

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

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INTRODUCTION

Effects of Climate Change, more visible every day, make it necessary to implement low-carbon strategies and energy efficiency actions as well as to raise capacity for better management of energy in public buildings.

In the school scope, TEESCHOOLS project provides solutions to local authorities to carry out energy renovation and it facilitates tools for helping in the management of energy in school buildings.

Findings and results of the project are the basis of this document and, moreover, daily work experience of partners is also an important aspect in the policy recommendations included in this activity.

The starting point of the document are the weak points identified in fields such as financing, technical, changing behavior, and organizational aspects in the renovation and management of school buildings to, from there, elaborate the political recommendations that could be implemented local, regional and national level.

POLICY RECOMMENDATIONS

Policy recommendations presented hereafter are the result of an harmonization effort based on the analysis of national barriers and weak points collected by the partnership in several events (regional workshop, training courses, world café) organized during the project. Politicians at regional and local level, municipal technical staff, schools staff and general stakeholders have been involved in these events. The outlined policy recommendation can be applied both by national and regional authorities and can have different accents depending on the national peculiar context. For this reason, the recommendations are necessarily been elaborated in general terms.

Harmonization of laws and norms

Energy is a concurrent legislative matter in several countries, as both national and regional governments can issue laws and norms. Complexity increases when it comes to energy requalification of buildings in which each municipality must comply with its building regulations. As an example, definition of nZEB in Italy can change from one region to another according to specific regional legislation. In France, without effective legal monitoring, it is very difficult for economic actors to keep up to date with energy renovation, as also French legislation comes from several sources. This context, designed to give Regions freedom to define specific requirements according to local climatic conditions, is nevertheless confusing. In several debates emerged the need to have a unique reference body or at least a unique information portal that can simplify the technical, legal and economic requalification tasks to the staff of Municipalities, which in general own the school buildings. The problem is particularly perceived in case of Energy Performance Contracts (EPC) the use of which, within the national public procurement codes, often generates confusion and risks of legal disputes. In controversial cases, an authentic interpretation of the laws should be developed by national bodies.

Administrative simplifications

Procedures for requesting public grants are too complicated and fit into a work environment, such as that of technical staff of Municipalities, which is already underpowered for the many tasks and the general hiring freeze applied in partnership countries. Administrative procedures in the context of energy renovation may take years before the actual implementation of elaborated projects, as often several agencies are involved in the evaluation process. The time required for the final approval of a building redevelopment project often exceeds the mandate of the mayors of the municipalities (which generally lasts 4 years), thereby decreasing the political interest in starting the process. The simplification of administrative formalities and procedures consists of a series of pragmatic and concrete measures designed to facilitate relations between the administration, companies and state agencies. A

consultancy desk and expert support should be provided at regional or province, metropolitan cities level to support the technical services of municipalities in all the technical, legal and economic phases required for the preparation and management of a request for public *funds*.

Financial aspects

A general lack of funds has been observed in most of the countries and is the main weak point in implementing energy efficiency projects. Moreover available funds come from different sources (National sources and European ones assigned through regional tenders) and are often cumulative. A deep knowledge of financing mechanism is therefore required.

Even in countries, as Italy, in which there are valid incentive systems, local administrations face overwhelming impediments to make energy efficiency interventions for the impossibility of finding resources in the Municipal budget and the inability to contract debts stated by national laws. For this reason several funds introduced by State or Regions in these years were not used at their full potential. Time consuming processes and complicated tendering procedures to access alternative funding, such as the funding from ESCOs and Banks discourage the use of these financing models. In particular the preparation, development and activation of EPC Contracts requires a strong political "commitment" and a considerable experience and ability to manage a contractual process not yet consolidated at administrative level. In addition, to ensure real independence, the Administrations need a minimum of resources to prepare the initial energy diagnoses and to structure the complex tender documentation. Although these costs will be repaid over the years with the economic savings that will be obtained, many Administrations, prefer not to venture on this road due to the risk of legal disputes when operating with not very widespread contracts To solve these aspects guidelines should be developed on critical aspects by national/regional governments and technical and legal support should be provided to Municipalities

Lack of technical advice to LA

staff Energy renovation of public buildings and the use of new contractual models as EPC requires strong technical, legal and financial expertise that is rarely available above all in small Municipalities. The need to overcome several critical aspects, from the fund raising, to financial design, the setting up of an efficient building data collection system as well as an efficient tender, requires a strong "political commitment" which can only be achieved by raising awareness at political level.

Problem oriented systematic training should be provided to Municipalities staff on technical, legal and financial aspects of public building renovation.

An experienced energy manager should be appointed in each municipality or at least in every union or small group of municipalities.

Lack of data on public buildings

Several partners evidenced a general lack of school building data (updated plans of the buildings and building elements, energy consumption bills) which jeopardize the requalification efforts. A time-consuming process is needed to gather information and usually the archived data are not updated. In some country regional or national databases of public buildings exist, but typically they are not harmonized, nor updated and do not allow exchange of data. A unique database format with a clear updating process and clear responsibilities can improve this aspect. Moreover a suitable accounting system for the recording of the energy data/bills at building level should be adopted, as this information is the basis for evaluating any requalification project.

Involvement of schools staff

In most part of the partnership countries Municipalities and Provinces are the owners of school buildings. Users of buildings (school deans, staff, students) are not the owners of the structures and they do not have direct means to improve the situation of their building: they do not pay for heating expenses nor have any economic advantage from energy saving, but on the other side students and school staff are the ones which suffers for no comfortable indoor conditions. This situation can lead to a sense of powerlessness instead of pushing for behavioural change (a sort of a tenant approach which is not really interested in improving other people's property). A way to incentivize schools organizations sharing with them the economic savings (by, e.g., purchasing educational materials) due to an improved energy efficiency should be developed by Municipalities. A systematic training aimed at behavioural change is needed and it should be included in the normal environmental education programs from the first years of primary schools.

CONCLUSIONS

The analysis of barriers and weak points conducted at national and partnership level allowed to identify a number of critical aspects that need to be improved for a full exploitation of energy requalification potential of public buildings. Analysis has been conducted in each country involving stakeholders by regional workshops, world cafe meetings, trainings.

Despite there are some peculiarities in each country, in most of cases problems of financing, technical, behavioural change or organizational issues are similar for the entire partnership. On the other side, due to these differences, the proposed solutions are necessarily generic.

The content of the policy recommendations are part of the Green Paper on energy efficiency in the school buildings document, a broader work that also includes aspects such as the current EE EU policy framework, the legislation in the partner countries, nZEB concept in Europe and partner countries, the actual conditions of schools building, or financing mechanism in partner countries. We recommend consulting the Green Paper document if you want to contextualize or deepen about energy efficiency in public buildings.

ANNEX 1 Italy

BARRIERS AND WEAK POINTS

Often the use of national and regional incentives by the Municipalities (owners of the schools) is not favoured for several reasons hereafter outlined:

1. Budget restriction for Local Authorities, problems in doing debts

Although in Italy there are valid incentive systems, local administrations face overwhelming impediments to make energy efficiency interventions. Apart from non-repayable incentives, it is very difficult for local authorities use any of the other tools made available by the State to incentivize energy efficiency and renewable sources for a number of reasons

- I. LA do not have own resources: over the years, state contributions to the Italian municipalities have been significantly reduced and local taxes cannot be increased because they are regulated by state laws. The few resources collected by the Municipalities are used to pay current expenditure (personnel, road maintenance, green area maintenance, bills, etc.) and cannot be diverted for investments.
- II. The Municipalities cannot take resources from the Cassa Depositi e Prestiti or from the conventional financial sector due first of all to the Stability Pact and then to the 2016 Stability Law which on the one hand it has eliminated the internal stability pact, but on the other it has introduced some other obligation on the municipal budget which make very difficult for municipalities to contract a mortgage.
- III. Even if the intervention leads to a guaranteed energy saving with a bank guarantee from the contractor superior to the mortgage payment, the law prohibits indebtedness. The penalties for those administrations that exceed a balanced budget have been considerably tightened, going to act on the appropriations of the following years. For this reason several funds introduced by State or Regions in these years were not used at their full potential. The impossibility of finding resources in the budget and the impossibility of indebtedness also impacts on the ability of Municipalities to access the Thermal Account, even in the version that provides a 65% non-repayable loan: the instrument is not fully usable as the incentives are deferred in five years and at best the GSE manages to anticipate only 2/5 of the contribution in advance..

2. Complexity of technical procedures for applying for financial incentives, LA understaffed

Incompatibility of some solutions (eg. Public Private Partnership (PPP)) with the public procurement code. Only recently the Italian legislator, implementing the aforementioned Directive CE/32/06, through Legislative Decree 115/2008, introduced (or better translated) the normative notion of the EPC contract. The EPC, therefore, is an atypical contract, since it lacks a complete legislative discipline. The formation of the energy efficiency contract therefore represents a delicate phase, implying not only the precise definition of the relationship among parts (the exact regulation of the roles, responsibilities, risks and benefits of the transaction, of the guarantees , also through clauses aimed at spreading and mitigating the risks inherent in the intervention), but also the assessment of technical and economic - financial aspects of the actual intervention, based on studies of the technical and economic feasibility of the project. It is not always simple therefore a clear allocation of responsibilities between administrations and financing.

3. Lack of technical advice and lack of internal skills

that can follow the necessary administrative practices, determine what actions can be undertaken and prioritize them. It is difficult for these reasons to carry out long-term interventions characterized by a better cost-effectiveness ratio.

4. Complexity of the ownership:

In Italy owners of school buildings are in general Municipalities and Provinces. Users of buildings (school directions) are not the owners of the structures and they do not have direct means to improve the situation of their building: they do not pay for heating expenses nor have any economic advantage from energy saving, but on the other side students and school workers are the ones which suffers for no comfortable indoor conditions. This situation can lead to a sense of powerlessness instead of pushing for behavioral change. Moreover re-qualification of secondary schools are assigned to the provinces whose programming in general does not take into account real consumption levels but it is driven by emergencies.

5. nZEB: payback period is too long with the actual incentives

As emerged also by pilot activities, payback period of energy refurbishment towards nZEB, based on existing incentives, is very long and do not stimulate actions in this direction

BEST PRACTICES

o National register of school buildings;

Since 2016 is active in Italy a **National register of school** buildings which provides updated data on the main characteristics of Italian school buildings (for example it includes information on the seismic adaptation of buildings, on the presence of collective spaces such as gyms or auditoriums, on the state of the supporting structures) and moreover provides data on mobility, environmental sustainability and the quality of the infrastructures of the school institutions (for example 63% of Italian schools have a school bus service, 71% of school buildings took steps to overcome architectural barriers - access with ramps, doors and in 58% of cases they identified solutions to reduce energy consumption, through zoning of the heating system (64%), double glazing (62%), solar panels (46%).

The register includes more than 42.000 school buildings and will allow to overcome the lack of data on buildings plans and structures, disseminate to public the knowledge on the buildings and to schedule with greater effectiveness maintenance operations. The school building characteristics saved in the national register are increasing year by year. Moreover the national register is joined by regional databases which have been instituted by several regions.

o CONSIP framework contracts

CONSIP is a joint-stock company, 100% owned by the Ministry of the Economy and Finance, which operates at the exclusive service of the Public Administration (PA) with the mission is to make the use of public resources more efficient and transparent, providing administrations with tools and skills to manage their purchases and stimulating companies to compete with the public system.

As energy efficiency is becoming a very important issue for PA, CONSIP developed framework contracts in the field of energy services based on Energy Performance Contracting (EPC) model. EPC contracts in fact are not applied as widely as they can in Italy, because of the complexity of technical procedures

and the lack of specific expertise that often discourages PA. These weaknesses can be overcome by CONSIP wide and pluriannual expertise and guiding role.

In terms of results, the action developed in the energy sector has allowed for "savings on unit prices" of around € 1.2 billion (2018), but above all "savings from efficiency and innovation". And in fact the more than 5.000 energy redevelopment projects carried out since 2008 have made it possible to obtain lower primary energy consumption in terms of "TEP" (i.e. Tonnes of Equivalent Oil) equal to 803.644 and lower emissions of 2.012.090 tons of CO₂.

o Strong political commitment;

Several weaknesses of PA (understaffing of PA, lack of technical advice) can be overcome by a strong political commitment which will allow:

- a. activation of working groups within the Municipalities dealing with issues related to energy efficiency and which include an energy manager (CSPT is an important example).
- b. ability to find cumulative incentives (national and regional). Municipalities must have internal competences able to identify and combine different available funds.
- c. continuing training on energy issues and crowdfunding is a necessary and indispensable action.

ANNEX 2 Greece

BARRIERS AND WEAK POINTS

- Financing incentives and fares. The major weak point of Greece in implementing energy efficiency projects is the lack of funds.
- Technical. On the technical aspect there is a weak point that concerns the municipalities and their staff. Although all public entities in Greece are required to have an energy manager at every public building these personnel is often under qualified for the position tasks that include proposition of energy saving measures in the buildings.
- Changing behavior. Raising the environmental awareness of children must begin early at school, where children are socialized, shaping viewpoints and behaviors, setting the foundation for their future life.
- Organizational. School buildings in Greece are managed by the municipalities which are also paying their energy bills. The first organizational issue is the lack of energy consumption data especially for heating (for oil boilers which are the common systems) while electrical data are very often given in periods longer than monthly which makes them less useful for energy consumption monitoring.

POLICY RECOMMENDATIONS

Using own funds of municipalities or regional governments for financing energy efficiency projects in schools is almost impossible, at least currently. Furthermore, in some cases behavioral change issues due to lack of/or poor information is also an issue that need to be addressed. In this context, the following policy recommendations are proposed in order to overcome the identified barriers.

1 st Policy Recommendation (at municipal level):

Establishment of a department for the Monitoring of the Energy Efficiency of Municipal Buildings & for the identification of National & EU funds for building interventions.

Due to the limited financial resources, the Municipalities should take advantage of every possible national or European fund available for energy efficiency. To achieve these, municipalities should be able to monitor the

energy consumption of their buildings, conduct feasibility studies, make their own proposals or even conduct energy audits to their buildings. Technical Experts should be hired permanently or by contract and have as their main job to plan and implement energy efficiency upgrades of the municipalities building stock. In this way, municipalities will be ready to participate in any available funding programs.

2 nd Policy Recommendation (at national level):

Simplify the procedures of the existing Legal Framework favoring the application of ESCO or other financing models.

This recommendation requires the involvement of the national government. A solid legal framework should be developed for other models of energy projects financing like the ESCO models with the energy performance contracting. The procedure that should be followed should be defined which will involve the owner the ESCO and the investor. The goal is to create confidence in energy saving projects and increase the interest of every possible investor.

3 rd Policy Recommendation (at municipal or regional level):

Organization and promotion of information/training events to raise energy efficiency awareness.

A good initiative would be the establishment of training programs and organisation of info-days (behavioral change events etc.) for the staff of the municipalities, the students and the teachers of schools, the staff of the regional governments and the citizens in order to raise their energy efficiency awareness.

4 th Policy Recommendation (at municipal or regional level):

Appointment of Energy Managers to public buildings (including schools).

Central energy management of municipal buildings would also be an advisable policy. Energy managers for all school buildings should be appointed with their main task to monitor energy consumption in schools, to report related problems and to facilitate any proposal for an energy upgrade. They could also communicate with the buildings users, in case of schools with the teachers and the students in order to promote behavioral change for energy saving in buildings.

ANNEX 3 Spain

Financing, incentives and fares (including payback period)

- There are not incentives enough to invest in the schools in order to improve their energy performance.
- Energy rehabilitation requires huge investments and the simple payback period is extremely long.

Technical

- Boilers are, in many cases, obsolete.
- There is a clear lack in technical advice.

Changing behaviour

- The education community is not aware of the importance of transmitting this kind of competences to the students.
- The environmental education is considered as an isolated subject.
A transversal program kept over the time and aimed to the students is required to cause changes in the students behaviour related with best practices in energy and environment.

Organizational

- The competences in the school have to be clearer.
- In general, school is not really implicated in the social life.

POLICY RECOMMENDATIONS

1. There are not enough incentives to invest in the schools in order to improve their energy performance.
The regional government has to include the objective of energy efficiency and installation of renewable energy sources in the program “Edificant”.
2. Energy rehabilitation requires huge investments and the simple payback period is extremely long.
The criteria of improvement of the energy efficiency have to be considered in all grants offered by the different governments.
The increase of funds and subsidies availability would drive local authorities to improve the energy performance of their buildings.
3. Boilers are, in many cases, obsolete.
Regional and local governments should promote the change of the boilers into more performance ones. They have to give incentives and financial eases to do these changes.

4. There is a clear lack in technical advice.

The creation of the figure of a local energy manager would be desirable. This expert would be responsible of the energy management of all the public buildings, including primary schools.

It would be interesting that schools have a direct way to consult about technical solutions to specific problems related with energy efficiency. It would be desirable if schools and local technicians had a closer relationship. Local authorities' technicians should better know the installations of schools and try to improve their energy performance and efficiency.
5. The education community is not aware of the importance of transmitting this kind of competences to the students.

The school's staff has to be taught in best energy practices, sustainability, energy efficiency, etc. and they have to put it into practice in order to be an example to the students. Therefore, they will be able to transmit all this knowledge effectively to the students. Many easy and not very expensive practices can help to show the importance to save energy such as the installation of presence detectors in the classrooms, halls, dining room or the installation of programmers on electrical devices. These actions can be made directly by the school's staff.
6. The environmental education is considered as an isolate subject.

The environmental competences have to be included in educational programs as a transversal subject to be taught during all the courses in primary school. Moreover, it must be related with several subjects.
7. The competences in the school have to be clearer.

It would be interesting and more realistic if the energy rehabilitation of the school buildings was promoted by the local governments.
8. In general, school is not really implicated in the social life.

The local government could promote joint activities among schools, government and companies of the energy sector in order to share experiences and knowledge.

ANNEX 4 Croatia

BARRIERS AND WEAK POINTS

Financial weak points and policy recommendations

Barriers of a financial nature that are currently hindering the development of energy renovation projects include:

- limited funding for municipalities available
- the absence of specific support programs for the energy renovation of cultural heritage buildings
- Underdeveloped ESCO market
- Lack of public grants and subsidies

Technical barriers

- Inadequate documentation of public sector buildings (including schools)
- Lack of option to include "soft" measures

Organizational, behavioural and social weak points and recommendations for improvement

- Complex administrative procedures
- Undefined commitments of the public sector in the implementation of the National Program for energy efficiency
- Insufficient user education for public procurement procedures
- Low awareness of contracting authorities (public sector) and potential energy service providers
- Lack of long-term and short-term building management plans

INSTITUCIONAL AND GOVERNMENTAL BARRIERS:

- Regulation and planning
- Institutions
- Different stakeholder interests

Regulatory obligations for implanting energy efficiency

Solutions for the problems can be solved by introducing a state-level legal obligation through the Energy Efficiency Act. The Ministry may prescribe and finance the creation of special departments and teams within the regional and city bodies, which would have experts from the technical, economic and legal professions

and who would be solely responsible for developing Action Plans and monitoring the implementation of the plans.

Alternatively, partnerships could be formed between local government units and the private sector, where private companies with knowledge and expertise could make plans for regional governments or major cities.

There are also Legislative measures that can be implemented to aid in renewal of public buildings:

- identify the most effective legislative mechanisms whose implementation would result in improvement of the energy efficiency of buildings (energy certification, boiler room inspection, stricter technical standards, etc.)
- oblige legislative acts to use renewable energy sources and apply energy efficiency measures in existing buildings
- amend or repeal restrictive legislative acts that discourage the improvement of energy efficiency in buildings
- make a legislative commitment to improve buildings with poor energy performance (e.g. introduce various restrictions and restrictions on the sale and lease of buildings of less than D energy class)

Covenant of Mayors

Thanks to the Covenant of Mayors, signatories benefit not only from the experience of thousands of other cities but also from a community of stakeholders that are supporting them in designing and delivering their energy and climate actions

FINANTIAL BARRIERS:

- Access to funding
- Long investment return period
- Lengthy and complex public tenders to obtain funding

Financial measures for energy efficiency in public buildings

- Development of financial instruments
- The method of awarding the financial grant

In order for financial institutions to track energy service providers, it is necessary to develop financial instruments in accordance with the rules of use of ESI funds, with a specific purpose for energy service providers. The development of financial instruments should also create the conditions for the development of the energy services market, including through the PPP model, that is, the

development of the market among private entities seeking to operate on the principles of energy service provision.

The following objectives can be achieved: to provide access to financing EE projects to encourage the development of ESCO markets through specific products to reduce the cost of financing for EE projects. The co-financing model should be adjusted in such a way that the aid is awarded in direct relation with the service provider, without a mediating role or that the risk of receiving the aid is sustained by the energy service provider, without affecting the obligations under the energy performance contract.

Financial grant schemes

The use of a grant scheme can (and should) achieve the following objectives:

- Encourage end-users to develop the technical bases needed for the implementation of energy renewal projects to develop a range of ready-to-carry energy renewal projects
- Encouragement to invest in energy efficiency technologies that have not yet been proven in the domestic market, with the aim of early exploitation of the many innovations existing in the market
- subsidizing projects whose cost-effectiveness is below the marginal level of market interest;
- encouraging the market to invest in energy efficiency measures that achieve a technical standard higher than the minimum required
- subsidizing ESCO projects by co-financing compensation for the duration of the contractual relationship

Given the above objectives the grant schemes should be designed in such a way as to encourage:

- motivation to use market funds
- investing in technical documentation
- investing in innovative technologies
- investing in projects that are below the market viability level but have high economic benefits for the community
- investing in measures that achieve higher levels of technical standards

The grant schemes would encourage the financing of commercially viable projects to further motivate beneficiaries to pursue those projects and it would finance the development of a technical and economic documentation showing the cost-effectiveness of investing in a potential energy renewal project. As the implementation of the energy renewal project depends on the findings and conclusions of the documentation in question, a high proportion of co-financing

is recommended in this case, to encourage the end recipients to take risks and invest their co-financing.

Financial grant scheme would also encourage investment in non-marketable projects. Non-viable projects are those projects that, under the available financing conditions, offer the investor a return on equity that is below the possible level profit in the market. The logic is that in case of insufficient return on own investment in an energy efficiency project, the rational entity will engage its own capital elsewhere, and therefore such investment should be encouraged in such a way that projects below acceptable level of return on own investment are given grants that will make up the difference needed.

POLICY RECOMMENDATIONS

Long term energy efficiency financial model

Subject to the requirements for the introduction of innovative and sustainable financial instruments and taking into account previously identified barriers an overview of financial measures that should accelerate the implementation of energy efficiency projects.

1. Establishment of financial instruments - an urban renewal fund for energy renewal projects through European Structural and Investment Funds and development banks to offer long-term and sustainable financing mechanisms (loans, guarantees, equity) for public and private sector users that would have several effects on previously identified barriers:
 - Continuous availability of funds ensured regardless of the budgetary resources of the state and local and regional self-government units
 - Involvement of commercial financial institutions and mobilization of more private equity.
 - Reducing the risk of investing in energy renewal projects for financial institutions.
 - The possibility of obtaining grants to increase the cost-effectiveness of ambitious and innovative projects.
 - Easier access to capital and lower financing costs for energy providers and PPP projects.
2. Further implementation of the Energy Sector Building Renovation Program:
 - Encouraging the development of the energy services market.
 - Reducing the burden on public sector budget users while avoiding additional borrowing.
 - Engagement of financial resources and capacity of the private sector

3. Establishment of a special support program for co-financing the energy renovation of protected cultural heritage buildings:
 - Promoting the energy renovation of cultural heritage buildings that have a high economic return (ERR) and low financial return (IRR).
 -
4. Establishment of a special instrument for co-financing the technical preparation of projects:
 - Avoiding high development costs of projects.
 - Creating a database of projects ready for funding and implementation.
5. Introduce a legal provision shifting the obligation to implement energy efficiency projects for large enterprises through the contribution system to energy suppliers:
 - Secured sources of grants for large enterprises with state aid amounts are not sufficient.
 - Unburdening the financial and human capacities of public institutions.

How to make energy efficiency investments make more attractive for banks or private investors.

The long-term strategy for encouraging investment in the reconstruction of public buildings aims to ensure the long-term removal of obstacles to private investment in the energy sector, by providing guidance on creating a clear, unambiguous and stable legal and administrative framework that will be incentivized to undertake investments in the energy renovation of public buildings which will reduce the degree of uncertainty that investors face.

Financial institutions are a key stakeholder in the strategic reconstruction of the National Building Fund because the public sector does not have the financial strength to support the implementation of all planned measures on its own. In the past, the involvement of private investors and banks in energy efficiency projects was minimal and limited to commercial projects. Energy renewal projects do not generate direct cash receipts but have the effect of reducing existing costs. These financial benefits are more susceptible to technical risk and user behaviour, and are the reason why banks have been less inclined to finance this type of project. Eliminating and overcoming these risks, as well as eliminating distrust of the ESCO financing model, is a key prerequisite for greater involvement of financial institutions.

The biggest barrier for private investors and energy service providers is limited access to affordable sources of financing. The lack of support from financial institutions in the form of long-term preferential loans, guarantees and project financing has led to the very high cost of ESCO projects and the consequent reluctance of investors to choose this model. EU cohesion policy requires that sustainable energy projects be implemented with greater involvement of private investors. In doing so, public grants must take on the role of complementary funding, which will mobilize private investors' funds in a way that makes them more attractive for their involvement in the financing of reconstruction. This objective can be achieved by introducing the following financial and regulatory mechanisms:

- subsidizing commercial loan interest will enable commercial banks to invest in energy renovation of buildings
- promoting the development of the energy services market through the implementation of the Public Buildings Renovation Program
- development of standardized energy performance contracts and standardized methods for measuring and verifying energy savings that will increase the confidence of users and financial institutions in the ESCO model

LACK OF NECESSARY KNOWLEDGE AND MOTIVATION:

- Lack of information
- Insufficiently addressed public
- Insufficient knowledge of the construction sector

Technical and social component of energy efficiency renewal

The precondition for successful launching and implementation of the integral energy renovation of the public buildings is a good development of the construction and energy services market, and a sufficient number of experienced companies specialized in the implementation of integral energy renovation, which covers the mechanical, energy and construction elements of the building and requires an interdisciplinary approach. The crisis in the Croatian construction and energy sector, resulting in the closure or bankruptcy of a large number of companies, has further strengthened the existing barrier of insufficient capacity, knowledge, ability and skills to successfully complete the complex task of integral building renovation.

However, the construction sector can quickly get back on its feet and provide the necessary expertise when private and governmental companies start to feel safe about security and better future of the construction sector. The direct impact of the National Building Fund Renewal Program on construction employment by

(including) 2020 could be up to 26,000 new jobs. This is a big increase over the current headcount. At the end of 2016, 68 653 employees were employed in companies registered in construction. However, it is questionable how much all companies whose construction is the main registered activity are engaged solely or exclusively in that activity. According to the CBS special report on construction, the average number of construction site workers in 2015 was 41 037 and was still declining compared to previous years. Although the National Building Fund redevelopment program not only mobilizes construction site workers but also designers, engineers, managers and administrative staff, it is clear from these figures that there is a large mobilization of resources, especially in construction. Mobilization potential can be roughly estimated at 40-50% of current resource engagement in construction.

Also, governmental bodies could add to improvement of construction sector by implementing several technical measures that should cover the following:

- continuously align technical norms and standards with new technological solutions available on the market
- analyse and apply centralized heat systems for heating and cooling buildings as much as possible
- build district biomass heating systems
- ensure proper control of compliance with construction regulations and enforcement of penal provisions in the event of non-compliance
- develop standard solutions for easy application in buildings of the same purpose
- introduce mandatory certification of the quality of installation services and products

The next barrier to be taken into account is only partial information, education and public participation in making important decisions about the renovation of buildings. Insufficient awareness of the positive effects for each individual and society as a whole, which the integral restoration of the entire national building stock certainly brings, results in insufficient motivation and often unjustified increase in risks that further block potential investors.

Some measures could be implemented to remedy lack of information and knowledge among all participants in energy renewal of public buildings:

- establish publicly accessible databases with good practice examples and all necessary data for launching and implementing energy renovation projects for buildings
- initiate and continuously implement educational programs for all categories of construction workers

- establish good communication channels for sharing knowledge and experience between different levels of government (national, regional, county, local)
- continually carry out promotional and educational activities for different target groups with an emphasis on the positive effects of energy renovation of buildings;
- continuously inform stakeholders and the public about the implementation of this Long-Term Strategy to encourage investment in the reconstruction of the National Building Fund of the Republic of Croatia.

ANNEX 5 Cyprus

Summarizing, the basic Barriers and potential problems in implementing and financing Energy Efficiency projects in public schools in Cyprus are:

From administrative point of view:

- Operating based on complicated management structures [many stakeholders are involved]
- Lack of awareness and lack of technical expertise on EE issues
- Limited available energy and operating data
- No Benchmarks available
- There are no appointed Energy Managers in schools

From legal point of view:

- Difficulty regarding the right use of EPCs and Public Procurements for buildings' energy upgrade.
- Increased bureaucracy
- Fragmentation of responsibilities

From financial point of view:

- Limited, stable available funding
- Difficulties to access the funding
- Time consuming processes and complicated tendering procedures to access alternative funding, such as the funding from ESCOs and Banks

From accounting 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

Overall, it can be seen that there is lack of a holist approach, whereas the launching of concrete investments is limited by the need of establishing technical, economic and legal expertise for project development.

POLICY RECOMMENDATIONS

The European climate and energy targets for 2030 require a reduction of the greenhouse gas emissions, an increase in energy efficiency and a share of

renewables in the total use of energy. Those will set the basis for the 2050's target, which commits to a reduction in GHG emissions by 80%-95%, in order to develop a sustainable, secure and decarbonised energy system.

The national commitment has been set to at least 24% cuts in greenhouse gas emissions by 2030 (compared to 2005 levels). The building sector, currently responsible for more than a third of the total GHG emissions, is expected to make a substantial contribution to achieve these goals. In addition to tightening requirements on new buildings, the focus is set on improving the energy performance of the current building stock, to ensure that the long-term renovation strategies increase the transformation of existing buildings into nearly zero-energy buildings.

TEESCHOOLS project and the outputs of the Energy Audits are an important asset to overcome the weak points when implementing and financing Energy Efficiency projects in (public) schools in Cyprus. Through TEESCHOOLS a list of proposals in order to improve the energy efficiency of typical primary schools and the thermal comfort conditions in the classrooms, has been established. Those can be used to eliminate the legal and administrative barriers for mainstreaming large scale - energy- renovations in schools, by addressing the main existing barriers and challenges as follows:

- Through the School Boards and the School Advisory Committee, the Ministry of Education, Culture, Sports and Youth can be reached in order to establish a specific programme for the energy efficiency of school buildings;
- By uptaking the results of the TEESCHOOLS project, a procedural framework to select existing (public) school buildings based on pre-defined criteria to implement energy renovations can be developed;
- If there are available Funding Schemes [Subsides or Intensives], the reports will help to set clear goals and targeted actions;
- If there no relevant Funding Schemes are available, then the Energy Audits reports can be used as the basis for the initiation of a financing mechanism;
- Energy and operating data collected within the project's duration can be provided to build-on and establish typical energy profiles for school buildings [benchmarks];
- Energy Managers can be allocated either per district/location, either centralised to simplify procedures and provide awareness and technical expertise, while collecting relevant data;

- The use of Energy Performance Contracts will be encouraged based on the most cost-effective scenarios.

All the solutions need to be confirmed with the Ministry and the national targets, to confirm that the results will be assessing, technical, economical and legal aspects and can be replicated. The solutions identified, will be aligned with the Ministry's priorities, capacity and commitment.

If a policy decision is not taken at national level, then local policies, can be assessed. Signatory Local Authorities of the Covenant of Mayors can be an alternative as they include in their SEAP's, measures for the energy upgrading of their building stock, as a key component to improve the overall energy efficiency of the Local Authority.

ANNEX 6 Bosnia and Herzegovina

In line with the needs of the current activities of the TEESCHOOLS project, this paper highlights five weaknesses related to energy efficiency in schools in Bosnia and Herzegovina.

Financing, incentives and fees (including the payback period)

- Weak point a.1. No clear, applicable, viable or innovative EE financing mechanisms have been developed in the public sector / education of BiH.
- Weak point a.2. Lack of knowledge, information and training of managers and even lack of interest and lack of understanding of EE problems in the public sector (including schools) in BiH is evident.

Technical weaknesses

- When it comes to technical weaknesses related to energy projects in education in BiH, apart from others, the problem of enormous. Such consumption is the result of old school buildings and obsolescence of equipment, but often the users of the facility are also responsible for these issues. Lack of accurate data on energy consumption in FBiH is a problem to be observed and is highlighted in the draft version of the FBiH Action Plan on EE (EEAP).

Change in behaviour

- Weak points in behaviour of managers, employees, students and other stakeholders in public education when it comes to energy management and raising energy efficiency to a higher level are evident in BiH.

Organizational Weaknesses

- Strategic, consistent and complete measures and activities that would improve the EE's status in education and other sectors of the public sector in BiH have not been undertaken. For example, in the organizational structures of public institutions (schools), no positions are foreseen for employees who would be tasked with managing the EE of the organization, nor are school managers in charge of energy management in the institution.

POLICY RECCOMENDATIONS

Recommendation 1: With regard to the weakness in the segment of financing, incentives and remuneration mentioned in Part 3.a.1. of this document, it is

necessary to proceed without delay to developing (or adapting the models from other markets to the local conditions) clear, less administratively complex and viable EE funding mechanisms applicable to public education in BiH. Of course this should be a part of a strategic approach to the development of financial instruments for EE projects in BiH. This would be the task of the competent authorities and institutions that should provide all the necessary political, legal, organizational and other steps necessary for these activities. Models of financing that already exist in the BH market need to be improved at least in the following partial segments:

- Self-financing: Provide initial capital investment for the establishment of revolving funds at different levels for EE projects, which would significantly contribute to easier and faster access to financial resources (the first fund of this kind in the region was established by the FBiH Environmental Protection Fund)
- Debt financing: Make it cheaper and more stimulating, lower interest rates, extend grace period and loan repayment period, reduce administrative procedures for obtaining funds, review sustainability and other application criteria to adapt to market conditions in BiH)
- Grants: It is necessary to make a step away from this source of financing and towards sustainable financial instruments that, inter alia, increase the involvement and interest of EE project participants.

Recommendation 2. In relation to the weak point noted in section 3.a.2. of this document, it is necessary without delay to begin with the quality and continuous informing of all relevant public groups about the available funding models of EE projects in the public sector and public education in BiH. The information must be clear, accurate and timely. In addition to informing them, it is necessary to immediately start educating managers, employees, pupils or users of school facilities about the importance, as well as direct and indirect benefits of implementing energy renovation. Education should also include new, innovative models of funding. For example, increasing knowledge of PPP and EPC models, the potential of ESCO companies and so on, will make it easier and quicker for managers of public education in BiH to start energy renovation projects in schools. Namely, these models that provide funding for EE projects from future energy savings and distribute the risk onto multiple project participants are undeniably a stimulus for launching new energy projects. Increasing knowledge of stakeholders in education about EE can also put a welcoming pressure on higher instances of government to more actively approach this subject.

Recommendation 3: In relation to overcoming the technical weaknesses observed in EE in BiH schools, it is especially important to devise and implement measures to reduce their enormous, often unjustified energy consumption. In this sense, it is also necessary to immediately approach the

measurement of energy consumption in the facilities and ensure systemic provision of accurate data on energy consumption. Namely, the lack of this data in BiH is a problem that needs to be addressed in order to implement further activities in the field of energy management in BiH. Measurement of energy consumption further enables determination of energy savings that can be achieved through a whole range of individual activities. Although this recommendation, due to the age of objects and obsolescence of equipment, basically implies investing in energy renovation of facilities or their parts, it is important to draw attention to the possibility of reducing energy consumption by non-investment: awareness-raising, increasing concern and changing user behavior. Stimulating users to save energy without decreasing their comfort is a recommendation that does not require a large investment, but rather a continuous and persistent education of owners, employees and school students.

Recommendation 4: Regarding behavioral changes, deviations in relation of managers, employees, students and other public education stakeholders in the area of energy management in schools in BiH are evident. They are often a consequence of the low level of knowledge about EE at all, the lack of understanding of the importance of implementing EE measures in schools or the lack of understanding the direct and indirect benefits and cobenefits of these projects for society and individuals in it. To change behavior and move towards more responsible energy management in schools, it is necessary without delay to enter into education of all these stakeholders on different aspects of EE projects. It is also necessary for competent institutions to develop and implement a unique communication strategy (with carefully selected messages, techniques and channels of communication) that would stimulate changes in knowledge, awareness and behavior and to properly understand the importance of EE projects for the individual, the education sector and the BiH society as a whole. *“In BiH, due attention has yet to be paid to public campaigns to promote energy efficiency. Promotional campaigns that provide clear information on how to achieve energy savings and encourage consumers to action can influence change in understanding and lead to action. They may, among other things, provide information on how to reduce energy consumption at workplaces, suggesting efficient lighting and heating, and making reasonable decisions when selecting construction and other materials and purchasing equipment. Information, education and training are extremely important for strengthening the culture of energy efficiency. Examples from other countries can be a good guide for similar programs in BiH.”* (<http://ekologija.ba/wp-content/uploads/2017/06/Zelena-knjiga-EU-o-energetski-efikasnosti.pdf>)

Recommendation 5: To eliminate organizational weaknesses in the EE sector in the public sector / education sector in BiH, it is imperative to make and implement a strategy for improving energy efficiency without delay. A strategic approach to the EE area in the public sector / education means the formation

of all necessary bodies and institutions, the adoption of all necessary laws, standards, procedures, plans and the like, and their alignment with the EU legislative framework. So, for the strategic steps to improve the organizational aspect of the EE in the public sector and specifically in BiH education, it is necessary first of all to have a firm legal framework. It will enable further drafting of planning documents in the field of EE and further institutional development of EE in BiH. The EE promotion strategy in the BiH public sector must also include organizational charts that clearly point to the structure and hierarchy of relevant organizations relevant to the implementation of EE measures. In the organizational structures of public organizations (schools), consistently, all legal acts should provide for the engagement of staff who will be concerned with EE and energy management.

Particular attention should be put on the fact that the organization of EE activities must provide the staff tasked with leading an adequate and specific communication strategy necessary to change the views of BiH citizens on energy efficiency.

ANNEX 7 France

Several weaknesses characterize the energy renovation of commercial buildings in France:

- French Legislation:

Without effective legal monitoring it is very difficult for economic actors to keep up to date with energy renovation, in fact the French legislative system is complex, the absence of a regulatory body that coordinates all the actors. French legislation comes from several sources.

- Financial assistance for energy renovation work.

In the case of energy-efficient housing renovation, there are many ways to make your home more energy-efficient. This is not the case in the tertiary sector.

POLICY RECOMMENDATIONS

Recommendation 1: Creation of a regulatory body

The creation of a regulatory pole that acts as an intermediary between the various actors in energy renovation would make it possible to:

- 1- Converge regulatory aspects, and implement a single regulation that is easy to understand and accessible to all stakeholders,
- 2- Creation of an energy sheet with clear, precise objectives.
- 3- Create a database of feedback,
- 4- Do not pass new laws that call into question projects under construction, and impose new standards.

Recommendation 2: Administrative simplification

Administrative procedures in the context of energy renovation may take years before the actual implementation of these projects, administrative

simplification would reduce the waiting times of the various state agencies[prefecture, department...].

The simplification of administrative formalities and procedures consists of a series of pragmatic and concrete measures designed to facilitate relations between the administration, companies and state agencies (e.g. ADEME).

Recommendation 3: Financial aspects

The implementation of real aid to local authorities would facilitate investment, which is also a factor in economic growth.