue-raising powers. Such limitations imply that any decision to invest in an EE project either requires the municipality to reallocate funds or convince higher levels of government that the EE project is economically viable. This may often not be a simple task. Reliance on transfers from other levels of government also exposes municipalities to the risk that permitted levels and uses of funds may be affected by changes in national budgetary or political priorities. This introduces further uncertainties and makes commitment to multi-year programs of capital expenditures more difficult.[1]

[1] Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH: "CF4EE - Crowdfunding for Energy Efficiency", October 2016, available at: http://www.ieadsm.org/wp/files/2016-10-28-CF4EE-Feasibility-Study-final.pdf

## 2.2. LOAN FINANCING

When it comes to loans, i.e. borrowing, national governments often impose limits on borrowing by municipalities to prevent them getting into financial difficulties. These restrictions may take the form of limits on the use of loan funds and/or on the total amount that municipalities may borrow. In both cases, EE projects are likely to lose out, because they are not typical capital expenditure projects that can be readily assessed and approved by higher authorities. In addition, when debt ceilings are in place, EE projects, with relatively low public profiles, are likely to have a lower priority than other pressing or mandated needs. [2]

Soft loans are dedicated credit lines for EE measures extended to end users at preferential terms in terms of maturity and/or interest rates. Such credit lines are often provided by national or international development banks (such as European Investment Bank (EIB) and European Bank for Reconstruction and Development (EBRD) and are further distributed to designated markets through regional partner retail banks.

## 2.3. ESCO MODEL

The terms "energy services"[3] and "energy service companies (ESCO)"[4] are already well known and established in the energy efficiency field. They were defined already in the Energy Services Directive (2006/32/EC). There are many initiatives to promote ESCO model in the EU, due to its potential to remove several important barriers to energy efficiency in public sector – availability of up-front capital needed for EE investments and lack of technical knowledge and capacities to develop, implement and monitor EE projects. ESCOs are companies that work on a basis of energy performance contracts (EPC). In an energy EPC arrangement, the ESCO is responsible for **optimizing building services systems and system operations in existing buildings across all branches of construction and maintenance.** The main service provided by the ESCO is a guaranteed level of savings over a defined period.

Basic concept of EPC is shown in Figure 2-1.

Before a tender is made, an energy cost baseline is determined for the building (or building pool) or facility. This is usually based on the energy consumption of the calendar year prior to commencement of the EPC, which is often also compared to the two preceding years in order to eliminate extreme climatic influences, usage fluctuations, etc. The evaluated baseline data is climate adjusted on the basis of mild or hot days (annual degree days). Proceeding from the energy cost baseline, the ESCO guarantees an annual energy cost savings (in EUR, calculated on a fixed price basis with the energy prices of the reference year) to the customer over the entire contract period. A fixed proportion of these guaranteed savings is set as the contracting fee, which the ESCO receives from the client to finance the investment, maintain the installations and attain a

[2] *Ibid*.
[3] 'Energy service': the physical benefit, utility or good derived from a combination of energy with energy efficient technology and/or with action, which may include the operations, maintenance and control necessary to deliver the service, which is delivered on the basis of a contract and in normal circumstances has proven to lead to verifiable and measurable or estimable energy efficiency improvement and/or primary energy savings
[4] 'Energy service company' (ESCo): a natural person or legal entity that delivers energy services and/or other energy efficiency improvement measures in a user's facility or premises, and accepts some degree of financial risk in so doing. The payment for the services delivered is based (either wholly or in part) on the achievement of energy efficiency improvements and on the meeting of the other agreed performance criteria

profit margin. Usually, the fee is set lower that the guaranteed saving in order for client to immediately benefit from savings.

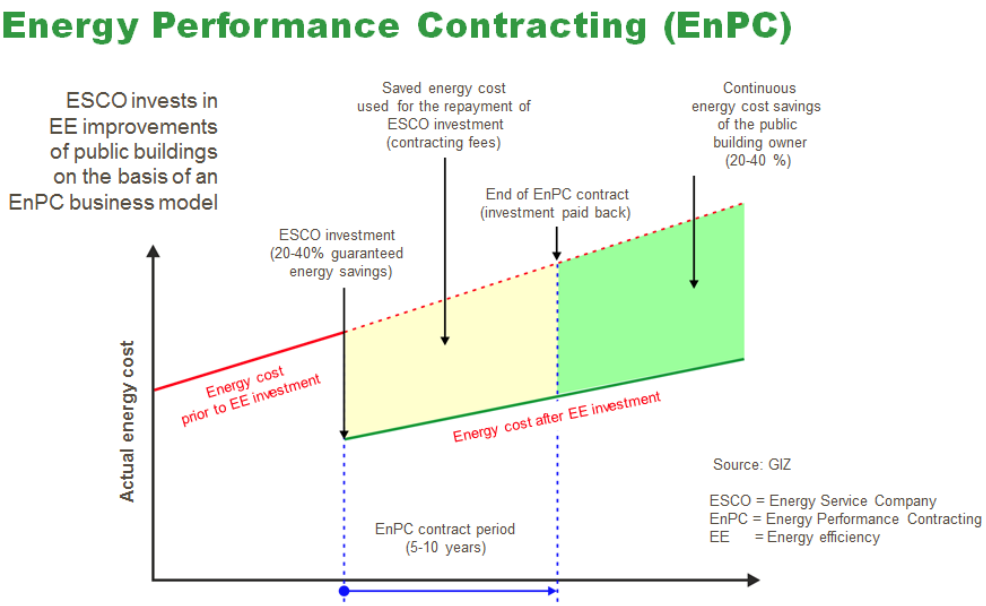


*Figure 2-1 – Basic concept of EPC and ESCO operation*

In order to verify the annual energy savings, incurred energy consumption costs are converted into the reference year basis and then compared to the baseline during EPC bill audits. For the sake of ensuring this comparability, energy supply bills received by the client need to be adjusted for the following factors:

- deviations from the reference year in climatic conditions (annual degree days);
- changes in energy prices compared to the reference year (energy bills received by the customer must always be converted into the energy prices of the reference year);
- changes in building/facility usage compared to the reference year (insofar as these may cause energy consumption changes).

If the difference between the adjusted energy cost savings and the guaranteed cost savings is zero, the ESCO is exactly within the performance parameters of its contract. If the difference is greater than zero, contract over-performance sets in (savings are greater than guaranteed); in this case, the extra savings can be shared among the ESCO and the client. If the difference is negative, the ESCO has not achieved its savings goal and must reimburse the customer with the resulting difference (because, according to EPC, ESCO guarantees savings).

If energy prices rise, the energy cost savings of the customer increase (energy saved multiplied by energy Price increases). This delivers additional budgetary benefit for the customer.

Contractually agreed one-off payments at the beginning (e.g. investment or building cost contributions) or at the end of the contract term (redemption sum) are also possible. With this solution, higher investment costs do not necessarily lead to higher contracting fees or longer contract durations.

Financing of EE project may or may not be ensured by ESCO[5]. There are two basic cases:

[5] Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH: "Assessing Framework Conditions

1. Customer financings – this model is usually referred to as "guaranteed savings". Here, an ESCO guarantees the outcome of investment in EE measures, but the customer (client) covers the whole investment and is responsible for accounting. This model is suitable if the customer has access to capital and if ESCO is a rather small company with limited balance sheet total.
2. ESCO financing - this model is usually referred to as "shared savings". Here, ESCO provides the financing, and is thus also responsible for the accounting, for all necessary investment, normally by borrowing from a bank. The customer pays a fee to the ESCO for the services rendered and for investment payback. Under a shared savings EPC arrangement, the client participates in the energy cost savings from the start of the main performance obligation period. The level of a client's share in cost savings must be stipulated in the contract. Typically, a client's profit share is between 10% and 20% of the savings achieved. Profit-sharing from the start results in shared savings EPC contracts having longer periods than a fixed-term arrangement, being that the annual contracting fee available to the ESCo for refinancing investment costs is lower. The benefit is that the customer's budgeted costs are directly reduced during the main performance obligation period of the savings guarantee agreement.

## 2.4. PPP MODEL

A Public-Private Partnership (PPP) arrangement differs from conventional public procurement in several respects. In a PPP arrangement the public and private sectors collaborate to deliver public infrastructure projects (e.g. roads, railways, hospitals) which typically share the following features:

- a long-term contract between a public procuring authority (the "Authority") and a private sector company (the "PPP Company") based on the procurement of services, not assets;
- the transfer of certain project risks to the private sector, notably with regard to designing, building, operating and/or financing the project;
- a focus on the specification of project outputs rather than project inputs, taking account of the whole life cycle implications for the project;
- the application of private financing (often "project finance") to underpin the risks transferred to the private sector; and
- payments to the private sector which reflect the services delivered. The PPP Company may be paid either by users through user charges (e.g. motorway tolls), by the Authority (e.g. availability payments, shadow tolls) or by a combination of both (e.g. low user charges together with public operating subsidies).

The rationale for using a PPP arrangement instead of conventional public procurement rests on the proposition that optimal risk sharing with the private partner delivers better "value for money" for the public sector and ultimately the end user.

PPP arrangements are more complex than conventional public procurement. They require detailed project preparation and planning, proper management of the procurement phase to incentivise competition among bidders. They also require careful contract design to set service standards, allocate risks and reach an

for Energy Service Companies", September 2012, available at: https://www.giz.de/fachexpertise/downloads/giz2013-en-esco-guide.pdf

acceptable balance between commercial risks and returns. These features require skills in the public sector which are not typically called for in conventional procurement. [6]

## 2.5. GRANT SCHEMES

Most of available grant schemes are based on the use of European Unison structural and investment funds (ESI). EE projects in buildings belong to projects that generate net income after completion, i.e. the energy cost savings of the project are treated as net income.

Under the preamble (paragraph 13) of the Delegated Regulation 480/2014, as well as under recital (paragraph 58) of Regulation 1303/2013 of the EU, it is necessary to accurately calculate net income to ensure the efficient use of Union funds and to avoid over-financing of projects. Determining the share of co-financing by the Union should reflect the rule of non-profit - grants must not result in earning a profit. If they are profitable, it is necessary to conduct a financial analysis to determine the financing gap, the assessment of the need for grant and the amount of potential grants.7 Therefore, the purpose of co-financing through grants is to close the financing gap that is generated in energy efficiency projects when the investment in energy efficiency cannot be paid off from savings on energy costs.

The formula for calculating the financing gap is:

$$NPV(i,N) = \sum_{t=0}^{N} \frac{R_t}{(1+i)^t} = R_0 + \sum_{t=1}^{N} \frac{R_t}{(1+i)^t}$$

where:

| | |
|---|---|
| $NPV(i,N)$ | net present value of the project |
| $i -$ | discount rate |
| $N -$ | period of project evaluation |
| $R_0 -$ | initial investment |
| $R_t = R_1 \dots \dots R_N -$ | net income = annual energy cost savings and maintenance costs |

The net present value is the difference between the sum of discounted net income over the entire project implementation period and the amount of investment costs. The net present value represents measure of added value today that results from the undertaken investment. In case the project has a negative net present value, it corresponds to the amount of the financing gap. The financing gap represents a part of the investment that needs to be co-financed by grants so that the net present value of the project corresponds to the amount of zero.

After calculating the financing gap in an absolute amount, it is necessary to determine the project co-financing rate. The co-financing rate is obtained as the ratio of the financing gap amount and the amount of initial investment in the energy efficiency project.

The formula for calculating the required co-financing rate is as follows:

[6] EIB European PPP Expertise Centre: http://www.eib.org/epec/g2g/intro2-ppp.htm
[7] GUIDANCE FOR BENEFICIARIES of European Structural and Investment Funds and related EU instruments, EC, 2014 (http://ec.europa.eu/regional_policy/sources/docgener/guides/synergy/synergies_beneficiaries.pdf)

$$co - financing\ rate = \frac{NPV\ (i, N)}{R_0}$$

If the project is co-financed by grants with the co-financing rate calculated according to the aforementioned model, the energy efficiency project in buildings will achieve net present zero value and will be economically justified.

## 2.6. COMBINATION OF DIFFERENT FINANCING MODELS

Usually, energy efficiency projects in public buildings combine two financing models. Rarely, more than two financing models are used. Research of usual practices in the Project Partner countries showed that dominantly grants (if available) are combined with own financing.

Recently, with the availability of EU structural and investment funds for energy efficiency across the MS, the blending of such funds with other financing models becomes increasingly interesting. The blending refers to combination of grants with other financing mechanism such as loans or ESCO/PPP model.

## 2.7. COMPARATIVE ANALYSIS OF FINANCING MODELS

The financing models described above may be compared based on several important criteria as demonstrated in the Table blow. There is no universally best solution, but for each particular situation (country, region, building) an optimal solution should be tailor-made.

*Table 2-1 Comparative analysis of considered models*

| Criteria/ Model | Own financing | Loan financing | Grants | ESCO model | PPP model |
|---|---|---|---|---|---|
| **Neutral impact on government debt** | ☺ | ☹ | ☺ | 😐 | ☺ |
| **Administrative procedure complexity** | ☺ | 😐 | 😐 | 😐 | ☹ |
| **Guarantee of savings / service standard** | ☹ | ☹ | 😐 | ☺ | ☺ |
| **Capacities and capabilities of the public bodies to implement the model** | ☺ | 😐 | 😐 | ☹ | ☹ |
| **Estimated multiplier effect** | ☹ | ☹ | 😐 | ☺ | ☺ |
| **Projects for which the model is appropriate** | Simple EE measures with short pay-back periods | Simpler EE measures with shorter pay-back periods | More complex projects, with longer pay-back periods | Highly complex projects, with moderate pay-back periods (up to 10 years) | Highly complex projects, usually with new buildings, long-term |

# 3. NATIONAL FINANCING MODELS FOR EE PROJECTS SCHOOLS

This chapter is based on the research on available financing models in countries facilitated by the questionnaire prepared for that purpose and the feedback of Project partners. The following issues are provided in this chapter: 1) overview of financial models used in a country; 2) description of typical financing model; 3) comparative analysis of availability, acceptability and usage of different financing models across participating countries and 4) overview of barriers for energy renovation of schools. The whole analysis is focused on public buildings and more specifically to schools.

## 3.1. BOSNIA AND HERZEGOVINA

### 3.1.1. OVERVIEW OF NATIONAL/REGIONAL/LOCAL FINANCING OPPORTUNITIES

Currently in the Federation BiH, the public sector largely finances energy efficiency measures through regular budget lines, within the framework of regular maintenance of buildings and equipment. For the implementation of a sustainable way of funding from public budgets, no additional mechanisms are yet to be provided to ensure long-term investment planning in energy efficiency measures and funding from realized savings.

When it comes to preferential loans, Revolving Fund established by the Federation of B&H Environmental Protection Fund should be emphasized. Funding is made through public calls and is intended for both legal and physical persons. This is the first real revolving fund in this area, and the funds are awarded under very favorable conditions (an interest rate of 0-4% per annum, a grace period of up to 12 months, a repayment term of up to 7 years). Another option is the Bosnia Energy Efficiency Project (BEEP), which represents the largest energy efficiency project in Bosnia and Herzegovina, will invest a total of 19 million USD in the Federation of Bosnia and Herzegovina in the next three years. The Federal Ministry of Physical Planning, through the Implementation Unit of the BEEP project, is responsible for the preparation, coordination, management and implementation of the project in the Federation of Bosnia and Herzegovina. Funds are allocated to local institutions in the form of grants, while the credit facilities taken by the World Bank are borne by the state of Bosnia and Herzegovina. Credit facilities are provided through the World Bank and are intended to improve energy efficiency in public facilities in the health and education sectors. The loan is secured at an annual rate of 1.25%.

Grants are available through Environmental Protection Fund as well as through the Green Economy Development Program (GED) program 2014-2018, which provides grants for co-financing projects from energy efficiency. The final beneficiary is required to co-finance a minimum of 50% of the project. The funds are allocated to facilities owned by the public sector. Cooperation is focused on Cantonal and Entity governments and ministries. The program is implemented through UNDP BiH and Entity Environmental and Environmental Funds. The goal of the scheme is to reduce public spending on energy and water consumption (by increasing energy efficiency and using renewable energy sources) and creating a favorable environment for investment in energy efficiency measures while creating 'green jobs'. The project is implemented through the following five components: (i) Strengthening institutional capacity; (ii) Institutionalization of energy management; (iii) Establishing the legal framework; (iv) Implementation of infrastructure measures; (v) Raising public awareness on energy efficiency.

ESCO and PPP model are still in the early development phase and there is a determination to enhance the use of these models through appropriate legal changes. [8]

#### 3.1.2. DESCRIPTION OF TYPICAL FINANCING MODEL FOR EE PROJECTS IN SCHOOLS

Situation with financing models for EE projects in schools in B&H may be summarized as follows (for details please see questionnaire responses in the Annex):

- Typically, EE projects in schools are financed through grants and loans, dominantly provided by international financing institutions and organizations (World Bank, Swedish International Development Agency).
- ESCO model has been used in the public sector and schools, but ESCO projects are limited to heating systems and not for the entire energy renovation of a building.
- PPP model is still in very early phase of its development.

#### 3.1.3. COMPARATIVE ANALYSIS OF AVAILABILITY, ACCEPTABILITY AND USAGE OF DIFFERENT FINANCING MODELS

Based on the analysis of possible financing models in B&H, their comparison is provided in the Table below (for details please see questionnaire responses in the Annex).

| Criteria/ Model | Own financing | Loan financing | Grants | ESCO model | PPP model |
|---|---|---|---|---|---|
| **Availability** | √ | √ | √ | √ | - |
| **Acceptability** | √ | √ | √ | √ | - |
| **Usage** | √ | √ | √ | √ | - |

**For B&H, financing models that will be further investigated to decide on optimal solution are, therefore, grants (in combination with own financing), loans and ESCO model.** PPP will not be further considered as the model is still not sufficiently developed to take it into consideration in the short-term.

#### 3.1.4. IDENTIFIED BARRIERS RELATED TO FINANCING OF EE PROJECTS IN SCHOOLS

The most important barriers related to financing and implementation of EE projects in schools in B&H are:

1. Financial barriers – insufficient pre-planned budget for implementation of EE measures.

## 3.2. CROATIA

#### 3.2.1. OVERVIEW OF NATIONAL/REGIONAL/LOCAL FINANCING OPPORTUNITIES

EE projects in the public sector in Croatia are supported through grants, loans and ESCO model, all based on the Government programmes for energy renovation of public buildings. The 1st Programme was adopted for the period 2014-2015 and was based on the combination of ESCO model with grant of up to 40% provided from the Environmental Protection and Energy Efficiency Fund. The 2nd programme envisages use of different

[8] Source: Energy Efficiency Action Plan of the Federation of B&H for period 2016-2018; available at: http://www.fmeri.gov.ba/akcioni-plan-energijske-efikasnosti-federacije-bosne-i-hercegovine-.aspx (accessed: 18/05/2018)

financing models for energy renovation of public buildings. The dominant model is based on the grants ensured from the European Regional Development Fund (ERDF) based on the Operational Programme "Competitiveness and Cohesion" (total funds ensured amount to EUR 211,810,805.00 for the period 2014-2020). These grants that are up to 45% for coastal area and up to 60% for continental area of Croatia. Grant rate is also diversified by the development index of the municipality in which the project is being implemented – the more developed municipality is, the lower grant rate is available for that municipality. If the municipality is not able to ensure the financing for the rest of the investment costs, it is allowed to take a loan from Croatian Bank for Reconstruction and Development (HBOR), which is ensured also from the ERDF, and has very favorable interest rates of up to 0,5%. There are no specific regional or local financing models.

### 3.2.2. FINANCING MODEL FOR EE PROJECTS IN SCHOOLS

Situation with financing models for EE projects in schools in Croatia may be summarized as follows (for details please see questionnaire responses in the Annex):

- Typically, EE projects in schools are financed through combination of grants and own funding.
- Loans may also be utilized, but for the time being they are not used.
- ESCO model is still underutilized in the public sector but increasingly considered, while PPP development is still in very early phase.

### 3.2.3. COMPARATIVE ANALYSIS OF AVAILABILITY, ACCEPTABILITY AND USAGE OF DIFFERENT FINANCING MODELS

Based on the analysis of possible financing models in Greece, their comparison is provided in the Table below (for details please see questionnaire responses in the Annex).

| Criteria/ Model | Own financing | Loan financing | Grants | ESCO model | PPP model |
|---|---|---|---|---|---|
| **Availability** | √ | √ | √ | √ | - |
| **Acceptability** | √ | - | √ | √ | - |
| **Usage** | √ | - | - | - | - |

**For Croatia, financing models that will be further investigated to decide on optimal solution are, therefore, grants (in combination with own financing) and ESCO model.** Loans will not be further considered as their use is not acceptable by the Project partner, while PPP is still not sufficiently developed to take it into consideration in the short-term.

### 3.2.4. IDENTIFIED BARRIERS RELATED TO FINANCING OF EE PROJECTS IN SCHOOLS

The most important barriers related to financing and implementation of EE projects in schools in Croatia are:

1. Administrative and legal barriers – lack of construction permits and other documents that are required for application for grants as well as unsolved land registry and ownership issues;
2. Financial barriers – irregular offer of grants, which hardens the planning of own funds.

## 3.3. CYPRUS

### 3.3.1. OVERVIEW OF NATIONAL/REGIONAL/LOCAL FINANCING OPPORTUNITIES

Financing of EUR 16 million has already been secured from the European and Structural Funds for the period 2014 - 2020 with a view to implementing energy upgrading projects in buildings owned and used by the central public administration. Also, the Department of Electrical and Mechanical Services has prepared standard energy performance contracting (EPC) forms for implementing energy savings measures in privately - owned public buildings. These forms can be adjusted in each case and are also expected to trigger the interest of energy service providers (ESPs).

For local authorities, there are no financing opportunities for EE projects. Local authorities have difficulties in implementing, or securing funds for, actions intended for residential and tertiary sector buildings. This is due to their limited energy-related powers, as such issues are regulated mostly at a central government level. However, the municipalities and communities which have undertaken binding targets may adopt incentives and measures for significantly increasing mobilization of energy investments within their boundaries, such as faster authorization procedures, reduced real estate duties and taxes, or even setting up local energy upgrade support plans. Consideration could also be given to setting up a feedback fund to support such investments, which could be funded from the savings resulting from the implementation of sustainable energy action plans, from grants, even from a fee imposed on the people living and undertakings operating in the municipality concerned. Naturally, each local authority should look into the measures in accordance with the financial, human and other resources at its disposal. The implementation of certain measures and incentives may also contradict the legislative framework on the functioning of local authorities, whereupon amendment to legislation or alternatives should be considered.[9]

### 3.3.2. FINANCING MODELS FOR EE PROJECTS IN SCHOOLS

Situation with financing models for EE projects in schools in Cyprus may be summarized as follows (for details please see questionnaire responses in the Annex):

- Typically, EE projects in schools are financed through combination of grants and own funding.
- Loans are from just recently available and may be considered by the school boards for the use in the future.
- ESCO model is available but ESCOs are currently dominantly dealing with RES, and there are indications that they might not be interested in projects in schools; nevertheless, this model should not be neglected.
- PPP model is not suitable nor used for EE project.

### 3.3.3. COMPARATIVE ANALYSIS OF AVAILABILITY, ACCEPTABILITY AND USAGE OF DIFFERENT FINANCING MODELS

Based on the analysis of possible financing models in Cyprus, their comparison is provided in the Table below (for details please see questionnaire responses in the Annex).

[9] Source: 4th National Energy Efficiency Action Plan; available at: https://ec.europa.eu/energy/sites/ener/files/documents/cy_neeap_2017_en.pdf (accessed: 16/05/2018)

| Criteria/ Model | Own financing | Loan financing | Grants | ESCO model | PPP model |
|---|---|---|---|---|---|
| **Availability** | √ | √ | √ | √ | - |
| **Acceptability** | √ | √ | √ (if grant scheme for public sector is to be established) | √ | - |
| **Usage** | √ | - | - | - | - |

**For Cyprus, financing models that will be further investigated to decide on optimal solution are, therefore, grants (in combination with own financing), loans and ESCO model.** PPP is considered to be not suitable for EE projects, hence will not be taken into account in further analyses.

#### 3.3.4. IDENTIFIED BARRIERS RELATED TO FINANCING OF EE PROJECTS IN SCHOOLS

The most important barriers related to financing and implementation of EE projects in schools in Cyprus are:

1. Administrative barriers – lack of technical expertise and data makes administrative procedures needed to obtain the financing very hard;
2. Financial barriers – there is a lack of own financing (from the budget), while administrative procedures for loans of for ESCO model are too time consuming;
3. Accounting barriers – there is no system for energy data and bills collection, which makes it very hard to evaluate EE projects and demonstrate their benefits.

## 3.4. FRANCE

#### 3.4.1. OVERVIEW OF NATIONAL/REGIONAL/LOCAL FINANCING OPPORTUNITIES

In accordance with Article 5 of Directive 2012/27/EU on energy efficiency, France has opted for the alternative approach in order to reduce the energy consumption of the State's property stock. The buildings affected by the implementation of this article are public buildings occupied by state services: offices, educational or sports buildings, health or social buildings, cultural buildings, shops or housing. In total, these buildings cover 22.2million square meters.

Local and regional authorities have a key role to play in the fight against climate change, control of energy consumption, promotion of renewable energies, and improvement of air quality. They are responsible for pivotal investments in energy terms: buildings, networks (lighting, heating) and transport. Through their town and spatial planning policies, they organize the distribution of activities and residential sites. Through their economic and regional development policies, they determine how to exploit the energy potential of their areas. The Contrats de Projets État - Régions (CPERs) (State - Regions project contracts) are the preferred tool for assisting the local and regional authorities with the implementation of their climate and energy policies: under the previous contracts between the State and the regions (project contracts for the 2007-2013 period), the State prioritized support for the regional climate energy plans and, through the ADEME, financed the territorial energy actions (actions for energy savings and development of renewable energy) by EUR 76 million per year. This support was extended, through the territorial component of the CPERs, to assistance from the regions for sub - regional climate plans. The regions' commitment to energy efficiency in particular results in the implementation of local policies for the facilitation, awareness-raising and support of energy saving and renewable energy generation measures, in partnership with the State. In this context, through Contrats

d'Objectifs Territoriaux (COT) (Local objective contracts), the ADEME finances those territories that want to equip themselves with internal engineering for the development of PCETs (Plans Climat-Énergie Territoriaux – Local climate-energy plans). [10]

### 3.4.2. FINANCING MODELS FOR EE PROJECTS IN SCHOOLS

Situation with financing models for EE projects in schools in France may be summarized as follows (for details please see questionnaire responses in the Annex):

- EE projects in schools were not priority, hence no own funding was used for such projects.
- Loans are available, but in accordance with the above, they were never utilized for EE projects in schools.
- Grants from EU sources are seen as increasingly important, while availability of state or regional support is expected to cease.
- ESCO and PPP models cannot be used in schools due to budgeting and accounting issues.

### 3.4.3. COMPARATIVE ANALYSIS OF AVAILABILITY, ACCEPTABILITY AND USAGE OF DIFFERENT FINANCING MODELS

Based on the analysis of possible financing models in France, their comparison is provided in the Table below (for details please see questionnaire responses in the Annex).

| Criteria/ Model | Own financing | Loan financing | Grants | ESCO model | PPP model |
|---|---|---|---|---|---|
| **Availability** | - | √ | √ | - | - |
| **Acceptability** | √ (only if planned as priority) | √ | √ (if available) | - | - |
| **Usage** | - | - | - | - | - |

**For France, financing models that will be further investigated to decide on optimal solution are, therefore, grants (in combination with own financing) and loans.** ESCO and PPP models are clearly marked as not acceptable for schools participating in the project.

### 3.4.4. IDENTIFIED BARRIERS RELATED TO FINANCING OF EE PROJECTS IN SCHOOLS

The most important barriers related to financing and implementation of EE projects in schools in France are:

1. Administrative barriers – slowness of administrative (construction permit issuing) and technical services causes that projects last from 3 to 100 years;
2. Legal barriers - there are no specific environmental requirements for renovation of existing buildings (unlike for construction of new buildings)
3. Financial barriers – as schools are under the jurisdiction of the Region, the implementation of EE projects depends on the availability of Region budget, which is limited and resulting in very few such projects implemented.

[10] Source: 4th National Energy Efficiency Action Plan; available at: https://ec.europa.eu/energy/sites/ener/files/documents/fr_neeap_2017_en.pdf (accessed 16/05/2018)

## 3.5. GREECE

### 3.5.1. OVERVIEW OF NATIONAL/REGIONAL/LOCAL FINANCING OPPORTUNITIES

The programme 'Energy upgrading of public buildings' aims at energy upgrading of energy-intensive public buildings, exploiting the potential for energy savings and improving energy efficiency in the building sector, with public sector buildings being an example to mobilise the entire economy. The programme is funded by the European Union [European Regional Development Fund (ERDF)] and National Resources, through the Regional Operational Programmes (ROP) and Operational Programme 'Competitiveness, Entrepreneurship, Innovation' (OP-CEI) and the Operational Programme 'Transport Infrastructure, Environment and Sustainable Development' (OP-TIESD) of NSRF 2014-2020. The total public expenditure of the operation amounts to EUR 244.93 million.

The Holding Fund under the name 'Infrastructure Fund' -which was set up with Ministerial Decision No 6269/29.11.2017 (Government Gazette, No 4159), aims at maximising the use of the Financial Instruments to cover the financial gap, inter alia in the fields of Energy Saving and Promotion of Renewable Energy Sources (RES). As part of the Fund, resources from the Operational Programme 'Competitiveness, Entrepreneurship, Innovation' (OP-CEI) relating to these areas will be drawn, in conjunction with national resources from a European Investment Bank (EIB) loan and repayments of the JESSICA financial instrument for the period 2007-2013. The liquidity of public and private entities will be strengthened through the Infrastructure Fund, for the implementation of projects with favorable funding conditions. The total resources of the Fund amount to EUR 450 million, while the resources of OP-CEI in the energy sector amount to EUR 128.7 million. [11]

Both mechanisms are established at the whole national level.

### 3.5.2. FINANCING MODELS FOR EE PROJECTS IN SCHOOLS

Situation with financing models for EE projects in schools in Greece may be summarised as follows (for details please see questionnaire responses in the Annex):

- Typically, EE projects in schools are financed through grants from Eu Cohesion and Structural funds.
- Loans are available but not utilised.
- ESCO and PPP models are not sufficiently developed.

### 3.5.3. COMPARATIVE ANALYSIS OF AVAILABILITY, ACCEPTABILITY AND USAGE OF DIFFERENT FINANCING MODELS

Based on the analysis of possible financing models in Greece, their comparison is provided in the Table below (for details please see questionnaire responses in the Annex).

| Criteria/ Model | Own financing | Loan financing | Grants | ESCO model | PPP model |
|---|---|---|---|---|---|
| **Availability** | - | √ | √ | √ | - |
| **Acceptability** | √ | √ | √ | - | - |
| **Usage** | - | - | - | - | - |

[11] Source: 4th National Energy Efficiency Action Plan; available at: https://ec.europa.eu/energy/sites/ener/files/documents/el_neeap_2017_en.pdf (accessed 16/05/2018)

**For Greece, financing models that will be further investigated to decide on optimal solution are, therefore, grants (in combination with own financing) and loans.** ESCO and PPP models are not well developed, hence will not be considered as financing options within this Project.

### 3.5.4. IDENTIFIED BARRIERS RELATED TO FINANCING OF EE PROJECTS IN SCHOOLS

The most important barriers related to financing and implementation of EE projects in schools in Greece are:

2. Administrative barriers – benefits of EE are not well known due to lack of data, technical capacities and best practice examples ant the level of public administration;
3. Financial barriers – limited accessibility to financing due to lack of proper own budget planning as well as lack of awareness and interest of financial institutions;
4. Legal and accounting barriers – the latest Eurostat guidelines on accounting if Energy Performance Contracting has not been transferred yet to Greek legislative framework, while public procurement legislation does not provide clear guidelines for EE projects based on ESCO model.

## 3.6. ITALY

### 3.6.1. OVERVIEW OF NATIONAL/REGIONAL/LOCAL FINANCING OPPORTUNITIES

In order to foster energy efficiency in school facilities, the main type of incentives issued by the Italian Government and available for Public Administration is the "Conto Termico 2.0" (Thermal Bill)[12]. Started on May 31st 2016, it incentives measures to increase energy efficiency and the production of thermal energy from renewable sources. The beneficiaries are Public Administrations, businesses and individuals that will have access to funds for 900 million € per year, of which 200 only for the Public Administrations. Grant incentive includes:

- Up to 65% for the nearly Zero Emission Building for existing building;
- Up to 40% for the insulation of walls and roofs interventions, for the replacement of windows, for the installation of solar shielding, indoor lighting, the building automation technologies and condensing boilers;
- Up to 50% for heat insulation measures in climate zones E/F and up to 55% in the case of thermal insulation and replacement of windowed closures, if combined with other system (condensing boilers, heat pumps, solar thermal, etc.);
- Even up to 65% for heat pumps, biomass boilers and appliances, hybrid systems with heat pumps and solar heating systems;
- 100% of the costs for the Energy Audit and for the Energy Performance Certificate for the PA (and ESCOs operating on their behalf) and 50% for private entities, with the cooperatives of inhabitants and social cooperatives.

Another important source of funding is European Regional Development Fund (ERDF). Grants up to 30% can be awarded from ERDF and responsible institution for distribution of the funds is Emilia-Romagna Region based on Regional Operative Programme-ERDF 2014-2020 of Emilia Romagna Region. The incentives can be

[12] Source: D.T.1.4.1 Report on sources of funding and support instruments to finance EE interventions in schools, Energy@Schools Project

combined as long as they do not exceed 100% of the eligible expenditure.

There are no incentives only dedicated to schools but incentives dedicated to Public Administration.

### 3.6.2. FINANCING MODELS FOR EE PROJECTS IN SCHOOLS

Situation with financing models for EE projects in schools in Italy may be summarised as follows (for details please see questionnaire responses in the Annex):

- Typically, EE projects in schools are financed through combination of grants and own funding.
- Loans are not acceptable financing model due to debt limitations.
- ESCO model is still underutilised in the public sector, while PPP development is still in very early phase.

### 3.6.3. COMPARATIVE ANALYSIS OF AVAILABILITY, ACCEPTABILITY AND USAGE OF DIFFERENT FINANCING MODELS

Based on the analysis of possible financing models in Italy, their comparison is provided in the Table below (for details please see questionnaire responses in the Annex).

| Criteria/ Model | Own financing | Loan financing | Grants | ESCO model | PPP model |
|---|---|---|---|---|---|
| **Availability** | √ | - | √ | √ | √ |
| **Acceptability** | √ | - | √ | ~ (only if model is further developed) | - |
| **Usage** | √ | - | - | - | - |

**For Italy, financing models that will be further investigated to decide on optimal solution are, therefore, grants (in combination with own financing) and ESCO model.** Loans will not be further considered as their use is impossible due to debt restrictions, while PPP is still not sufficiently developed to take it into consideration in the short-term.

### 3.6.4. IDENTIFIED BARRIERS RELATED TO FINANCING OF EE PROJECTS IN SCHOOLS

The most important barriers related to financing and implementation of EE projects in schools in Italy are:

3. Administrative barriers
    a. procedures for obtaining grants are often complicated and public authorities do not have opacities to cope with these procedures themselves, leading to the necessity to engage external consultants, which may also take considerable time;
    b. many schools are under architectural heritage protection, hence the procedures for obtaining the permissions for their renovation are complicated and long;
4. Financial barriers – schools are in the jurisdiction of local public authorities, which are not allowed to use loans for implementation of EE measures due to debt limitations;
5. Accounting barriers – there is an obligation to plan EE projects in three-year investment plans of municipalities, but the realisation of these investments is strictly connected to the available budget, e.g. revenues coming from urban charges, which may not suffice.

## 3.7. SPAIN

### 3.7.1. OVERVIEW OF NATIONAL/REGIONAL/LOCAL FINANCING OPPORTUNITIES

At national level, there is Aid Programme to Improve the Energy Efficiency of Existing Buildings (PAREER - CRECE Programme). It's second phase, PAREER-II was launched in 2018 and implemented by Spanish National EE Fund. Grant amounting to 30-90% of eligible investments are available to public and private bodies, with total allocated a budget of EUR 125,658,000. [13]

Autonomous Community of Valencia runs EE programme for buildings through which it is possible to obtain up to 40% of grant for EE investments in non-residential public or private buildings. Valencia also runs a programme Edificant, aimed at improvement of educational centres. EUR 700 million is available in period 2018-2022 for building more than 200 schools and institutes and for renovating another 500.

### 3.7.2. FINANCING MODEL FOR EE PROJECTS IN SCHOOLS

Situation with financing models for EE projects in schools in Spain may be summarised as follows (for details please see questionnaire responses in the Annex):

- Typically, EE projects in schools are financed through own funding, while new grant opportunities from both national and regional level are emerging.
- Other financing models have not been used for financing EE projects in schools.

### 3.7.3. COMPARATIVE ANALYSIS OF AVAILABILITY, ACCEPTABILITY AND USAGE OF DIFFERENT FINANCING MODELS

Based on the analysis of possible financing models in Spain, their comparison is provided in the Table below (for details please see questionnaire responses in the Annex).

| Criteria/ Model | Own financing | Loan financing | Grants | ESCO model | PPP model |
|---|---|---|---|---|---|
| **Availability** | √ | √ | √ | √ | - |
| **Acceptability** | √ | - | √ | - | - |
| **Usage** | - | - | - | - | - |

**For Spain, financing models that will be further investigated to decide on optimal solution are, therefore, grants (in combination with own financing).** There are no plans to use available loans for financing EE projects in schools, ESCO is determined as not economically feasible for schools, while PPP model is still not sufficiently developed to take it into consideration in the short-term.

### 3.7.4. IDENTIFIED BARRIERS RELATED TO FINANCING OF EE PROJECTS IN SCHOOLS

The most important barriers related to financing and implementation of EE projects in schools in Spain are:

1. Financial barriers – EE projects in schools are not financially attractive as energy consumption is low and pay back periods of related investments are usually high.

[13] Source: 4th National Energy Efficiency plan, avaialble at: https://ec.europa.eu/energy/sites/ener/files/documents/es_neeap_2017_en.pdf (accessed 16/05/2018)

# 4. RECOMMENDED FINANCING MODEL FOR EACH SCHOOL

Within TEESCHOOLS project, a calculation model has been developed aiming at analysing different possible financing models for a given school and deciding on the optimal model. Inputs in the model are data from energy audits performed for each participating school, and models analysed are those determined for each country as acceptable (see chapter 3). Calculation parameters, like grant rates or loan interest rates are obtained through feedback of Project partners (see questionnaire responses in the Annex).

## 4.1. DESCRIPTION OF MODEL

In calculations 4 basic financing models have been considered: own (budget) financing, credit financing, ESCO model and private public partnership model. Additionally, subsidy (grant) scheme model has been considered in combination with ESCO model. Following estimations has been made considering additional cost for each model:

- Administrative, legal and architect cost - 10% of cost of equipment and works
- Interest rate – as stated in questionnaire for each country
- Other bank cost - 10% of cost of equipment and works
- ESCO model related cost - 20% of cost of equipment and works
- PPP model related cost - 30% of cost of equipment and works
- Discount rate – 6%
- Lifetime of renovation measures – 25 years

Also, calculation with 60% subsidy combining with ESCO model has been made. Furthermore, if individual project isn't profitable with 60% subsidy, financing gap has been calculated – how much subsidy is needed to break even.

## 4.2. INPUTS PER COUNTRY AND PER SCHOOL

Inputs related to financing models that will be considered in a specific country and parameters of these models (as per feedback from questionnaires) is presented in the Table below.

*Table 2 – Financing models and their parameters per country*

| Criteria/ Model | Own financing* | Loan financing | | Grants | ESCO model*** | PPP model |
|---|---|---|---|---|---|---|
| | | Interest rate % | Duration year | Grant rate** % | | |
| **B&H** | √ | 1.25 | 10 | 40 | 20% | |
| **Croatia** | √ | | | 45 | 20% | |
| **Cyprus** | √ | 3.00 -5.00 | 7 - 10 | n/a (up to 50% based on similar schemes) | | |
| **France** | √ | < 1.00 | 5 - 7 | n/a | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Greece** | √ | 3.00 -5.00 | 5 - 7 | 100 | | |
| **Italy** | √ | | | 65 | 20% | |
| **Spain** | √ | | | 100 | | |

** Own financing is a 'default model', which actually shows the total amount of investment needed for implementation of proposed EE measures in the analysed schools (as estimated by energy audits)*
*** Maximal grant rates are shown in the Table.*
**** Assumed increase in cost of equipment and works due to provision of full-scale service in ESCO model (note: this is just a calculation assumption as explained in section 4.1)*

Although some countries denoted certain financing models, in particular ESCO and PPP, as not applicable or not considered for application in the schools at the moment, it has to be emphasized that all possible financing models will be taken into account in determination of optimal financing model. This approach is taken due to the fact that Project Partners in their questionnaires dominantly responded that ESCO or PPP models are not well known or not yet sufficiently developed in their countries, although they do exist. Therefore, by analysing these models, additional information and proof of benefits from the use of these models will be given and can be used by Project Partners to make more informed decisions related to financing of energy efficiency projects in their schools.

Financial outputs from energy audits per country and per school are provided in the table below. It has to be emphasised that only data for nZEB renovation option are presented and used for further analysis.

*Table 3 – Financial outputs of energy audits for nZEB renovation of schools*

| B&H<br>Name of school | Floor area [m2] | Investment Costs [€] | Investment € per m2 | Cost saving per m2 | Energy cost saving [€] | Simple pay-back period | Total energy consumption before renovation (kWh) | Total energy savings after nZEB renovation (kWh) | Energy saving per m2 [kWh/m2] | Energy savings [% of current total energy consumption] | Total energy costs before renovation (kWh) | Average energy price €/kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ZEPCE | 2.065 | 78.195,41 | 37,87 | 11,88 | 24.540,79 | 3,19 | 386.953,00 | 238.553,00 | 115,52 | 61,65% | 34.586,35 | 0,09 |
| ZENICA | 1.844 | 147.481,68 | 79,98 | 9,08 | 16741,66 | 8,81 | 317.742,00 | 193.411,00 | 104,89 | 60,87% | 28.585,66 | 0,09 |
| VISOKO | 1.904 | 71.038,78 | 37,31 | 2,09 | 3.976,11 | 17,87 | 317.879,00 | 40.818,00 | 21,44 | 12,84% | 28.869,19 | 0,09 |
| KAKANJ | 2.240 | 110.476,53 | 49,32 | 8,37 | 18.743,18 | 5,89 | 355.946,36 | 216.534,01 | 96,67 | 60,83% | 33.015,21 | 0,09 |
| TESANJ | 1.633 | 154.989,80 | 94,91 | 22,38 | 36.548,33 | 4,24 | 505.773,00 | 418.893,00 | 256,52 | 82,82% | 44.721,06 | 0,09 |
| **AVERAGE** | **1.937** | **112.436,44** | **59,88** | **10,76** | **20.110,01** | **8,00** | **376.858,67** | **221.641,80** | **119,01** | **55,80%** | **33.955,49** | **0,09** |

| CROATIA<br>Name of school | Floor area [m2] | Investment Costs [€] | Investment € per m2 | Cost saving per m2 | Energy cost saving [€] | Simple pay-back period | Total energy consumption before renovation (kWh) | Total energy savings after nZEB renovation (kWh) | Energy saving per m2 [kWh/m2] | Energy savings [% of current total energy consumption] | Total energy costs before renovation (€) | Average energy price €/kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KMAN-KOCUNAR | 4.081 | 1.389.550,00 | 340,46 | 3,04 | 12.394,00 | 112,12 | 297.736,00 | 245.021,00 | 60,03 | 82,29% | 18.033,12 | 0,06 |
| BOL | 4.012 | 1.158.775,00 | 288,82 | 3,28 | 13173,53 | 87,96 | 317.156,00 | 258.155,00 | 64,34 | 81,40% | 19.332,01 | 0,06 |
| VISOKA | 4.558 | 543.044,00 | 119,14 | 1,96 | 8.931,00 | 60,80 | 224.390,00 | 99.750,00 | 21,88 | 44,45% | 14.587,87 | 0,07 |
| TRSTENIK | 3.887 | 776.545,00 | 199,77 | 3,42 | 13.306,37 | 58,36 | 333.290,00 | 197.658,00 | 50,85 | 59,31% | 20.811,79 | 0,06 |
| GRIPE | 5.506 | 1.011.078,32 | 183,63 | 2,46 | 13.547,89 | 74,63 | 332.668,00 | 250.953,35 | 45,58 | 75,44% | 21.098,34 | 0,06 |
| **AVERAGE** | **4.409** | **975.798,46** | **226,36** | **2,83** | **12.270,56** | **78,77** | **301.048,00** | **210.307,47** | **48,54** | **68,58%** | **18.772,63** | **0,06** |

| CYPRUS<br>Name of school | Floor area [m2] | Investment Costs [€] | Investment € per m2 | Cost saving per m2 | Energy cost saving [€] | Simple pay-back period | Total energy consumption before renovation (kWh) | Total energy savings after nZEB renovation (kWh) | Energy saving per m2 [kWh/m2] | Energy savings [% of current total energy consumption] | Total energy costs before renovation (€) | Average energy price €/kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HADJIGEORGAKIS KORNESIOS | 1.286 | 288.914,00 | 224,66 | 2,85 | 3.670,42 | 78,71 | 51.873,97 | 25.481,00 | 19,81 | 49,12% | 6.424,68 | 0,12 |
| DROUSIA PRIMARY SCHOOL | 447 | 35.116,10 | 78,56 | 11,87 | 5.306,30 | 6,62 | 22.069,00 | 18.080,90 | 40,45 | 81,93% | 2.926,54 | 0,13 |
| ''Ayios Georgios' 3rd PRIMARY SCHOOL OF LAKATAMIA' | 1.831 | 346.530,00 | 189,26 | 2,72 | 4.980,71 | 69,57 | 92.587,94 | 39.851,93 | 21,77 | 43,04% | 9.679,74 | 0,10 |
| 'Ayios Andreas' PRIMARY SCHOOL [1st and 2nd Cycle] | 1.757 | 341.587,00 | 194,41 | 5,29 | 9.286,01 | 36,79 | 147.164,47 | 78.297,36 | 44,56 | 53,20% | 15.170,33 | 0,10 |
| 'Livadia' PRIMARY SCHOOL - 2nd Cycle | 764 | 228.276,00 | 298,79 | 4,75 | 3.632,35 | 62,85 | 33.772,87 | 25.642,64 | 33,56 | 75,93% | 4.189,48 | 0,12 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 'Voroklini' PRIMARY SCHOOL | 1.534 | 414.554,00 | 270,24 | 3,37 | 5.170,26 | 80,18 | 43.371,81 | 32.302,38 | 21,06 | 74,48% | 6.156,49 | 0,14 |
| **AVERAGE** | **1.267** | **273.212,62** | **209,32** | **5,14** | **5.341,01** | **55,79** | **65.140,01** | **36.609,37** | **30,20** | **62,95%** | **7.424,54** | **0,12** |

| **FRANCE**<br>Name of school | Floor area [m2] | Investment Costs [€] | Investment € per m2 | Cost saving per m2 | Energy cost saving [€] | Simple pay-back period | Total energy consumption before renovation (kWh) | Total energy savings after nZEB renovation (kWh) | Energy saving per m2 [kWh/m2] | Energy savings [% of current total energy consumption] | Total energy costs before renovation (€) | Average energy price €/kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CFA LE BEAUSSET** | 3.263 | 475.300,00 | 145,66 | 11,55 | 37.700,00 | 12,61 | 719.448,00 | 384.600,00 | 117,87 | 53,46% | 67.358,00 | 0,03 |
| **CFA GAP** | 4.402 | 584.900,00 | 132,87 | 3,04 | 13.400,00 | 43,65 | 493.470,00 | 272.100,00 | 61,81 | 55,14% | 34.637,00 | 0,07 |
| **CFA LES ARCS** | 3.339 | 717.400,00 | 214,85 | 11,98 | 40.000,00 | 17,94 | 751.301,00 | 490.900,00 | 147,02 | 65,34% | 60.449,00 | 0,08 |
| **CFA DIGNE** | 7.379 | 855.300,00 | 115,91 | 7,30 | 53.900,00 | 15,87 | 1.228.770,00 | 602.100,00 | 81,60 | 49,00% | 121.583,0 | 0,10 |
| **CFA AVIGNON** | 1.669 | 303.000,00 | 181,55 | 7,43 | 12.400,00 | 24,44 | 179.015,00 | 169.900,00 | 101,80 | 94,91% | 18.252,00 | 0,10 |
| **AVERAGE** | **4.010** | **587.180,00** | **158,17** | **8,26** | **31.480,00** | **22,90** | **674.400,80** | **383.920,00** | **102,02** | **63,57%** | **60.455,80** | **0,08** |

| **GREECE**<br>Name of school | Floor area [m2] | Investment Costs [€] | Investment € per m2 | Cost saving per m2 | Energy cost saving [€] | Simple pay-back period | Total energy consumption before renovation (kWh) | Total energy savings after nZEB renovation (kWh) | Energy saving per m2 [kWh/m2] | Energy savings [% of current total energy consumption] | Total energy costs before renovation (€) | Average energy price €/kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2ND JUNIOR HIGH OF VARI** | 2.152 | 48.240,00 | 22,42 | 2,12 | 4.564,47 | 10,57 | 47.914,00 | 30.357,00 | 14,11 | 63,36% | 6.249,94 | 0,13 |
| **1ST JUNIOR HIGH SCHOOL OF VOULA** | 1.388 | 144.014,00 | 103,76 | 2,43 | 3.372,99 | 42,70 | 36.764,00 | 25.577,00 | 18,43 | 69,57% | 4.446,94 | 0,12 |
| **1ST PRIMARY SCHOOL OF VOULA** | 1.861 | 138.363,00 | 74,35 | 3,05 | 5.672,00 | 24,39 | 48.328,00 | 39.472,06 | 21,21 | 81,68% | 6.286,73 | 0,13 |
| **PRIMARY SCHOOL OF VARKIZA** | 1.040 | 109.494,00 | 105,28 | 4,97 | 5.172,50 | 21,17 | 53.375,00 | 40.699,00 | 39,13 | 76,25% | 6.389,40 | 0,12 |
| **PRIMARY SCHOOL OF VOULIAGMENI** | 1.756 | 125.325,00 | 71,37 | 2,75 | 4.829,41 | 25,95 | 54.721,00 | 37.250,00 | 21,21 | 68,07% | 6.506,63 | 0,12 |
| **AVERAGE** | **1.639** | **113.087,20** | **75,43** | **3,06** | **4.722,27** | **24,96** | **48.220,40** | **34.671,01** | **22,82** | **71,79%** | **5.975,93** | **0,12** |

| ITALY<br>Name of school | Floor area [m2] | Investment Costs [€] | Investment € per m2 | Cost saving per m2 | Energy cost saving [€] | Simple pay-back period | Total energy consumption before renovation (kWh) | Total energy savings after nZEB renovation (kWh) | Energy saving per m2 [kWh/m2] | Energy savings [% of current total energy consumption] | Total energy costs before renovation (€) | Average energy price €/kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Don Milani** | 658 | 409.000,00 | 621,50 | 14,07 | 9.262,12 | 44,16 | 143.339,02 | 111.110,74 | 168,84 | 77,52% | 12.606,70 | 0,09 |
| **Alberghetti** | 724 | 335.300,00 | 463,12 | 101,52 | 73.501,93 | 4,56 | 38.002,00 | 319.573,60 | 441,40 | 840,94% | 7.220,38 | 0,19 |
| **Scappi** | 7.966 | 1.774.000,00 | 222,69 | 9,90 | 78.868,29 | 22,49 | 836.767,06 | 415.096,25 | 52,11 | 49,61% | 103.861,13 | 0,12 |
| **Albertazzi-Pizzigotti** | 5.539 | 1.455.000,00 | 262,68 | 11,58 | 64.155,28 | 22,68 | 5.501,29 | 337.659,37 | 60,96 | **6137,82%** | 10.452,09 | 1,90 |
| **Sassatelli** | 3.013 | 1.060.800,00 | 352,04 | 31,96 | 96.304,41 | 11,02 | 42.290,96 | 506.865,35 | 168,21 | **1198,52%** | 8.035,28 | 0,19 |
| **AVERAGE** | **3.580** | **1.006.820,00** | **384,41** | **17,53** | **52.635,13** | **24,67** | **213.180,07** | **303.862,74** | **131,07** | **1570,89%** | **28.435,12** | **0,50** |

| SPAIN<br>Name of school | Floor area [m2] | Investment Costs [€] | Investment € per m2 | Cost saving per m2 | Energy cost saving [€] | Simple pay-back period | Total energy consumption before renovation (kWh) | Total energy savings after nZEB renovation (kWh) | Energy saving per m2 [kWh/m2] | Energy savings [% of current total energy consumption] | Total energy costs before renovation (€) | Average energy price €/kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SANT FRANCESC DE BORJA** | 1.557 | 141.530,00 | 90,90 | 2,04 | 3.184,00 | 44,45 | 86.514,00 | 40.984,00 | 26,32 | 47,37% | 6.716,87 | 0,08 |
| **CEIP LLUIS VIVES** | 4.024 | 267.424,00 | 66,46 | 1,84 | 7.405,00 | 36,11 | 182.984,00 | 68.163,00 | 16,94 | 37,25% | 18.039,99 | 0,10 |
| **CEIP JUAN VICENTE MORA** | 3.392 | 86.170,00 | 25,40 | 2,07 | 7.031,00 | 12,26 | 98.272,00 | 65.521,00 | 19,32 | 66,67% | 10.545,67 | 0,11 |
| **CEIP STA MARIA D'AIGÜES VIVES** | 670 | 38.200,00 | 57,01 | 3,03 | 2.027,00 | 18,85 | 34.000,00 | 15.318,00 | 22,86 | 45,05% | 4.498,20 | 0,13 |
| **CEIP LES COMES** | 1.599 | 115.530,00 | 72,25 | 1,97 | 3.146,00 | 36,72 | 74.373,00 | 28.964,00 | 18,11 | 38,94% | 7.871,22 | 0,11 |
| **AVERAGE** | **2.248** | **129.770,80** | **62,41** | **2,19** | **4.558,60** | **29,68** | **95.228,60** | **43.790,00** | **20,71** | **47,06%** | **9.534,39** | **0,10** |

It is interesting to notice huge differences between countries related to costs of nZEB renovation and feasibility of such renovation expressed with simple pay-back period. These differences are the result of differences in estimated investment costs and estimated energy cost savings (please note, that energy cost savings depend on both estimated energy savings (as a percentage of the current energy consumption and in absolute terms) and the cost of energy used in the building). These differences are shown in Figure 4-1 for defined nZEB renovation scenarios.

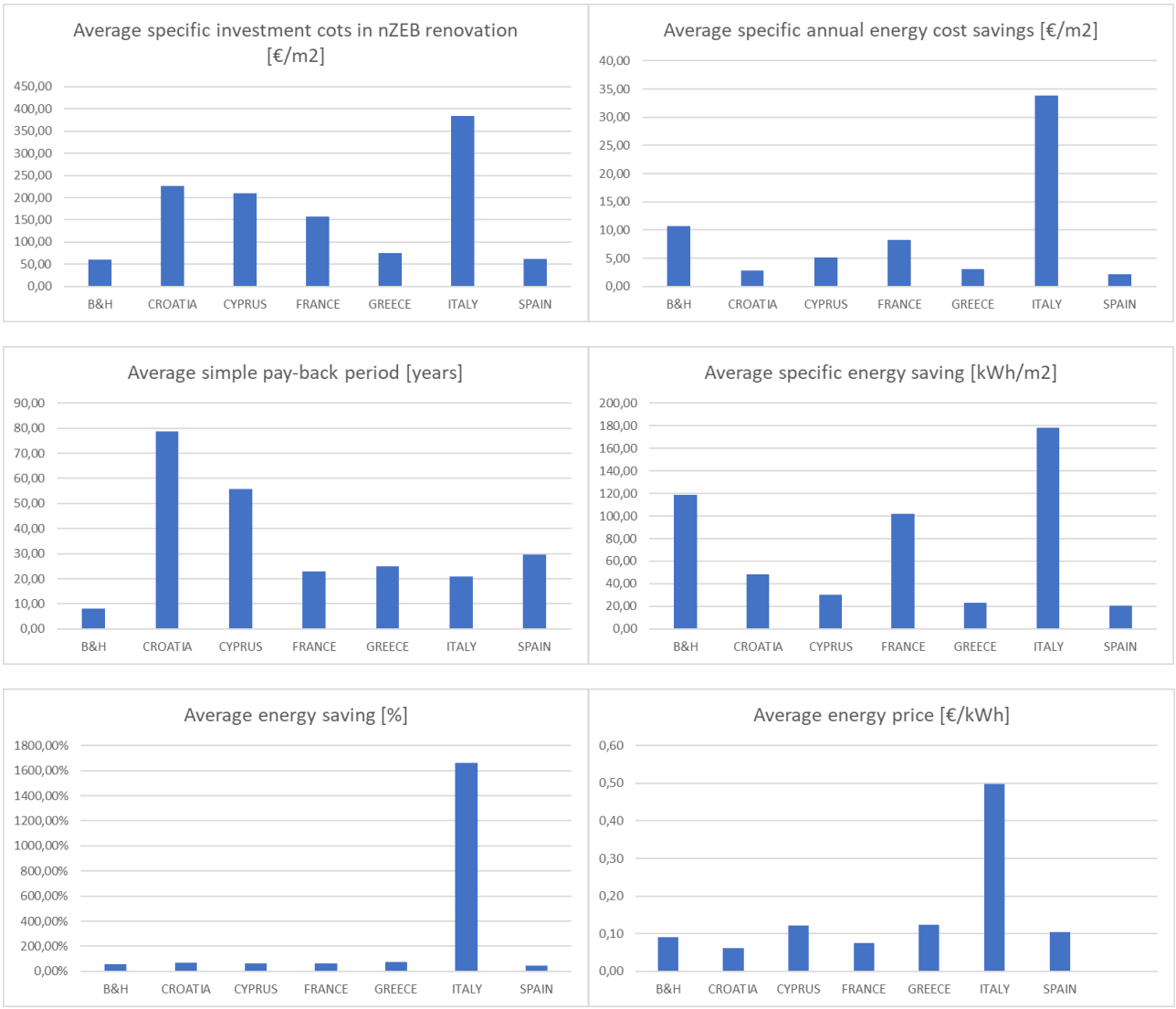


*Figure 4-1 Country comparison of characteristics of nZEB renovation of schools*

Analysis per individual measures in schools revealed several interesting issues:

- The level (thickness) of thermal insulation and the need for replacement of windows differ across the countries – for schools where both actions (thermal insulation of outer envelope and replacement of windows) are envisaged, there are huge differences in specific costs (costs per surface of the building) as shown in Figure 4.2;

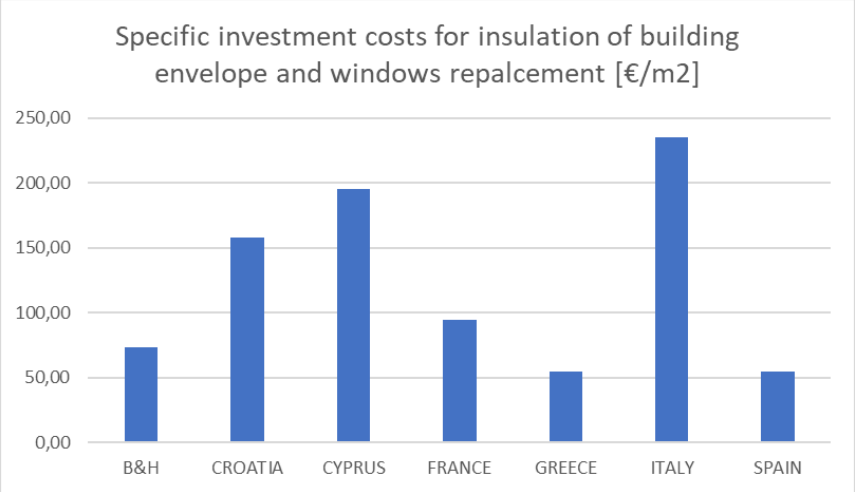


*Figure 4-2 Country comparison of specific investment costs for insulation of building envelope and windows replacement, expressed in Euros per floor area surface of a building*

- There are different measures proposed for improvement of heating systems and the selection of these measures significantly influences the costs of renovation – e.g. in B&H only smaller interventions in district/central heating systems are envisaged (with average specific cost of 2,80 €/$m^2$ of a building floor area); in Croatia, installation of new heat pumps is envisaged (with average specific cost of 80,29 €/$m^2$ of a building floor area); in Italy installation of geothermal heat pumps is envisaged (with average specific cost of 77,42 €/$m^2$); in Greece, France and Spain replacement of boilers is envisaged (with average specific cost of 17,50 €/$m^2$, 22,44 €/$m^2$ and 21,69 €/$m^2$ of a building floor area, respectively);

- Introduction of PV systems is envisaged in Croatia, Cyprus, Greece and Italy, with average prices ranging from above 2.00,00 €/kW in Croatia to approximately 1.500,00 €/kW in Cyprus and Greece.

Different definitions of nZEB standards, different choices of measures to come to the nZEB standard and different costs of these measures per countries are the main reasons behind huge differences in economic feasibility of such projects per countries.

## 4.3. RESULTS PER COUNTRY AND PER SCHOOL

Based on the established model for determining optimal financing model, the following proposals for each participating school are given. It has to be noted that in the recommendations provided below, the project partners are directed to investigate possibilities for co-financing of energy efficiency via grants from national sources that already exist in their countries, as they have reported in the questionnaire. Most of these grant schemes are related to the use of European Structural and Investment Funds, in particular to the use of European Regional Development Fund. These grants are more easily accessible and appropriate for smaller projects, like projects in individual schools.

### 4.3.1. BOSNIA AND HERZEGOVINA

| B&H<br>Name of school | Investment Costs [€] | Energy cost saving [€] | Simple pay-back period | Administrative, legal and architect cost (10%) | Interest rate | Credit financing cost | Other bank cost (3%) | ESCO cost (20%) | ESCO financing cost | PPP cost (30%) | PPP financing cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ZEPCE | 78.195,41 | 24.540,79 | 3,19 | 7.819,54 | 1,25% | 2.097,27 | 2.345,86 | 15.639,08 | 2.780,61 | 23.458,62 | 3.229,27 |
| ZENICA | 147.481,68 | 16.741,66 | 8,81 | 14.748,17 | 1,25% | 11.410,43 | 4.424,45 | 29.496,34 | 15.299,12 | 44.244,50 | 17.883,62 |
| VISOKO | 71.038,78 | 3.976,11 | 17,87 | 7.103,88 | 1,25% | 12.286,54 | 2.131,16 | 14.207,76 | 16.796,17 | 21.311,63 | 19.868,58 |
| KAKANJ | 110.476,53 | 18.743,18 | 5,89 | 11.047,65 | 1,25% | 5.572,39 | 3.314,30 | 22.095,31 | 7.430,01 | 33.142,96 | 8.656,69 |
| TESANJ | 154.989,80 | 36.548,33 | 4,24 | 15.498,98 | 1,25% | 5.558,76 | 4.649,69 | 30.997,96 | 7.387,43 | 46.496,94 | 8.590,79 |

| B&H | 1. Budget financing | | | | 2. Credit financing | | | | 3. ESCO financing | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Name of school | Total cost | Payback | NPV | IRR | Total cost | Payback | NPV | IRR | Total cost | Payback | NPV | IRR |
| ZEPCE | 86.015 | 3,50 | 227.699 | 28,48% | 90.458 | 3,69 | 223.256 | 27,06% | 104.435 | 4,26 | 209.279 | 23,38% |
| ZENICA | 162.230 | 9,69 | 51.785 | 9,17% | 178.065 | 10,64 | 35.950 | 8,04% | 207.025 | 12,37 | 6.989 | 6,35% |
| VISOKO | 78.143 | 19,65 | -27.315 | 1,94% | 92.560 | 23,28 | -41.732 | 0,56% | 109.147 | 27,45 | -58.319 | -0,71% |
| KAKANJ | 121.524 | 6,48 | 118.077 | 14,95% | 130.411 | 6,96 | 109.190 | 13,81% | 151.049 | 8,06 | 88.551 | 11,61% |
| TESANJ | 170.489 | 4,66 | 296.722 | 21,26% | 180.697 | 4,94 | 286.513 | 20,01% | 208.874 | 5,72 | 258.336 | 17,16% |

| B&H | 4. PPP financing | | | | 5. Subsidies (ESCO+Subsidy) | | | | | 6. Financing gap (Subsidy needed to breakeven) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Name of school | Total cost | Payback | NPV | IRR | % subsidy | Total cost | Payback | NPV | IRR | % subsidy | Total cost | Payback | NPV | IRR |
| ZEPCE | 112.703 | 4,59 | 201.011 | 21,61% | 60% | 41.109,99 | 1,68 | 272.604 | 59,69% | 60% | 41.109,99 | 1,68 | 272.604 | 59,69% |
| ZENICA | 224.358 | 13,40 | -10.343 | 5,51% | 60% | 79.014,84 | 4,72 | 135.000 | 21,01% | 60% | 79.014,84 | 4,72 | 135.000 | 21,01% |
| VISOKO | 119.323 | 30,01 | -68.495 | -1,36% | 60% | 39.287,59 | 9,88 | 11.540 | 8,93% | 60% | 39.287,59 | 9,88 | 11.540 | 8,93% |
| KAKANJ | 163.324 | 8,71 | 76.277 | 10,54% | 60% | 58.607,72 | 3,13 | 180.993 | 31,95% | 60% | 58.607,72 | 3,13 | 180.993 | 31,95% |
| TESANJ | 225.577 | 6,17 | 241.634 | 15,79% | 60% | 81.768,87 | 2,24 | 385.441 | 44,69% | 60% | 81.768,87 | 2,24 | 385.441 | 44,69% |

### 4.3.2. CROATIA

| CROATIA<br>Name of school | Investment Costs [€] | Energy cost saving [€] | Simple pay-back period | Administrative, legal and architect cost (10%) | Interest rate | Credit financing cost | Other bank cost (3%) | ESCO cost (20%) | ESCO financing cost | PPP cost (30%) | PPP financing cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| KMAN-KOCUNAR | 1.389.550,00 | 12.394,00 | 112,11 | 138.955,00 | 4,00% | #NUM! | 41.686,50 | 277.910,00 | #NUM! | 416.865,00 | #NUM! |
| BOL | 1.158.775,00 | 13.173,53 | 87,96 | 115.877,50 | 4,00% | #NUM! | 34.763,25 | 231.755,00 | #NUM! | 347.632,50 | #NUM! |
| VISOKA | 543.044,00 | 8.931,00 | 60,80 | 54.304,40 | 4,00% | #NUM! | 16.291,32 | 108.608,80 | #NUM! | 162.913,20 | #NUM! |
| TRSTENIK | 776.545,00 | 13.306,37 | 58,36 | 77.654,50 | 4,00% | #NUM! | 23.296,35 | 155.309,00 | #NUM! | 232.963,50 | #NUM! |
| GRIPE | 1.011.078,32 | 13.547,89 | 74,63 | 101.107,83 | 4,00% | #NUM! | 30.332,35 | 202.215,66 | #NUM! | 303.323,50 | #NUM! |

| CROATIA | 1. Budget financing | | | | 2. Credit financing | | | | 3. ESCO financing | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Name of school | Total cost | Payback | NPV | IRR | Total cost | Payback | NPV | IRR | Total cost | Payback | NPV | IRR |
| KMAN-KOCUNAR | 1.528.505 | 123,33 | -1.370.068 | -9,76% | #NUM! | #NUM! | #NUM! | #VALUE! | #NUM! | #NUM! | #NUM! | #VALUE! |
| BOL | 1.274.653 | 96,76 | -1.106.251 | -8,51% | #NUM! | #NUM! | #NUM! | #VALUE! | #NUM! | #NUM! | #NUM! | #VALUE! |
| VISOKA | 597.348 | 66,88 | -483.180 | -6,47% | #NUM! | #NUM! | #NUM! | #VALUE! | #NUM! | #NUM! | #NUM! | #VALUE! |
| TRSTENIK | 854.200 | 64,19 | -684.099 | -6,24% | #NUM! | #NUM! | #NUM! | #VALUE! | #NUM! | #NUM! | #NUM! | #VALUE! |
| GRIPE | 1.112.186 | 82,09 | -938.999 | -7,62% | #NUM! | #NUM! | #NUM! | #VALUE! | #NUM! | #NUM! | #NUM! | #VALUE! |

| CROATIA | 4. PPP financing | | | | 5. Subsidies (ESCO+Subsidy) | | | | | 6. Financing gap (Subsidy needed to breakeven) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Name of school | Total cost | Payback | NPV | IRR | % subsidy | Total cost | Payback | NPV | IRR | % subsidy | Total cost | Payback | NPV | IRR |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **KMAN-KOCUNAR** | #NUM! | #NUM! | #NUM! | #VALUE! | 60% | #NUM! | #NUM! | #NUM! | #VALUE! | 93% | 158.436,92 | 12,78 | 0 | 6,00% |
| **BOL** | #NUM! | #NUM! | #NUM! | #VALUE! | 60% | #NUM! | #NUM! | #NUM! | #VALUE! | 91% | 168.401,93 | 12,78 | 0 | 6,00% |
| **VISOKA** | #NUM! | #NUM! | #NUM! | #VALUE! | 60% | #NUM! | #NUM! | #NUM! | #VALUE! | 87% | 114.168,15 | 12,78 | 0 | 6,00% |
| **TRSTENIK** | #NUM! | #NUM! | #NUM! | #VALUE! | 60% | #NUM! | #NUM! | #NUM! | #VALUE! | 87% | 170.100,07 | 12,78 | 0 | 6,00% |
| **GRIPE** | #NUM! | #NUM! | #NUM! | #VALUE! | 60% | #NUM! | #NUM! | #NUM! | #VALUE! | 90% | 173.187,50 | 12,78 | 0 | 6,00% |

**NOTE: When #NUM! is shown in table it means that projects can't cover cost of financing (interests) with projected savings, the monthly cost of financing is greater than monthly saving, thus project can't be repaid.**

### 4.3.3. CYPRUS

| **CYPRUS**<br>**Name of school** | **Investment Costs [€]** | **Energy cost saving [€]** | **Simple pay-back period** | **Administrative, legal and architect cost (10%)** | **Interest rate** | **Credit financing cost** | **Other bank cost (3%)** | **ESCO cost (20%)** | **ESCO financing cost** | **PPP cost (30%)** | **PPP financing cost** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **HADJIGEORGAKIS KORNESIOS** | 288.914,00 | 3.670,42 | 78,71 | 28.891,40 | 4,00% | #NUM! | 8.667,42 | 57.782,80 | #NUM! | 86.674,20 | #NUM! |
| **DROUSIA PRIMARY SCHOOL** | 35.116,10 | 5.306,30 | 6,62 | 3.511,61 | 4,00% | 7.547,26 | 1.053,48 | 7.023,22 | 10.395,48 | 10.534,83 | 12.358,11 |
| **''Ayios Georgios' 3rd PRIMARY SCHOOL OF LAKATAMIA'** | 346.530,00 | 4.980,71 | 69,57 | 34.653,00 | 4,00% | #NUM! | 10.395,90 | 69.306,00 | #NUM! | 103.959,00 | #NUM! |
| **'Ayios Andreas' PRIMARY SCHOOL [1st and 2nd Cycle]** | 341.587,00 | 9.286,01 | 36,79 | 34.158,70 | 4,00% | #NUM! | 10.247,61 | 68.317,40 | #NUM! | 102.476,10 | #NUM! |
| **'Livadia' PRIMARY SCHOOL - 2nd Cycle** | 228.276,00 | 3.632,35 | 62,85 | 22.827,60 | 4,00% | #NUM! | 6.848,28 | 45.655,20 | #NUM! | 68.482,80 | #NUM! |
| **'Voroklini' PRIMARY SCHOOL** | 414.554,00 | 5.170,26 | 80,18 | 41.455,40 | 4,00% | #NUM! | 12.436,62 | 82.910,80 | #NUM! | 124.366,20 | #NUM! |

| **CYPRUS** | **1. Budget financing** | **2. Credit financing** | **3. ESCO financing** |
|---|---|---|---|

| Name of school | Total cost | Payback | NPV | IRR | Total cost | Payback | NPV | IRR | Total cost | Payback | NPV | IRR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HADJIGEORGAKIS KORNESIOS | 317.805 | 86,59 | -270.885 | -7,91% | #NUM! | #NUM! | #NUM! | #VALUE! | #NUM! | #NUM! | #NUM! | #VALUE! |
| DROUSIA PRIMARY SCHOOL | 38.628 | 7,28 | 29.205 | 13,10% | 47.228 | 8,90 | 20.604 | 10,26% | 56.046 | 10,56 | 11.786 | 8,12% |
| ''Ayios Georgios' 3rd PRIMARY SCHOOL OF LAKATAMIA' | 381.183 | 76,53 | -317.513 | -7,23% | #NUM! | #NUM! | #NUM! | #VALUE! | #NUM! | #NUM! | #NUM! | #VALUE! |
| 'Ayios Andreas' PRIMARY SCHOOL [1st and 2nd Cycle] | 375.746 | 40,46 | -257.039 | -3,41% | #NUM! | #NUM! | #NUM! | #VALUE! | #NUM! | #NUM! | #NUM! | #VALUE! |
| 'Livadia' PRIMARY SCHOOL - 2nd Cycle | 251.104 | 69,13 | -204.670 | -6,66% | #NUM! | #NUM! | #NUM! | #VALUE! | #NUM! | #NUM! | #NUM! | #VALUE! |
| 'Voroklini' PRIMARY SCHOOL | 456.009 | 88,20 | -389.916 | -8,01% | #NUM! | #NUM! | #NUM! | #VALUE! | #NUM! | #NUM! | #NUM! | #VALUE! |

| CYPRUS | 4. PPP financing | | | | 5. Subsidies (ESCO+Subsidy) | | | | | 6. Financing gap (Subsidy needed to breakeven) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Name of school | Total cost | Payback | NPV | IRR | % subsidy | Total cost | Payback | NPV | IRR | % subsidy | Total cost | Payback | NPV | IRR |
| HADJIGEORGAKIS KORNESIOS | #NUM! | #NUM! | #NUM! | #VALUE! | 60% | #NUM! | #NUM! | #NUM! | #VALUE! | 90% | 46.920,30 | 12,78 | 0 | 6,00% |
| DROUSIA PRIMARY SCHOOL | 61.521 | 11,59 | 6.312 | 7,06% | 60% | 19.678,59 | 3,71 | 48.154 | 26,89% | 60% | 19.678,59 | 3,71 | 48.154 | 26,89 % |
| ''Ayios Georgios' 3rd PRIMARY SCHOOL OF LAKATAMIA' | #NUM! | #NUM! | #NUM! | #VALUE! | 60% | #NUM! | #NUM! | #NUM! | #VALUE! | 89% | 63.670,20 | 12,78 | 0 | 6,00% |
| 'Ayios Andreas' PRIMARY SCHOOL [1st and 2nd Cycle] | #NUM! | #NUM! | #NUM! | #VALUE! | 60% | 336.882,28 | 36,28 | -218.176 | -2,68% | 79% | 118.706,34 | 12,78 | 0 | 6,00% |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 'Livadia' PRIMARY SCHOOL - 2nd Cycle | #NUM! | #NUM! | #NUM! | #VALUE! | 60% | #NUM! | #NUM! | #NUM! | #VALUE! | 88% | 46.433,58 | 12,78 | 0 | 6,00% |
| 'Voroklini' PRIMARY SCHOOL | #NUM! | #NUM! | #NUM! | #VALUE! | 60% | #NUM! | #NUM! | #NUM! | #VALUE! | 90% | 66.093,28 | 12,78 | 0 | 6,00% |

**NOTE: When #NUM! is shown in table it means that projects can't cover cost of financing (interests) with projected savings, the monthly cost of financing is greater than monthly saving, thus project can't be repaid.**

### 4.3.4. FRANCE

| FRANCE<br>Name of school | Investment Costs [€] | Energy cost saving [€] | Simple pay-back period | Administrative, legal and architect cost (10%) | Interest rate | Credit financing cost | Other bank cost (3%) | ESCO cost (20%) | ESCO financing cost | PPP cost (30%) | PPP financing cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CFA LE BEAUSSET | 475.300,00 | 37.700,00 | 12,61 | 47.530,00 | 0,50% | 20.204,89 | 14.259,00 | 95.060,00 | 26.925,95 | 142.590,00 | 31.358,02 |
| CFA GAP | 584.900,00 | 13.400,00 | 43,65 | 58.490,00 | 0,50% | 98.152,22 | 17.547,00 | 116.980,00 | 134.090,31 | 175.470,00 | 158.545,51 |
| CFA LES ARCS | 717.400,00 | 40.000,00 | 17,94 | 71.740,00 | 0,50% | 44.255,63 | 21.522,00 | 143.480,00 | 59.200,25 | 215.220,00 | 69.099,13 |
| CFA DIGNE | 855.300,00 | 53.900,00 | 15,87 | 85.530,00 | 0,50% | 46.313,82 | 25.659,00 | 171.060,00 | 61.862,30 | 256.590,00 | 72.143,05 |
| CFA AVIGNON | 303.000,00 | 12.400,00 | 24,44 | 30.300,00 | 0,50% | 26.140,80 | 9.090,00 | 60.600,00 | 35.135,78 | 90.900,00 | 41.128,78 |

| FRANCE | 1. Budget financing | | | | 2. Credit financing | | | | 3. ESCO financing | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Name of school | Total cost | Payback | NPV | IRR | Total cost | Payback | NPV | IRR | Total cost | Payback | NPV | IRR |
| CFA LE BEAUSSET | 522.830 | 13,87 | -40.897 | 5,16% | 557.294 | 14,78 | -75.361 | 4,53% | 644.816 | 17,10 | -162.883 | 3,16% |
| CFA GAP | 643.390 | 48,01 | -472.093 | -4,50% | 759.089 | 56,65 | -587.792 | -5,50% | 894.460 | 66,75 | -723.163 | -6,46% |
| CFA LES ARCS | 789.140 | 19,73 | -277.806 | 1,91% | 854.918 | 21,37 | -343.583 | 1,24% | 991.820 | 24,80 | -480.486 | 0,06% |
| CFA DIGNE | 940.830 | 17,46 | -251.807 | 2,98% | 1.012.803 | 18,79 | -323.780 | 2,33% | 1.173.752 | 21,78 | -484.729 | 1,09% |
| CFA AVIGNON | 333.300 | 26,88 | -174.786 | -0,55% | 368.531 | 29,72 | -210.017 | -1,29% | 429.036 | 34,60 | -270.522 | -2,36% |

| FRANCE | 4. PPP financing | | | | 5. Subsidies (ESCO+Subsidy) | | | | | 6. Financing gap (Subsidy needed to breakeven) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Name of school | Total cost | Payback | NPV | IRR | % subsidy | Total cost | Payback | NPV | IRR | % subsidy | Total cost | Payback | NPV | IRR |
| CFA LE BEAUSSET | 696.778 | 18,48 | -214.845 | 2,47% | 60% | 251.349,91 | 6,67 | 230.583 | 14,49% | 60% | 251.349,91 | 6,67 | 230.583 | 14,49% |
| CFA GAP | 977.406 | 72,94 | -806.109 | -6,97% | 60% | 322.901,89 | 24,10 | -151.605 | 0,28% | 78% | 171.296,97 | 12,78 | 0 | 6,00% |
| CFA LES ARCS | 1.073.459 | 26,84 | -562.125 | -0,54% | 60% | 382.105,60 | 9,55 | 129.229 | 9,35% | 60% | 382.105,60 | 9,55 | 129.229 | 9,35% |
| CFA DIGNE | 1.269.563 | 23,55 | -580.540 | 0,46% | 60% | 454.285,81 | 8,43 | 234.737 | 10,99% | 60% | 454.285,81 | 8,43 | 234.737 | 10,99% |
| CFA AVIGNON | 465.329 | 37,53 | -306.815 | -2,91% | 60% | 162.821,62 | 13,13 | -4.308 | 5,72% | 61% | 158.513,62 | 12,78 | 0 | 6,00% |

### 4.3.5. GREECE

| GREECE<br>Name of school | Investment Costs [€] | Energy cost saving [€] | Simple pay-back period | Administrative, legal and architect cost (10%) | Interest rate | Credit financing cost | Other bank cost (3%) | ESCO cost (20%) | ESCO financing cost | PPP cost (30%) | PPP financing cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2ND JUNIOR HIGH OF VARI | 48.240,00 | 4.564,47 | 10,57 | 4.824,00 | 3,00% | 13.065,76 | 1.447,20 | 9.648,00 | 18.229,70 | 14.472,00 | 21.852,38 |
| 1ST JUNIOR HIGH SCHOOL OF VOULA | 144.014,00 | 3.372,99 | 42,7 | 14.401,40 | 3,00% | #NUM! | 4.320,42 | 28.802,80 | #NUM! | 43.204,20 | #NUM! |
| 1ST PRIMARY SCHOOL OF VOULA | 138.363,00 | 5.672,00 | 24,39 | 13.836,30 | 3,00% | 175.728,91 | 4.150,89 | 27.672,60 | 392.478,84 | 41.508,90 | #NUM! |
| PRIMARY SCHOOL OF VARKIZA | 109.494,00 | 5.172,50 | 21,17 | 10.949,40 | 3,00% | 94.560,28 | 3.284,82 | 21.898,80 | 159.114,44 | 32.848,20 | 226.311,56 |
| PRIMARY SCHOOL OF VOULIAGMENI | 125.325,00 | 4.829,41 | 25,95 | 12.532,50 | 3,00% | 199.751,23 | 3.759,75 | 25.065,00 | #NUM! | 37.597,50 | #NUM! |

| GREECE | 1. Budget financing | | | | 2. Credit financing | | | | 3. ESCO financing | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Name of school | Total cost | Payback | NPV | IRR | Total cost | Payback | NPV | IRR | Total cost | Payback | NPV | IRR |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2ND JUNIOR HIGH OF VARI** | 53.064 | 11,63 | 5.285 | 7,03% | 67.577 | 14,80 | -9.228 | 4,52% | 80.942 | 17,73 | -22.592 | 2,84% |
| **1ST JUNIOR HIGH SCHOOL OF VOULA** | 158.415 | 46,97 | -115.297 | -4,36% | #NUM! | #NUM! | #NUM! | #VALUE! | #NUM! | #NUM! | #NUM! | #VALUE! |
| **1ST PRIMARY SCHOOL OF VOULA** | 152.199 | 26,83 | -79.692 | -0,54% | 332.079 | 58,55 | -259.572 | -5,70% | 572.351 | 100,91 | -499.844 | -8,73% |
| **PRIMARY SCHOOL OF VARKIZA** | 120.443 | 23,29 | -54.321 | 0,55% | 218.288 | 42,20 | -152.167 | -3,68% | 301.457 | 58,28 | -235.335 | -5,67% |
| **PRIMARY SCHOOL OF VOULIAGMENI** | 137.858 | 28,55 | -76.121 | -1,00% | 341.368 | 70,69 | -279.632 | -6,79% | #NUM! | #NUM! | #NUM! | #VALUE! |

| **GREECE** | **4. PPP financing** | | | | **5. Subsidies (ESCO+Subsidy)** | | | | | **6. Financing gap (Subsidy needed to breakeven)** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Name of school** | **Total cost** | **Payback** | **NPV** | **IRR** | **% subsidy** | **Total cost** | **Payback** | **NPV** | **IRR** | **% subsidy** | **Total cost** | **Payback** | **NPV** | **IRR** |
| **2ND JUNIOR HIGH OF VARI** | 89.388 | 19,58 | -31.039 | 1,97% | 60% | 27.446,61 | 6,01 | 30.903 | 16,24% | 60% | 27.446,61 | 6,01 | 30.903 | 16,24% |
| **1ST JUNIOR HIGH SCHOOL OF VOULA** | #NUM! | #NUM! | #NUM! | #VALUE! | 60% | 123.470,38 | 36,61 | -80.352 | -2,74% | 81% | 43.118,13 | 12,78 | 0 | 6,00% |
| **1ST PRIMARY SCHOOL OF VOULA** | #NUM! | #NUM! | #NUM! | #VALUE! | 60% | 90.660,66 | 15,98 | -18.153 | 3,78% | 67% | 72.507,20 | 12,78 | 0 | 6,00% |
| **PRIMARY SCHOOL OF VARKIZA** | 379.603 | 73,39 | -313.481 | -7,00% | 60% | 69.194,14 | 13,38 | -3.072 | 5,53% | 61% | 66.121,91 | 12,78 | 0 | 6,00% |
| **PRIMARY SCHOOL OF VOULIAGMENI** | #NUM! | #NUM! | #NUM! | #VALUE! | 60% | 83.637,26 | 17,32 | -21.901 | 3,05% | 69% | 61.736,07 | 12,78 | 0 | 6,00% |

**NOTE: When #NUM! is shown in table it means that projects can't cover cost of financing (interests) with projected savings, the monthly cost of financing is greater than monthly saving, thus project can't be repaid.**

### 4.3.6. ITALY

| ITALY<br>Name of school | Investment Costs [€] | Energy cost saving [€] | Simple pay-back period | Administrative, legal and architect cost (10%) | Interest rate | Credit financing cost | Other bank cost (3%) | ESCO cost (20%) | ESCO financing cost | PPP cost (30%) | PPP financing cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Don Milani | 409.000,00 | 9.262,12 | 44,16 | 40.900,00 | 3,0% | #NUM! | 12.270,00 | 81.800,00 | #NUM! | 122.700,00 | #NUM! |
| Alberghetti | 335.300,00 | 73.501,93 | 4,56 | 33.530,00 | 3,0% | 33.231,31 | 10.059,00 | 67.060,00 | 44.689,41 | 100.590,00 | 52.340,37 |
| Scappi | 1.774.000,00 | 78.868,29 | 22,49 | 177.400,00 | 3,0% | 1.779.653,06 | 53.220,00 | 354.800,00 | 3.214.847,30 | 532.200,00 | 5.137.333,03 |
| Albertazzi-Pizzigotti | 1.455.000,00 | 64.155,28 | 22,68 | 145.500,00 | 3,0% | 1.491.827,72 | 43.650,00 | 291.000,00 | 2.730.107,51 | 436.500,00 | 4.488.707,25 |
| Sassatelli | 1.060.800,00 | 96.304,41 | 11,02 | 106.080,00 | 3,0% | 303.800,30 | 31.824,00 | 212.160,00 | 425.375,54 | 318.240,00 | 511.110,06 |

| ITALY | 1. Budget financing | | | | 2. Credit financing | | | | 3. ESCO financing | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Name of school | Total cost | Payback | NPV | IRR | Total cost | Payback | NPV | IRR | Total cost | Payback | NPV | IRR |
| Don Milani | 449.900 | 48,57 | -331.499 | -4,57% | #NUM! | #NUM! | #NUM! | #VALUE! | #NUM! | #NUM! | #NUM! | #VALUE! |
| Alberghetti | 368.830 | 5,02 | 570.771 | 19,71% | 412.120 | 5,61 | 527.481 | 17,52% | 480.579 | 6,54 | 459.022 | 14,81% |
| Scappi | 1.951.400 | 24,74 | -943.199 | 0,08% | 3.784.273 | 47,98 | -2.776.072 | -4,49% | 5.521.047 | 70,00 | -4.512.846 | -6,73% |
| Albertazzi-Pizzigotti | 1.600.500 | 24,95 | -780.380 | 0,02% | 3.135.978 | 48,88 | -2.315.858 | -4,61% | 4.621.608 | 72,04 | -3.801.488 | -6,90% |
| Sassatelli | 1.166.880 | 12,12 | 64.214 | 6,57% | 1.502.504 | 15,60 | -271.411 | 4,01% | 1.804.416 | 18,74 | -573.322 | 2,35% |

| ITALY | 4. PPP financing | | | | 5. Subsidies (ESCO+Subsidy) | | | | | 6. Financing gap (Subsidy needed to breakeven) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Name of school | Total cost | Payback | NPV | IRR | % subsidy | Total cost | Payback | NPV | IRR | % subsidy | Total cost | Payback | NPV | IRR |
| Don Milani | #NUM! | #NUM! | #NUM! | #VALUE | 60% | 360.915,42 | 38,97 | -242.514 | -3,16% | 82% | 118.400,94 | 12,7 | 0 | 6,00% |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ! | | | | | | | | 8 | | | |
| **Alberghetti** | 521.760 | 7,10 | 417.841 | 13,49% | 60% | 181.096,91 | 2,46 | 758.504 | 40,58% | 60% | 181.096,91 | 2,46 | 758.504 | 40,58 % |
| **Scappi** | 7.620.933 | 96,63 | -6.612.732 | -8,50% | 60% | 1.137.541,09 | 14,42 | -129.340 | 4,77% | 64% | 1.008.201,44 | 12,78 | 0 | 6,00% |
| **Albertazzi-Pizzigotti** | 6.525.707 | 101,72 | -5.705.587 | -8,77% | 60% | 934.931,63 | 14,57 | -114.812 | 4,67% | 64% | 820.119,80 | 12,78 | 0 | 6,00% |
| **Sassatelli** | 1.996.230 | 20,73 | -765.136 | 1,50% | 60% | 606.007,05 | 6,29 | 625.087 | 15,45% | 60% | 606.007,05 | 6,29 | 625.087 | 15,45 % |

**NOTE: When #NUM! is shown in table it means that projects can't cover cost of financing (interests) with projected savings, the monthly cost of financing is greater than monthly saving, thus project can't be repaid.**

### 4.3.7. SPAIN

| **SPAIN** Name of school | Investment Costs [€] | Energy cost saving [€] | Simple pay-back period | Administrative, legal and architect cost (10%) | Interest rate | Credit financing cost | Other bank cost (3%) | ESCO cost (20%) | ESCO financing cost | PPP cost (30%) | PPP financing cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SANT FRANCESC DE BORJA** | 141.530,00 | 3.184,00 | 44,45 | 14.153,00 | 0,50% | 24.278,02 | 4.245,90 | 28.306,00 | 33.192,82 | 42.459,00 | 39.265,46 |
| **CEIP LLUIS VIVES** | 267.424,00 | 7.405,00 | 36,11 | 26.742,40 | 0,50% | 35.862,27 | 8.022,72 | 53.484,80 | 48.659,19 | 80.227,20 | 57.288,59 |
| **CEIP JUAN VICENTE MORA** | 86.170,00 | 7.031,00 | 12,25572 | 8.617,00 | 0,50% | 3.556,46 | 2.585,10 | 17.234,00 | 4.738,33 | 25.851,00 | 5.517,46 |
| **CEIP STA MARIA D'AIGÜES VIVES** | 38.200,00 | 2.027,00 | 18,85 | 3.820,00 | 0,50% | 2.484,99 | 1.146,00 | 7.640,00 | 3.326,32 | 11.460,00 | 3.884,03 |
| **CEIP LES COMES** | 115.530,00 | 3.146,00 | 36,72282 | 11.553,00 | 0,50% | 15.797,33 | 3.465,90 | 23.106,00 | 21.445,70 | 34.659,00 | 25.257,23 |

| **SPAIN** | **1. Budget financing** | **2. Credit financing** | **3. ESCO financing** |
|---|---|---|---|

| Name of school | Total cost | Payback | NPV | IRR | Total cost | Payback | NPV | IRR | Total cost | Payback | NPV | IRR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SANT FRANCESC DE BORJA | 155.683 | 48,90 | -114.981 | -4,61% | 184.207 | 57,85 | -143.505 | -5,63% | 217.182 | 68,21 | -176.480 | -6,59% |
| CEIP LLUIS VIVES | 294.166 | 39,73 | -199.506 | -3,29% | 338.051 | 45,65 | -243.391 | -4,18% | 396.310 | 53,52 | -301.650 | -5,16% |
| CEIP JUAN VICENTE MORA | 94.787 | 13,48 | -4.907 | 5,45% | 100.929 | 14,35 | -11.049 | 4,82% | 116.759 | 16,61 | -26.880 | 3,43% |
| CEIP STA MARIA D'AIGÜES VIVES | 42.020 | 20,73 | -16.108 | 1,50% | 45.651 | 22,52 | -19.739 | 0,82% | 52.986 | 26,14 | -27.074 | -0,34% |
| CEIP LES COMES | 127.083 | 40,40 | -86.867 | -3,39% | 146.346 | 46,52 | -106.130 | -4,30% | 171.635 | 54,56 | -131.418 | -5,28% |

| SPAIN | 4. PPP financing | | | | 5. Subsidies (ESCO+Subsidy) | | | | | 6. Financing gap (Subsidy needed to breakeven) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Name of school | Total cost | Payback | NPV | IRR | % subsidy | Total cost | Payback | NPV | IRR | % subsidy | Total cost | Payback | NPV | IRR |
| SANT FRANCESC DE BORJA | 237.407 | 74,56 | -196.705 | -7,09% | 60% | 78.223,62 | 24,57 | -37.521 | 0,13% | 79% | 40.702,21 | 12,78 | 0 | 6,00% |
| CEIP LLUIS VIVES | 431.682 | 58,30 | -337.021 | -5,67% | 60% | 146.059,34 | 19,72 | -51.399 | 1,91% | 74% | 94.660,75 | 12,78 | 0 | 6,00% |
| CEIP JUAN VICENTE MORA | 126.155 | 17,94 | -36.276 | 2,73% | 60% | 45.547,33 | 6,48 | 44.332 | 14,96% | 60% | 45.547,33 | 6,48 | 44.332 | 14,96% |
| CEIP STA MARIA D'AIGÜES VIVES | 57.364 | 28,30 | -31.452 | -0,93% | 60% | 20.371,40 | 10,05 | 5.540 | 8,72% | 60% | 20.371,40 | 10,05 | 5.540 | 8,72% |
| CEIP LES COMES | 186.999 | 59,44 | -146.783 | -5,79% | 60% | 63.153,46 | 20,07 | -22.937 | 1,76% | 74% | 40.216,44 | 12,78 | 0 | 6,00% |

# 5. ANNEX – FEEDBACK FROM PARTNERS ON FINANCING MODELS FOR EE PROJECTS IN SCHOOLS

## 5.1. BOSNIA AND HERZEGOVINA

| Question | Answer | | | |
|---|---|---|---|---|
| **1. General information** | | | | |
| **Name of partner** | Department for Development and International Projects of Zenica - Doboj Canton | | | |
| **Type and number of schools chosen for pilots** | Primary | Elementary | College | |
| | 58 | 30 | 0 | |
| **Who is the legal owner of schools** | Zenica - Doboj Canton | | | |
| **Who pays utility bills and regular maintenance for schools** | Ministry for education, science, culture and sport of Zenica - Doboj Canton | | | |
| **What is the source for those costs** | Budget of the Zenica - Doboj Canton | | | |
| **Who is responsible for making decisions on implementation of energy renovation projects** | Ministry for education, science, culture and sport of Zenica - Doboj Canton | | | |
| **What is the source for the cost of energy renovation** | Budget of the Zenica - Doboj Canton | | | |
| **Which department (sector, institution) is responsible for implementation of energy renovation (in public buildings)** | It depends on to which relevant Ministry does the object belong to, so the Ministry of education, culture, science and sports is responsible for school buildings. | | | |
| **2. Financing EE projects using own funds** | | | | |
| **Do you have funds in your budget allocated for EE projects in public buildings** | Yes | | | No |
| | 500.000,00 € | | | / |
| **Do you have funds in your budget allocated for EE projects specifically in schools** | Yes | | | No |
| | 307.000,00 € | | | / |
| **Have you already implemented EE projects in schools using own funds** | Yes | | | No |
| | EE projects in 10 schools; total investment 400.000,00 € | | | / |
| **3. Financing EE projects using credit or loan funds (debt)** | | | | |
| **Is this kind of financing available for you?** | Yes | | | No |
| | Source (commercial bank, development bank, other) | Interest rate | Repayment period | / |
| | Federation of Bosnia and Herzegovina (with the funds of the International Development association for the realization of the BEEP | 1,25% | 10 years | |

| | | | | |
|---|---|---|---|---|
| | project, finances by the World Bank) | | | |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | | | No |
| | We are planning to invest in EE projects using the same credit line, and for the upcoming period, more than 2.000.000,00 € is planned to be invested in EE project. Funds for these kinds of purposes aren't necessarily approved each year, and the distribution of such funds depends on their availability. | | | / |
| **Have you conducted EE project in schools financed by credit or loan funds (debt)** | Yes | | | No |
| | EE projects in 10 schools, total investment 1.370.000,00 €, loan from World bank, 1,25% interest rate, 10 years repayment period | | | / |
| **4. Financing EE projects using grants, subsidies or other incentives** | | | | |
| **Is this kind of financing available for you?** | Yes | | | No |
| | Source (national, EU funds, other) | Grant rate % | Max. amount of grant per project | / |
| | Green Economic Development (GED)<br>Name of institution responsible for disbursement: UNDP<br>Source of funds: Government of Sweden, Environmental Fund of Federation BiH, Environmental Protection and Energy Efficiency Fund of Republika Srpska<br>Total amount available for all applicants: 1.215.000,00 € (for the year 2018) | n/A | n/A | |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | | | No |
| | We plan to invest in EE projects using grants, subsidies and incentives, but we cannot plan the amount of funds that will be received from the institutions providing the funds. | | | / |
| **Have you conducted EE project in schools co-financed by grants, subsidies or other incentives** | Yes | | | No |
| | EE projects in 12 schools were implemented using grants from EU funds, Swedish International Development Agency (SIDA), and local funds (Federation Environmental Fund). Total investment was 3.000.000,00 €.<br>Swedish International Development Agency (SIDA) has a minimum of 20% amount of the total investment, the local Fund provided by the Environmental fund of Federation of Bosnia and Herzegovina has a maximum | | | / |

| | | |
|---|---|---|
| | 40% amount of the total investment. | |
| **5. Financing EE projects using ESCO model** | | |
| **Is this kind of financing available for you?** | Yes | No |
| | This type of EE implementation has been done by introducing heating on the basis of installation of geothermal heat pumps for heating the area of the school using the ESCO model of EE and Renewable energy funding. This model has been done in 4 schools which can be considered as pilot projects and long-term effects of this kind of funding model are to be further analysed). | / |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | No |
| | We have plans to do more EE projects using this model, after analysing the already implemented projects. | / |
| **Have you conducted energy efficiency project in schools financed by credit or loan funds (debt)** | Yes | No |
| | Yes, as partnership between the Ministry of Education, science, culture and sports of Zenica-Doboj Canton and Switzerland "Caritas". EE projects in schools using ESCO model were conducted in 4 district schools in Visoko, Zepce and Zavidovici. Total investment was 45.000,00 € | / |
| **6. Financing EE projects using PPP model** | | |
| **Is this kind of financing available for you?** | Yes | No |
| | | This type of partnership (PPP) is still in the discussion phase, and projects still have not been implemented because the legal framework in this area has changed several times. |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | No |
| | Yes, but as it was already mentioned, this type of partnership will be available after fulfilling the legal pre-conditions of this type of model. | / |
| **Have you conducted energy efficiency project in schools financed by credit or loan funds (debt)** | Yes | No |
| | / | This type of partnership (PPP) is still in the discussion phase, and projects still have not been implemented because the legal framework in this area has changed several times. |
| **7. Barriers** | | |

| | |
|---|---|
| **Barriers and potential problems in implementing and financing EE project in schools from <u>administrative</u> point of view** | None |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>legal</u> point of view** | None |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>financial</u> point of view** | Insufficient pre-planned budget for measures |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>accounting</u> point of view** | None |
| **8. Case study – best practice example** | |
| **If available, case study report on specific past successful EE project in schools** | Not available |

## 5.2. CROATIA

| Question | Answer | | | |
|---|---|---|---|---|
| **9. General information** | | | | |
| **Name of partner** | City of Split | | | |
| **Type and number of schools chosen for pilots** | Primary | Elementary | College | |
| | 29 | / | / | |
| **Who is the legal owner of schools** | City of Split | | | |
| **Who pays utility bills and regular maintenance for schools** | City of Split | | | |
| **What is the source for those costs** | city budget, national budget | | | |
| **Who is responsible for making decisions on implementation of energy renovation projects** | City of Split | | | |
| **What is the source for the cost of energy renovation** | national, European budget | | | |
| **Which department (sector, institution) is responsible for implementation of energy renovation (in public buildings)** | Department for construction and development project management | | | |
| **10. Financing EE projects using own funds** | | | | |
| **Do you have funds in your budget allocated for EE projects in public buildings** | Yes | | | No |
| | 150.000,00 € | | | / |
| **Do you have funds in your budget allocated for EE projects specifically in schools** | Yes | | | No |
| | 120.000,00 € | | | <explain why not> |
| **Have you already implemented EE projects in schools using own funds** | Yes | | | No |
| | / | | | Lack of incentives. There would be more local projects if European and national funds would make energy efficiency public building renovation an acceptable activity and cost for co-financing. |
| **11. Financing EE projects using credit or loan funds (debt)** | | | | |
| **Is this kind of financing available for you?** | Yes | | | No |
| | Source (commercial bank, | Interest | Repayment | / |

| | | | | |
|---|---|---|---|---|
| | development bank, other) | rate | period | |
| | Croatian Bank for Reconstruction and Development (HBOR) – EE loan for public buildings (ESCOs or public authorities)<br>------<br>HBOR ESIF EE loan – for public authorities that have already received grants from ERDF | Up to 4%<br><br>------<br>Up to 0,5% | Up to 14 years<br><br>-------<br>Up to 14 years | |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | | | No |
| | / | | | Credit loans are not acceptable model of financing for City of Split in this area of planning. |
| **Have you conducted EE project in schools financed by credit or loan funds (debt)** | Yes | | | No |
| | / | | | Credit loans are not acceptable model of financing for City of Split in this area of planning. |
| **12. Financing EE projects using grants, subsidies or other incentives** | | | | |
| **Is this kind of financing available for you?** | Yes | | | No |
| | Source (national, EU funds, other) | Grant rate % | Max. amount of grant per project | / |
| | Name of grant, subsidy or incentive: Energy renewal and use of renewable energy sources in public sector buildings<br>Name of institution responsible for disbursement: Ministry of construction and physical planning<br>Source of funds: ESI funds<br>Who is eligible for applying: government bodies, ministries, central state offices, state administrative organizations and state administration offices in counties, units of local or regional self-government (cities and counties), public institutions or institutions performing social activities, religious communities, associations that have public authority regulated by a special law | 85% | 5.333.333,333 € | |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | | | No |
| | No specific plans yet, but this possibility will be investigated. | | | / |
| **Have you conducted EE** | Yes | | | No |

| | | |
|---|---|---|
| **project in schools co-financed by grants, subsidies or other incentives** | / | Lack of European and national incentives as a key spark for enrolling in such financing. |
| **13. Financing EE projects using ESCO model** | | |
| **Is this kind of financing available for you?** | Yes | No |
| | There are ESCOs operating in Croatia, so this kind of financing is available. There was a government programme for energy renovation of public buildings using ESCO model with subsidies up to 40% from Environmental Protection and Energy Efficiency Fund. | / |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | No |
| | ESCO model hasn't been acceptable as much as it had been expected of it so far. There are indications of will of governing bodies of City of Split to take this kind of financing into consideration. | / |
| **Have you conducted energy efficiency project in schools financed by credit or loan funds (debt)** | Yes | No |
| | / | ESCO model hasn't been acceptable |
| **14. Financing EE projects using PPP model** | | |
| **Is this kind of financing available for you?** | Yes | No |
| | Yes, there is a legislative framework for PPP projects in Croatia. Its utilisation for EE projects in buildings is very limited. | / |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | No |
| | / | The procedures for PPP are too complicated. |
| **Have you conducted energy efficiency project in schools financed by credit or loan funds (debt)** | Yes | No |
| | / | / |
| **15. Barriers** | | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>administrative</u> point of view** | Lack of construction building permit and project documentation of referred schools> | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>legal</u> point of view** | Unsolved land registry relations and lack of clear ownership documentation of schools | |

| | |
|---|---|
| **Barriers and potential problems in implementing and financing EE project in schools from financial point of view** | Insufficient pre-planned budget for measures, lack of possibility to enter into the debt, irregular offer of grants |
| **Barriers and potential problems in implementing and financing EE project in schools from accounting point of view** | Unclear or undefined accounting standards for EE projects in public entities> |
| **16. Case study – best practice example** | |
| **If available, case study report on specific past successful EE project in schools** | / |

## 5.3. CYPRUS

| Question | Answer | | |
|---|---|---|---|
| **17. General information** | | | |
| **Name of partner** | CEA - Cyprus Energy Agency | | |
| **Type and number of schools chosen for pilots** | Primary | Elementary | College |
| | 6 | / | / |
| **Who is the legal owner of schools** | The School Board: responsible for the financial and overall management of the school building, for the management of the school's property and equipment, the extension and the improvement and maintenance of the school building (the actions and decisions of the School Board must be approved by the Council of Ministers and audited by the General Auditor of the Republic of Cyprus).<br>For Schools located in communities: the members of the community council are also the members of the School Board. For Schools located in municipalities: seven members of the School Board are elected and the rest four come from the municipal council. For a cluster of communities, the presidents of the communities are the members of the school board, with president the president of the community where the school is operating [elections every 5 years].<br>It's noted that the Cabinet of Ministers may entrust a school board with the general management of a school or of a school situated in the region of another municipality or community. It also may entrust a school administration with the general management of schools located in its area which are owned by another school board or for which another school board has legal rights | | |
| **Who pays utility bills and regular maintenance for schools** | Ministry of Education and Culture: responsible for the school's annual budget and grants given to the schools and for meeting the schools' annual financial obligations (the school's annual budget, must be submitted and approved by the Ministry). The Ministry of Education and Culture releases a grant to the schools, based to the annual budget submitted by the School Board, to meet the school's annual financial obligations (e.g. payment of technical/cleaning staff, building maintenance etc). | | |
| **What is the source for those costs** | Ministry of Education and Culture [Public Funding] | | |
| **Who is responsible for making decisions on implementation of energy renovation projects** | Technical Services of the Ministry of Education and Culture: they are the responsible department for the improvement of the school buildings, taking into account any education or technical requirements. The budget that they manage, includes construction of new school buildings, renovation and extension of existing school buildings and sports facilities.<br>Is noted that Cyprus has an indicative target (based on the EPBD) for energy renovations of existing public buildings, which is under the authority of the Ministry of Energy, Commerce, Industry and Tourism. | | |
| **What is the source for the cost of energy renovation** | Ministry of Education and Culture [Public Funding] | | |
| **Which department (sector, institution) is responsible for implementation of energy renovation (in public buildings)** | The 2010 Energy Performance of Buildings Directive and the 2012 Energy Efficiency Directive are the EU's main legislation covering the reduction of the energy consumption of buildings. Under the Energy Efficiency Directive from the 01/01/2014:<br>1. EU countries make energy efficient renovations to at least 3% of buildings owned and occupied by central government (The 3% rate is calculated on the total floor area of buildings with a total useful floor area over 250 m2 owned and occupied by the central public administration of the Member State concerned)<br>2. EU governments should only purchase buildings which are highly energy efficient<br>3. EU countries must draw-up long-term national building renovation strategies which | | |

| | | | |
|---|---|---|---|
| | can be included in their National Energy Efficiency Action Plans<br>Therefore, in Cyprus: Emphasis is given to stricter energy efficiency standards and investments for public buildings to become new. This will help to meet the obligation of Cyprus to renovate 3% of the heated surface of public owned buildings used by central government every year. Priority is given to buildings with the lowest energy efficiency" (article 7, directive 2010/31/EE – Adapted in: Cyprus' "Long-term strategy for mobilising investment in the renovation of the national stock of residential and commercial buildings, both public and private". (MECIT) | | |
| **18. Financing EE projects using own funds** | | | |
| **Do you have funds in your budget allocated for EE projects in public buildings** | Yes | | No |
| | The Technical Services of the Ministry have a budget for maintaining the schools at a good state. The Ministry of Energy, Commerce, Industry and Tourism (MECIT), is responsible for the allocation of the Structural Funds for projects related to the energy efficiency of public buildings. The MECIT is also responsible for the incomes from the Special Fund (Green Tax from electricity), through which it lunches subsidies and grands for energy efficiency.<br><br>It varies from year to year, usually it ranges between 8 to 16 million per year | | / |
| **Do you have funds in your budget allocated for EE projects specifically in schools** | Yes | | No |
| | / | | Not directly for the energy efficiency of schools. |
| **Have you already implemented EE projects in schools using own funds** | Yes | | No |
| | Individual interventions for energy upgrades are happening each year with funding from the Ministry of Education and Cultural.<br>2 to 5 schools on average per year.<br>100 000 - 300 000 euros per year | | / |
| **19. Financing EE projects using credit or loan funds (debt)** | | | |
| **Is this kind of financing available for you?** | Yes | | No |
| | Source (commercial bank, development bank, other) | Interest rate | Repayment period |
| | Green Loans (commercial banks, or the European Reconstruction and Development Bank and other | 3-5% | 7-10 years |
| | | | / |
| **Do you have plans to** | Yes | | No |

| | | | | |
|---|---|---|---|---|
| **invest in EE projects in schools using this model** | In Cyprus, 4 banks provide green loans, financing EE projects (like soft loans for thermal insulation on the roof), which the school boards can take into advantage. | | | / |
| **Have you conducted EE project in schools financed by credit or loan funds (debt)** | Yes | | | No |
| | / | | | The majority of the energy efficiency projects was happening with private (own) funding, as until recently ESCOs and Loans from Banks were not available in Cyprus. |
| **20. Financing EE projects using grants, subsidies or other incentives** | | | | |
| **Is this kind of financing available for you?** | Yes | | | No |
| | Source (national, EU funds, other) | Grant rate % | Max. amount of grant per project | / |
| | Potential financial sources in Cyprus are the Grant Schemes of the MECIT for Energy Renovations, the Structural Funds and the European Funded Projects. However, at this moment, the available subsidies from MECIT regard the residential buildings and there are plans for businesses. For public buildings there is nothing available at the moment and it seems that it will remain like this, therefore for public buildings (including schools), Structural Funds and European Funded Projects | Not specified – It can vary.<br><br>For example, on the current Grant scheme of MECIT for residential houses this equals to 50% | Not specified – It can vary.<br><br>For example, on the current Grant scheme of MECIT for residential houses this equals to 15000 euros or 25000, depending on the case. | |

| | | | | |
|---|---|---|---|---|
| | are the most possible to be used. | | | |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | | | No |
| | By using the results from the energy audits of the schools, we can locate the needs and direct the schools to take into advantage of the available funds/subsidies, which are available at the time. Moreover, if an opportunity arises, we can use funds from projects, as the example of the energy upgrade of 4 public buildings through the 'ENERGEIN' Project which was funded by the European Regional Development Fund through the programme Interreg Greece – Cyprus (Even if is not referring to school buildings). | | | / |
| **Have you conducted EE project in schools co-financed by grants, subsidies or other incentives** | Yes | | | No |
| | / | | | It depends on the success of applications to EU programmes. |
| **21. Financing EE projects using ESCO model** | | | | |
| **Is this kind of financing available for you?** | Yes | | | No |
| | In Cyprus we currently have 26 registered ESCO's which predominantly are dealing with buildings and RES, but with no project results to present (most of them are just registered). | | | / |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | | | No |
| | If an opportunity arises and conditions are favorable, EE projects in schools can be financed by an ESCO model. However, this will require a lot of work and preparation, as there was nothing similar done previously. Moreover, based on the results from the energy audits until now, it doesn't seem that ESCOs will have a great interest for schools, as the energy savings are limited. Nevertheless, each school has to be studied individually. | | | / |
| **Have you conducted energy efficiency project in schools financed by credit or loan funds (debt)** | Yes | | | No |
| | / | | | The relevant law for ESCOs was adapted in Cyprus just 4 years ago (2014) and until today, only few ESCOs are officially registered |
| **22. Financing EE projects using PPP model** | | | | |
| **Is this kind of financing available for you?** | Yes | | | No |
| | / | | | See below |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | | | No |
| | / | | | See below |
| **Have you conducted** | Yes | | | No |

| | | |
|---|---|---|
| **energy efficiency project in schools financed by credit or loan funds (debt)** | / | This model is more suitable for investments and not for the energy upgrade projects. The energy upgrade of a school might be more suitable to be funded by the ESCO model as there is the EPC which defines the benefit for the ESCO. |
| **23. Barriers** | | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>administrative</u> point of view** | Lack of awareness and lack of technical expertise. Limited available energy and operating data. No Benchmarks are available either. | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>legal</u> point of view** | There is a difficulty regarding the right use of EPCs and Public Procurements for buildings' energy upgrade. | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>financial</u> point of view** | Limited available funding (is defined by the Ministry of Education and Culture). Difficulties to access the funding. Time consuming processes to access alternative funding, such as the funding from ESCOs and Banks. | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>accounting</u> point of view** | Energy Data and Energy Bills are not acquired easily. A time-consuming process is needed and usually the older data are archived. A suitable accounting system is not available for the recording of the energy data/bills, which can be used for evaluating such projects. | |
| **24. Case study – best practice example** | | |
| **If available, case study report on specific past successful EE project in schools** | Please see D.3.3.7 | |

## 5.4. FRANCE

| Question | Answer | | |
|---|---|---|---|
| **25. General information** | | | |
| **Name of partner** | Chamber of Craft and Trade PACA Region | | |
| **Type and number of schools chosen for pilots** | Primary | Secondary | College |
| | / | 5 | / |
| **Who is the legal owner of schools** | Chamber of Craft and Trade PACA Region | | |
| **Who pays utility bills and regular maintenance for schools** | Chamber of Craft and Trade PACA Region | | |
| **What is the source for those costs** | operating costs of the structure related to heating, water, electricity, maintenance of equipment, costs related to studies of students with the purchase of study-specific equipment<br>➢ Bills are paid with our budget, our budget is regional and concerns 6 territories. | | |
| **Who is responsible for making decisions on implementation of energy renovation projects** | school's director | | |
| **What is the source for the cost of energy renovation** | own resource and state aids | | |
| **Which department (sector, institution) is responsible for implementation of energy renovation (in public buildings)** | We have a public institution who helps and make recommendations: Ademe | | |
| **26. Financing EE projects using own funds** | | | |
| **Do you have funds in your budget allocated for EE projects in public buildings** | Yes | No | |
| | / | See below | |
| **Do you have funds in your budget allocated for EE projects specifically in schools** | Yes | No | |
| | / | See below | |
| **Have you already implemented EE projects in schools using own funds** | Yes | No | |
| | / | Because at the time is was not a main thing to do, our priorities are determined by a type of council composed of officials who decide each year, the budget for our entity plan actions to do. If it is not voted and decided, we can do a thing. | |
| **27. Financing EE projects using credit or loan funds (debt)** | | | |
| **Is this kind of financing** | Yes | No | |

| | | | | |
|---|---|---|---|---|
| **available for you?** | Source (commercial bank, development bank, other) | Interest rate | Repayment period | / |
| | own funds, EU funds and state funds | <1% | 5-7 years | |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | | | No |
| | Yes, according to availability | | | / |
| **Have you conducted EE project in schools financed by credit or loan funds (debt)** | Yes | | | No |
| | / | | | We have conducted many other European projects but it was not about schools, it was only about new materials, ecological material,… and how to use it. |
| **28. Financing EE projects using grants, subsidies or other incentives** | | | | |
| **Is this kind of financing available for you?** | Yes | | | No |
| | Source (national, EU funds, other) | Grant rate % | Max. amount of grant per project | / |
| | Regional funds and European funds, not national ones or private funds (because we are a public entity) | | | |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | | | No |
| | Actually, it is a huge thing to use our own funds and invest them in energy efficiency and energy savings. Region funds and state aids are becoming less and less important. The only way is to get European funding to realize actions and renovations | | | / |
| **Have you conducted EE project in schools co-financed by grants, subsidies or other incentives** | Yes | | | No |
| | / | | | Lack of financing |
| **29. Financing EE projects using ESCO model** | | | | |
| **Is this kind of financing available for you?** | Yes | | | No |
| | / | | | It should be in next few years when our institutions will decide to do some renovation work but not now. |
| **Do you have plans to** | Yes | | | No |

| | | |
|---|---|---|
| **invest in EE projects in schools using this model** | / | We cannot use that king of model in our schools because year after year, budgets are re-evaluate down and it will be hard to conduct more activities or experimentations in our schools. But the ESCO model could be proposed and used in other schools in the region, but schools dependent on the state |
| **Have you conducted energy efficiency project in schools financed by credit or loan funds (debt)** | Yes | No |
| | / | With the Teeschools project it is the first time that we done measurements about energy efficiency, because we have no obligation to improve that king of expenditures or experiences. |
| **30. Financing EE projects using PPP model** | | |
| **Is this kind of financing available for you?** | Yes | No |
| | / | Cause in our country we have public schools or private ones, we do not have semi-private and semi-public schools. If its private it is private funds, public schools is national or regional funds. |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | No |
| | / | For the same reason that we can combine public funds and private funds |
| **Have you conducted energy efficiency project in schools financed by credit or loan funds (debt)** | Yes | No |
| | / | We did not have conduct energy efficiency project nor used credit or loan funds to do them |
| **31. Barriers** | | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>administrative</u> point of view** | Administrative problems are one of the major problems for sustainable development in schools. To be able to build or renovate, you need building permits that cities award and you have to find high-performance architects in this area. Generally, the slowness of administrative and technical services means that projects take a lot of time and are spread over a period of 3 to 10 years. | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>legal</u> point of view** | From the legal point of view, in France we have an obligation for the construction of new buildings. They must meet environmental criteria meeting the RT 2012 standard. So, for a region that wants to build a new school, it will have to comply with this type of criteria. On the other hand, for the renovation there is no environmental obligation. However, the national will is to meet, in fact, the criteria of the RT 2012 standard, both in the construction and renovation of public buildings. | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>financial</u> point of view** | We have very few schools that belong to us. Most schools are financially dependent on the Region. It is therefore the Region that decides to renovate or build sustainable schools. If the funds are available, the region implements exemplary pilot projects, but there are very few such projects, because funds are difficult to obtain. | |

| | |
|---|---|
| **Barriers and potential problems in implementing and financing EE project in schools from <u>accounting</u> point of view** | Saving energy, making money or reselling energy is not a foil in itself. This remains a benefit for the state, but it is less compared to the expenses made for construction and renovation. The state aims more and more to set up autonomous structures at the energy level (water recycling, electricity via solar panels, building without heating, ..) to limit spending in terms of energy consumption. |
| **32. Case study – best practice example** | |
| **If available, case study report on specific past successful EE project in schools** | no case study report |

## 5.5. GREECE

| Question | Answer | | | |
|---|---|---|---|---|
| **33. General information** | | | | |
| **Name of partner** | EGTC Efxini Poli | | | |
| **Type and number of schools chosen for pilots** | Primary | Elementary | College | |
| | 5 | / | / | |
| **Who is the legal owner of schools** | Municipalities | | | |
| **Who pays utility bills and regular maintenance for schools** | Municipality's budget - payment by the school or the School board | | | |
| **What is the source for those costs** | State budget for Municipality's operation, given every fiscal year | | | |
| **Who is responsible for making decisions on implementation of energy renovation projects** | Technical Division of the Municipality | | | |
| **What is the source for the cost of energy renovation** | Municipality | | | |
| **Which department (sector, institution) is responsible for implementation of energy renovation (in public buildings)** | Technical Division of the Municipality/Technical Division of the Attica Region | | | |
| **34. Financing EE projects using own funds** | | | | |
| **Do you have funds in your budget allocated for EE projects in public buildings** | Yes | | | No |
| | / | | | In general terms no - But, currently, for the implementation of the EED (27/2012/EC), the Greek state through EU Cohesion funds and Structural Funds - NSRF 2014-2020 is starting to allocate funds for public buildings, including schools |
| **Do you have funds in your budget allocated for EE projects specifically in schools** | Yes | | | No |
| | / | | | The Municipality of BBB, Attica, Greece will analyse further the outcome of this proposed model and will take decisions by the end of this year, in order to start implementation with the coming fiscal year |
| **Have you already implemented EE projects in schools using own funds** | Yes | | | No |
| | / | | | Not yet in action any relevant project through EU Cohesion Fund for Greece - due to bureaucracy reason, most probably |
| **35. Financing EE projects using credit or loan funds (debt)** | | | | |
| **Is this kind of financing available for you?** | Yes | | | No |
| | Source (commercial | Interest rate | Repayment period | <explain why not> |

| | | | | |
|---|---|---|---|---|
| | bank, development bank, other) | | | |
| | Commercial banks, Loan and Consignment Fund and Infrastructure Fund (is about to be established) | 3% - 5% | 5 - 7 years | |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | | | No |
| | Most probably | | | <explain why not> |
| **Have you conducted EE project in schools financed by credit or loan funds (debt)** | Yes | | | No |
| | / | | | / |
| **36. Financing EE projects using grants, subsidies or other incentives** | | | | |
| **Is this kind of financing available for you?** | Yes | | | No |
| | Source (national, EU funds, other) | Grant rate % | Max. amount of grant per project | / |
| | **Programm for Energy Upgrade of Public Buildings** - is about to start for public buildings<br>Name of institution responsible for disbursment: Ministry of Environment & Energy<br>Source of funds: Structural Funds - NSRF 2014-2020<br>Who is eligible for applying: Public Buildings<br>Total amount available for all applicants: € 270,000,000 | Max percentage subsidied per project: 100 % | Max amount available per projects: N/A yet | |
| **Do you have plans to** | Yes | | | No |

| | | |
|---|---|---|
| **invest in EE projects in schools using this model** | Specific plans not known yet. | / |
| **Have you conducted EE project in schools co-financed by grants, subsidies or other incentives** | Yes | No |
| | In Greece YES, in Municipality of VVV NO | / |
| **37. Financing EE projects using ESCO model** | | |
| **Is this kind of financing available for you?** | Yes | No |
| | There are ESCOs available and have recently started doing EE projects | / |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | No |
| | / | not known yet |
| **Have you conducted energy efficiency project in schools financed by credit or loan funds (debt)** | Yes | No |
| | / | No, as this is model that is just recently developed. |
| **38. Financing EE projects using PPP model** | | |
| **Is this kind of financing available for you?** | Yes | No |
| | / | See below |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | No |
| | / | See below |
| **Have you conducted energy efficiency project in schools financed by credit or loan funds (debt)** | Yes | No |
| | / | Model not known in detail, especially for public schools. |
| **39. Barriers** | | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>administrative</u> point of view** | 1. Not known in administration level the benefits of EE<br>2. Lack of technical capacity for identifying and prioritize energy efficiency projects<br>3. Lack of energy data in public building<br>4. Lack of attractive best practice examples for the implementation of EE projects through ESCO models | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>legal</u> point of view** | No these type of barriers existing - Legal framework existing for EE - However, Law 4412/2016 for public procurement does not provide clear provisions for implementation of EE projects through ESCO models | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>financial</u> point of view** | Insufficient pre-planned budget for measures is a typical barrier - Limited public funding and limited access of the municipalities to debt financing - Lack of experience of financial institutions for EE projects - Low awareness and interest of private financial institutions (banks) for EE projects. | |

| | |
|---|---|
| **Barriers and potential problems in implementing and financing EE project in schools from <u>accounting</u> point of view** | For ESCO model: The latest Eurostat published guidelines on the accounting of Energy Performance Contract (EPC) has not been transferred yet to Greek legislative framework |
| **40. Case study – best practice example** | |
| **If available, case study report on specific past successful EE project in schools** | 1) 4TH GYMNASIUM OF ATHENS, ATTICA EE measures implemented: Ext. wall ins, roof ins., new EE windows, new LED lighting, new heating system - 450 students/2497 m2/ amount of investment: 80 805 € savings in energy and €: 279120 kWh/yr (from 207 to 95 kWh/m2*yr) repayment period: 2 years model of financing used: municipality budget source of funds: as above subsidies: - grants or incentives used: -<br><br>2) 1st GYMNASIUM OF PYLAIA, THESSLONIKI - total surface of 3583 m2<br>EE measures implemented: new EE windows, new LED lighting, new central heating system, new geothermal heating system for the library - PVs on the roof, new A/C split units in the offices and BEMS system amount of investment: 399410 € savings in energy and €: 143000 kwh/yr (from 120 to 80 kWh/m2*yr) repayment period: N/A (37,4% reduction in total energy cost) model of financing used: EU funds - grants source of funds: EU Cohesion fund, European Regional Development Fund<br>subsidies: - grants or incentives used: - |

## 5.6. ITALY

| Question | Answer | | | |
|---|---|---|---|---|
| **41. General information** | | | | |
| **Name of partner** | ENEA/Municipality of Castel San Pietro Terme | | | |
| **Type and number of schools chosen for pilots** | Primary | Elementary | College | |
| | 3 | 1 | 1 | |
| **Who is the legal owner of schools** | The owner of the school buildings is the Municipality of Castel san Pietro Terme; in the case of High schools the management is in charge to the Metropolitan City of Bologna | | | |
| **Who pays utility bills and regular maintenance for schools** | Elementary and secondary: Municipality of Castel san Pietro Terme; High schools: Metropolitan City of Bologna | | | |
| **What is the source for those costs** | Local public funds | | | |
| **Who is responsible for making decisions on implementation of energy renovation projects** | Municipality's and Metropolitan City's technicians | | | |
| **What is the source for the cost of energy renovation** | different and combined types of sources, depending on single school's solutions: State, region, local and other public funds (EU projects - rarely) | | | |
| **Which department (sector, institution) is responsible for implementation of energy renovation (in public buildings)** | It is not specified. Nevertheless, in general, among other duties, the energy manager is also appointed to detect and implement energy efficiency measures, where needed and where possible. At the Municipality of Castel san Pietro Terme, the responsible for EE renovation projects is Environment and Public Works Department (Servizio Ambiente e Lavori pubblici) | | | |
| **42. Financing EE projects using own funds** | | | | |
| **Do you have funds in your budget allocated for EE projects in public buildings** | Yes | | No | |
| | / | | not specifically for EE purpose | |
| **Do you have funds in your budget allocated for EE projects specifically in schools** | Yes | | No | |
| | Yes (co-financing of schemes involving other external funds, see section 4)<br>120.000 € | | / | |
| **Have you already implemented EE projects in schools using own funds** | Yes | | No | |
| | In one school, 40.000 € | | <explain why not> | |
| **43. Financing EE projects using credit or loan funds (debt)** | | | | |
| **Is this kind of financing available for you?** | Yes | | | No |
| | Source (commercial bank, development bank, other) | Interest rate | Repayment period | See below |
| | <state as many as possible> | | | |

| | | | | |
|---|---|---|---|---|
| **Do you have plans to invest in EE projects in schools using this model** | Yes | | | No |
| | / | | | See below |
| **Have you conducted EE project in schools financed by credit or loan funds (debt)** | Yes | | | No |
| | / | | | According to the Italian law, public sector cannot have debts (if they exceed the National Stability Law thresholds). |
| **44. Financing EE projects using grants, subsidies or other incentives** | | | | |
| **Is this kind of financing available for you?** | Yes | | | No |
| | Source (national, EU funds, other) | Grant rate % | Max. amount of grant per project | / |
| | 1) European Regional Development Funds POR FESR calls (nearly twice a year)<br>Institution responsible: Emilia-Romagna Region<br>Source of funds: EU<br>Who is eligible for applying: Public sector - buildings and plants<br>Total amount available for all applicants: In Emilia-Romagna the total amount is € 28.000.000,00 | 30% | € 500.000,00 | |
| | Conto Termico (Thermal Accounting)<br>Institution responsible: Italian Ministry for Economic Development (MiSE)<br>Source of funds: National<br>Who is eligible for applying: | Up to 65% | Each improvement action has a specific reimbursement rate which is calculated case specific. For nZEB renovations the maximum rate of reimbursement | |

| | | | | |
|---|---|---|---|---|
| | Public and private sector<br>Total amount available for all applicants:<br>Annual limit of funds is € 900.000.000,00. | | is 65%. Vat is eligible. | |
| | Good schools: school buildings<br>Institution responsible: Ministry of Education, University and Research (MIUR)<br>Source of funds: National<br>Who is eligible for applying: public schools (not universities)<br>Total amount available for all applicants: €3,9 billions (for all types of renovation - seismic, safety and energy) | Case specific. It is not possible to measure. | Depends on the type of renovation. | |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | | | No |
| | 3 schools: Pizzigotti, Don Milani and Ercolani<br>Pizzigotti: € 152.700,00; Don Milani: € 123.000,00; Ercolani: € 147.700,00<br>POR FESR and Thermal Accounting (TA)<br>Pizzigotti (68%): € 37.532,00 (POR FESR) + € 67.063,00 (TA); Don Milani (90%): € 36.800,00 (POR FESR) + € 74.700,00 (TA); Ercolani (81%): € 43.980,00 (POR FESR) + € 75.824,00 (TA) | | | / |
| **Have you conducted EE project in schools co-financed by grants, subsidies or other incentives** | Yes | | | No |
| | / | | | / |
| **45. Financing EE projects using ESCO model** | | | | |
| **Is this kind of financing available for you?** | Yes | | | No |
| | ESCO market is increasing in Italy and it appears to be a solid future for energy management in the public sector. | | | / |
| **Do you have plans to** | Yes | | | No |

| | | |
|---|---|---|
| **invest in EE projects in schools using this model** | the Municipality of Castel San Pietro Terme is running a public tender for an EPC contract related to public buildings energy management | / |
| **Have you conducted energy efficiency project in schools financed by credit or loan funds (debt)** | Yes | No |
| | / | As already said the ESCO model is quite new in Italy. Moreover, the time and energy consuming administrative process for ESCO tenders preparation and the big size (in terms of time and money) of the ESCO contract is something that still need to be addressed properly. |
| **46. Financing EE projects using PPP model** | | |
| **Is this kind of financing available for you?** | Yes | No |
| | Still underdeveloped model, with no experience. | / |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | No |
| | Probably yes. It's an interesting but very recent model. It means that hopefully in a near future there will be some virtuous examples of PPP applied models that can help for a better knowledge of this practice. | / |
| **Have you conducted energy efficiency project in schools financed by credit or loan funds (debt)** | Yes | No |
| | / | PPP model is recent. These models will be considered in the years to come. |
| **47. Barriers** | | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>administrative</u> point of view** | Often municipalities and other local institutions don't have enough staff to apply for available funds. Normally they refer to external companies which may have particularly long and complex timings and procedures for hiring. Moreover, in Italy most of the schools were built between 1920 and 1950 and are considered historically relevant buildings. For this reason, EE renovation projects must take into account the architectural heritage prescriptions and as consequence it is often difficult to obtain all the necessary permissions. | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>legal</u> point of view** | None. | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>financial</u> point of view** | According to Italian law, public institutions can have debts only if they remain inside the stability law thresholds (usually very low thresholds) so they now use bank loans very rarely. | |

| | |
|---|---|
| **Barriers and potential problems in implementing and financing EE project in schools from <u>accounting</u> point of view** | Renovation plans and EE projects in school must be included in a three years programme for the investments that is mandatory for any Public Administration. The realization of this three years programme is strictly linked to the revenues coming into the PA budget from urban charges, properties selling, without breaking the Stability Law. |
| **48. Case study – best practice example** | |
| **If available, case study report on specific past successful EE project in schools** | schools mentioned above |

## 5.7. SPAIN

| Question | Answer | | | |
|---|---|---|---|---|
| **49. General information** | | | | |
| **Name of partner** | RIBERA CONSORTIUM | | | |
| **Type and number of schools chosen for pilots** | Primary | Elementary | College | |
| | / | 17 | / | |
| **Who is the legal owner of schools** | Regional authority | | | |
| **Who pays utility bills and regular maintenance for schools** | Municipalities | | | |
| **What is the source for those costs** | Own funds<br>Municipality annual budget includes the electricity/natural gas/other carriers supply. Minor (sometimes major) renovation actions at school buildings are allocated in local authority's budgets. In fact, in the last years, regional authorities have only built new buildings. | | | |
| **Who is responsible for making decisions on implementation of energy renovation projects** | Legally the competences are regional. But, in fact, municipalities are who renovates and repairs primary school buildings. | | | |
| **What is the source for the cost of energy renovation** | Own funds. Funds & subsidies from other supra-municipal authorities | | | |
| **Which department (sector, institution) is responsible for implementation of energy renovation (in public buildings)** | Instituto para la Diversificación y Ahorro de la Energía (IDAE). Spanish Ministry of Energy, Tourism and Industry | | | |
| **50. Financing EE projects using own funds** | | | | |
| **Do you have funds in your budget allocated for EE projects in public buildings** | Yes | | No | |
| | 336 M€ | | / | |
| **Do you have funds in your budget allocated for EE projects specifically in schools** | Yes | | No | |
| | / | | No. Related to public buildings | |
| **Have you already implemented EE projects in schools using own funds** | Yes | | No | |
| | / | | / | |
| **51. Financing EE projects using credit or loan funds (debt)** | | | | |
| **Is this kind of financing available for you?** | Yes | | | No |
| | Source (commercial bank, development bank, other) | Interest rate | Repayment period | / |
| | N/A | less than 1% | more than 10 years | |

| | | | | |
|---|---|---|---|---|
| **Do you have plans to invest in EE projects in schools using this model** | Yes | | | No |
| | / | | | Not particularly in schools but public buildings are eligible |
| **Have you conducted EE project in schools financed by credit or loan funds (debt)** | Yes | | | No |
| | / | | | / |
| **52. Financing EE projects using grants, subsidies or other incentives** | | | | |
| **Is this kind of financing available for you?** | | Yes | | No |
| | Source (national, EU funds, other) | Grant rate % | Max. amount of grant per project | / |
| | **PAREER II**<br>Name of institution responsible for disbursement: Instituto para la Diversificación y Ahorro de la Energía (IDAE). Spanish Ministry of Energy, Tourism and Industry<br>Source of funds: (EU funds, national, regional or local funds, other?): Spanish National Energy Efficiency Fund<br>Who is eligible for applying: Public & private bodies<br>Total amount available for all applicants: 204 €<br>----------<br>**Low Carbon Economy Programme**<br>Name of institution responsible for disbursement: Instituto para la Diversificación y Ahorro de la Energía (IDAE). Spanish Ministry of Energy, Tourism and Industry<br>Source of funds: (EU funds, national, regional or local funds, | Max percentage subsidies per project: 30-90 %<br>----------<br>Max percentage subsidized per project: Valencia Region 50 % | Max amount available per projects: 25,000 - 1M€<br>----------<br>Max amount available per projects: 5M € | |

| | | | | |
|---|---|---|---|---|
| | other?)<br>Who is eligible for applying: Public organizations<br>Total amount available for all applicants: 336 €<br>----------<br>**EE programme for buildings**<br>Name of institution responsible for disbursement: IVACE (Valencia Ministry of Economy, Competitiveness and Industry). Regional Government.<br>Source of funds: EU (ERDF funds)<br>Who is eligible for applying: Tertiary buildings (non-residential), public and private<br>Total amount available for all applicants: 500,000 €/year<br>----------<br>**EDIFICANT**<br>Name of institution responsible for disbursement: Valencia Ministry of Education. Regional Government<br>Source of funds: Regional funds<br>Who is eligible for applying: Building, extension and remodelling public schools' buildings<br>Total amount available for all applicants: 111 million for 2018 (700 million for the period 2018-2022) | ----------<br>Max percentage subsidized per project: 40 %<br><br>----------<br>Max percentage subsidized per project: 100 % | ----------<br>Max amount available per projects: limit applied by regional government according to model (according classrooms built in each school- according to each remodelling ....) that correspond to each municipality. | |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | | | No |
| | / | | | not specifically |
| **Have you conducted EE** | Yes | | | No |

| | | |
|---|---|---|
| **project in schools co-financed by grants, subsidies or other incentives** | / | / |
| **53. Financing EE projects using ESCO model** | | |
| **Is this kind of financing available for you?** | Yes | No |
| | Existing, but not economically feasible for schools | / |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | No |
| | / | Not a particular budget amount addressed to school buildings |
| **Have you conducted energy efficiency project in schools financed by credit or loan funds (debt)** | Yes | No |
| | / | This kind of financing is not economically feasible for schools |
| **54. Financing EE projects using PPP model** | | |
| **Is this kind of financing available for you?** | Yes | No |
| | / | See below |
| **Do you have plans to invest in EE projects in schools using this model** | Yes | No |
| | / | See below |
| **Have you conducted energy efficiency project in schools financed by credit or loan funds (debt)** | Yes | No |
| | / | This kind of model is not well developed in our region |
| **55. Barriers** | | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>administrative</u> point of view** | / | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>legal</u> point of view** | / | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>financial</u>** | Energy consumption for heating and cooling are low and pay-back times for the investments are usually very high. | |

| | |
|---|---|
| **point of view** | |
| **Barriers and potential problems in implementing and financing EE project in schools from <u>accounting</u> point of view** | / |
| **56. Case study – best practice example** | |
| **If available, case study report on specific past successful EE project in schools** | Public school in Valencia – Gasoil boiler substitution for a VRV heat pump – Investment 91.300 € – Energy saving 61.700 kWh/year – Economic saving 4.900 €/year – Grant: 23.200 € – Repayment period: 14 years |