



ESMES Project

“Energy Smart Mediterranean Schools Network”

A_B.4.3_0123

ENI CBC MED PROGRAM

Output 3.3 Case studies on REEE project portfolio solutions for enhanced energy rehabilitation of schools’ buildings

Schools involvement

Activity 3.3.1 Cross-border case studies drafting and sharing

Table of content

Sommario

1. INTRODUCTION	3
1.1. ESMES Project	3
1.2. ESMES ACTIVITIES - WP3	3
2. CASE STUDY METHODOLOGY	4
3. SCOPE OF THE DOCUMENT	5
4. PROJECT PARTNERS EXPERIENCE	5
4.1. Framework and criteria.....	5
4.2. Procedure and authorization	9
4.3. Governmental bodies involved.....	11
4.4. Feedbacks	12

1. INTRODUCTION

1.1. ESMES Project

ESMES project (Energy Smart Mediterranean Schools Network) is a project co-financed by the European Commission under the ENI CBC Med Program, the largest Cross-Border Cooperation (CBC) initiative implemented by the EU under the European Neighbourhood Instrument (ENI). The Programme brings together the coastal territories of 14 countries in view of fostering fair, equitable development on both sides of the Mediterranean. This project is specifically focusing on the optimization of energy consumption in public schools through innovative, monitoring-based renewable energy and energy efficiency (REEE) pilot actions. At the same time, the project is improving the capacity of 5 public institutions in order to implement innovative energy rehabilitations.

ESMES intends to contribute to increased awareness and better energy habits in schools, through practical training in REEE delivered to 8,000 students. On the economical level, it is expected to save € 30,000 /year through the return of REEE investments. Finally, the project should save 240 CO₂ tons/year, 270,000 kWh/year from RE and 30,000 kWh/year through energy efficiency.

ESMES project is particularly objected to **enhance** capacities of national, regional, and local institutions of Jordan, Tunisia, Lebanon, Italy and Spain to plan and realise improved energy rehabilitations for higher energy sustainability of public buildings through cross-border cooperation, **reduce** energy consumption in 10 public school buildings in the above mentioned countries through the introduction of cost-effective REEE solutions tailored to buildings energy loads, type&use and climatic zone and **increase** the civil society awareness in energy habits through the cross-border engagement of students in a sustainable use of energy resources.

For further information about ESMES project: <http://www.enicbcmmed.eu/projects/esmes>

1.2. ESMES ACTIVITIES - WP3

ESMES activities are divided into work packages, according to the activities output as indicated below:

WP1:Management;

WP2: Communication;

WP3: Institutional capacity building for sustainable energy policy making & rehabilitations management;

WP4: Planning of REEE rehabilitations in 10 public schools;

WP5: Pilot of REEE innovative solutions in target public schools.

This document falls under the: “WP3 - Institutional capacity building for sustainable energy policy making & rehabilitations management”, which aims to develop the knowledge and the operational capacities of national/regional/local Energy and education institutions to plan, implement and evaluate energy.

rehabilitations that are sustainable, cost-effective and tailored on building types&uses, energy loads and climatic zones.

As part of the above mentioned output, six case studies on REEE project portfolio solutions for enhanced energy rehabilitation of schools’ buildings are to be developed by the six project partners.

Thanks to the cross-border and national common work among PPs, associates and external stakeholders, the interventions that rely upon technical evidence arising from WP4-WP5 for project REEE solutions and smart monitoring practices; each partner has contributed expertise on a specific topic to develop its case study. Alcamo’s role is to develop the **Methodological case study “schools involvement”** in addition to the technical and policy case studies developed by the other project partners. All partners will benefit from the joint work to strengthen their expertise on other topics.

The ultimate beneficiaries of the case studies are the public institutions that will use them to strengthen the capacity to implement energy retrofits based on REEE solutions, and energy professionals to develop competencies and expand networks for REEE project solutions.

2. CASE STUDY METHODOLOGY

Based on evidence from WP4-WP5 pilots, support of national hubs and Thematic Committees; PPs draft case studies of their responsibility. Case studies rely on project experience, e.g. REEE solutions: rationale, implementation, actual performance, possible policy measures for replication and SEM measures: adoption and improvement based on energy performance feedbacks.

Six cross-border case studies on REEE project portfolio solutions for enhanced energy rehabilitation in school buildings are delivered by the six project partners: BEN, PP1, PP2, PP3, PP4 and PP5.. Each case study has been assigned to a project partner based on its expertise as per the CBC framework. The six case studies are namely:

- Monitoring driven rehabilitations (GJU);
- SEM measures (ICU);
- REEE solutions: custom design (CRIB);
- Investment planning through solutions portfolio approach (LCEC);
- Policy and financial support for REEE rehabilitations (ANME);
- Methodology: schools’ involvement (Alcamo).

Because the ESMES project focuses on optimising energy use in **public schools** through a monitoring-based Renewable Energy and Energy Efficiency (REEE) pilot, and because schools are complex physical and social facilities within the nation's educational systems, they have significant energy use and, like other buildings, can exhibit inefficient energy use patterns; it was pointed out how important it is to consider the methodological part of the inclusion of the schools to be renovated.

The aim of this case study is to present and describe the systemic framework that has been followed in the 5 countries to involve the schools of interventions and to facilitate energy reduction in schools across different contexts. This selection and involvement approach to choose the schools, has been piloted in all the public schools located in five countries: Jordan, Italy, Spain, Tunisia and Lebanon.

3. SCOPE OF THE DOCUMENT

This case study provides background information on the schools involved in all countries participating in the ESMES project and the criteria used to select schools for interventions in all countries.

4. PROJECT PARTNERS EXPERIENCE

4.1. Framework and criteria

The first part of the case study is devoted to examining the criteria for selecting schools in each country, the factors, the framework, and the methodological logic followed by the project partners, as indicated below:

In **Jordan**, the schools in the project were chosen to ensure the inclusion of schools that meet specific criteria, which was specified by conducting several site visits nationwide, covering various regions from north to south. The primary objective of these visits was to evaluate the overall conditions of the schools and analyse their energy-related requirements. Multiple factors were taken into consideration during the selection process, including but not limited to schools' infrastructure and energy consumption patterns. Additionally, considerations were given to the schools' geographical locations, educational demographics, and socioeconomic factors that could impact their energy behaviour.



By conducting these site visits and considering these diverse factors, a robust baseline report was established. This report provided valuable insights into the current energy situation of each selected school and served as a foundation for identifying suitable energy conservation measures and developing an effective project strategy.



Overall, the selection of schools for inclusion in the project was a comprehensive and methodical process, aimed at ensuring that the chosen schools had a

representative mix of energy-related characteristics and the potential for meaningful energy efficiency improvements.

In **Italy**, Alcamo municipal schools through a special project.



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was inviting all to participate request to join the

In **Spain**, for the schools contest, at la Ribera county (Valencia Autonomous Region, Spain), 9 CEIP were involved at ESMES contest for 2020-2021 scholar year.

Target group was Spanish primary schools participating at ESMES school contest. Consorci de la Ribera (CRIB) invited 15 primary schools that had been involved previously in the



TEESCHOOLS project, an Interreg
Med programme project focused on a similar topic.



In particular, for the **Non-standard energy loads schools**; CRIB identified in la Ribera county 6 Vocational Education and Training (VET) schools that showed an electricity consumption profile with non-linear loads because of having metal or electricity workshops with machinery. CRIB invited those schools and in

order to select the educational centre where the action would be carried out, CRIB launched a procedure of selection based on a series of criteria for assessing the suitability of the centre. Awarding criteria were the following ones:

1. School annual electricity consumption per student;
2. School total annual energy consumption per student;
3. Year of construction of the buildings;
4. Existence of information about the school buildings;
5. Initiatives on the school energy saving started in the centre during the last 2 years.

While for the **Standard energy loads schools (sub-grant)**, CRIB launched the terms of reference of a call for grants addressing a city council for energy rehabilitation of a public school in its territory. The grant call for proposals was aiming to improve the energy sustainability of a public-school building of Spain (Valencia Autonomous Region) based on the increase of buildings energy efficiency and the installation of



sustainable energy sources. Beneficiary was a city council that had to submit a school buildings rehabilitation proposal focusing on the components of school buildings with the highest energy consumption and / or highest amount of CO2 emissions, while ensuring that the subsidised

interventions are replicable and with a reasonable relationship between effectiveness and cost. The pilot had to be a public education centre.

To be eligible, applicants had to demonstrate that the proposed school rehabilitation actions would mean an improvement of the production of renewable energy and / or a reduction in energy consumption and, therefore, a reduction of greenhouse gas emissions in the territory comprising the municipalities of Mancomunitat de la Ribera Alta de Xúquer and Mancomunitat de la Ribera Baixa counties.

Criteria to evaluate the candidacy were the following ones:

- i. The suitability of intervention actions to project objectives. Furthermore, it appreciated the economic investment foreseen in such a way that was expected to get a higher level of investments. Also, it was appreciated as a possible innovation, both from a technical and procedural point of view. This criterion was evaluated through the submitted school audit, including

the action plan where the proposed measures were identified and valued financially (template MODEL Iib). Maximum weight: 50 points;

- ii. Increased production of renewable energy. kWh of renewable energy produced per year: greater amount of solar photovoltaic energy produced in-situ by the proposed plant in theoretical kWh/year. This criterion was evaluated through the calculation of the proposed photovoltaic solar power plant included, either in the action plan or through other studies (template MODEL Iib). Maximum weight: 20 points;

- iii. Reduction of school energy consumption (kWh saved/total kWh) per year: higher energy savings induced in the school with the proposed energy efficiency actions. Maximum 20 points. Template MODEL Iib. Maximum weight: 10 points;

- iv. Permits and administrative authorization: it was positively appreciated that the city council had the necessary permits and / or authorizations to carry out the proposed sustainable energy actions. Maximum weight: 10 points;

- v. Adhesion to Covenant of Mayors initiative: it was appreciated that the city council had formalised its adhesion to Covenant of Mayors initiative. This criterion shall be assessed based on MODEL I template Responsible statement. Maximum 10 points. The maximum score to obtain is 100 points.

In **Tunisia**, schools were selected in coordination with the Regional Delegation for Education in Sousse, which has adopted an approach of selection taking into consideration the scale of the institutions, the energy consumed and the connection on low voltage to the electricity network.

In **Lebanon**, LCEC has adopted specific criteria for the selection of public schools participating in ESMES activities.

The nomination of the schools was done by the Ministry of Education and Higher Education (MEHE) according to the following:

- The schools should be owned by MEHE;
- The schools should be geographically distributed among the different climatic zones in Lebanon:

- 3 schools in the Coastal-Beirut climatic zone;
- 3 schools in the Coastal-Bay Sour climatic zone;
- 3 schools in the Western Mid Mountains climatic zone;
- 3 schools in the High Mountains climatic zone;

- 3 schools in the Inland climatic zone.



- The schools should complete and submit a baseline data collection survey.

4.2. Procedure and authorization

In **Jordan**, the selection of schools for the REEE pilot activities involved a comprehensive process, considering various factors to ensure suitability and effectiveness. A collaborative effort was made with the Ministry of Education to facilitate the selection process and ensure alignment with educational goals. The following factors were taken into account during the selection process:

- 1- Geographical location: The schools were chosen based on their geographical distribution to ensure representation across different regions in Jordan from the north to the south, excluding the capital city.
- 2- Specific requirements and needs: The unique requirements and needs of each school were considered to ensure that the



selected schools would benefit the most from the REEE solutions. Factors such as the size of the school, its facilities, buildings use, surroundings, and the energy demands were taken into consideration.

3- Energy consumption: The energy consumption patterns of the schools were analysed to identify schools with higher energy demands, providing opportunities for significant energy savings and efficiency improvements through REEE interventions.

4- School type: Both scientific and vocational schools were included in the selection process to cover a diverse range of educational institutions. This approach allowed for a comprehensive assessment of the impact of REEE solutions in different educational contexts.

5- Infrastructure availability: The existing infrastructure of the schools was evaluated to determine the feasibility of implementing REEE solutions and maintenance requirements. This assessment considered factors such as the condition of electrical systems, roof area availability for solar installations, insulations, windows, and compatibility with the proposed technologies.

6- Gender equality: Ensuring gender equality was an important consideration in the selection process. Both boys' and girls' schools were included to provide equal opportunities for REEE interventions and to promote



gender balance in the implementation of sustainable energy solutions.

By considering these factors and engaging in a collaborative process with the Ministry of Education, the selected schools were well-suited for the monitoring-based REEE pilot activities, maximising the potential for successful implementation and positive impact on energy efficiency and sustainability in the educational sector.

In **Italy**, among the schools invited to participate, Alcamo chose the school with the highest energy consumption resulting from the monitoring data.

In **Spain**, in the case of the contest, CRIB didn't follow any selection procedure because they got to involve the 9 schools needed, while in O.4.1 and O.4.2 rehabilitation schools, CRIB designed and launched a competitive procedure to choose the educational centre.

In **Tunisia**, The National Agency for Energy Conservation has organised meetings and visits to the proposed institutions with the Department Equipment within the Regional Delegation for Education in Sousse, to identify their interest in the project and to evaluate the infrastructure. Then, a list of beneficiaries was identified and a schedule was agreed.



In **Lebanon**, after meeting with the representative of the ministry of Education and Higher Education (MEHE), and introducing the

ESMES project, its goals and activities; the ministry approved moving forward with the project with public schools and nominated 15 schools, schools per climatic zone in Lebanon. Following the evaluation of the submitted surveys by the public schools and meetings held with school principals, one school per climatic zone was chosen to be part of the ESMES project.

The selection was based on the completeness of the survey and the willingness of the principals to cooperate with the LCEC staff throughout the ESMES activities.

4.3. Governmental bodies involved

One of the challenges in creating partnerships and implementing renovation projects in the public schools is the governmental restrictions and guidelines, whether it is a government department or an independent regulator who has the primary role, there will often also be other bodies with a role in regulating the energy implementation methods, as it also varies from one country to another as indicated below:



In **Jordan**, The Ministry of Education was the primary governmental body that the German Jordanian University collaborated with, to proceed with the selection. Their involvement provided essential data, insights, and recommendations, aligning the project with national educational priorities and regulations. Their support ensured a coordinated and effective approach to school selection.



In **Italy**, it was only the municipal body of Alcamo.

In **Spain**, CRIB proposed and agreed with the Spanish Energy Hub the different procedures. The hub is formed by regional government representatives and other local authorities and academia.

In **Tunisia**, The for Education in the the involved body in



Regional Delegate state of Sousse was the selection phase.

In **Lebanon**, The selection process was done in full coordination with the Ministry of Education and Higher Education (MEHE) in Lebanon. MEHE also nominated a focal point for a closer coordination on the implementation of ESMES activities.



4.4. Feedbacks

In addition to the criteria and methodology used by the project partners to engage schools in the ESMES project, the purpose of this study is to examine the potential repeatability, stakeholder reactions, impressions and feedback, to know whether to keep or change the same methodology.

The project partners express the positive impressions they have in their countries as below:

In **Jordan**, the school directors involved in the project showed a positive and enthusiastic response. They actively engaged in discussions, implemented energy-saving measures, and encouraged a sustainable energy culture within their schools. Their support was instrumental in the successful implementation of the project.

In **Italy**, the reaction was very positive as it sensitised and involved the students in implementing energy saving measures, benefiting from the work carried out on the photovoltaic system which the school was able to benefit from, also for the purposes of future initiatives.

In **Spain**, school's directors and stakeholders were really proud and satisfied with their participation in the ESMES project. Specifically, In the case of the contest, it was very difficult to carry out the foreseen activities because of the COVID, but finally the contest was successful and all feedback was positive.

In **Tunisia**, the commission by the Regional Delegate for Education and the National Agency for Energy Control have notified the interest of directors and their commitment to coordinate the project.

In **Lebanon**, following the ongoing energy crisis in Lebanon and the drastic increase of fuel prices, the schools couldn't run their generators and the education process was deeply affected. As such, the school directors were very positive and cooperative during the installation phase of solar PV systems and retrofitting existing lamps with LED ones. The directors also reflected the enthusiasm of the energy teams with the awareness raising activities conducted.