DELIVERABLE D.T1.2.3

Interreg-CE FEEDSCHOOLS solutions

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D.T1.2.3: Interreg – CE FEEDSCHOOLS solutions

A.T1.2 Transferability assessment of past outcomes for adaptation, extension & deployment in new Pilot Areas

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1. Introduction

The deliverable T1.2.3 belongs to the activity related to the transferability assessment of past project outcomes (A.T1.2). In particular, for each previously funded EE project/solution, a document has been created reporting the information on how the outcomes could be adapted tailored, extended, and deployed in the new pilot areas to capitalize them and widespread their impact.
In the following section, the outcomes related to FEEDSCHOOLS, Interreg Central Europe project are reported and future activities to be realized are described as done under the framework of FEEDSCHOOLS Project.

2. Adaptation and implementation of (technical solution) O.T 1.1 - Web based toolkit to support deep renovation of school buildings

The tools have been designed for a non-expert user with which knows basic characteristics of the school building. Furthermore, the additional sections of the web tool will be listed underlining which documents can be found in it.

Toolkit helps to facilitate the development of renovation plans, by using novel energy saving technologies in public building by 3 aspects, of economic, energy saving and environmental performance. As the critical point in all Central Europe regions is the scarcity of public funding to invest in renovation activities, and considering the driving role that can have the public sector in developing the energy efficiency market a particular attention will be given to inventory, systematize and adapt Energy performance contracts models, PPP partnerships, to maximize the flux of private capital in public building renovations.
Feedschools innovative web based toolkit consists of:
- A database on novel energy efficiency technologies and good practices (innovative techniques, materials, components and systems) for retrofitting existing buildings and in particular schools and convert them to Nearly Energy Zero Buildings (nZEB);
- An energy and resource efficiency (ERE) application (App) for calculating energy profile and carbon footprint based on simplified Life Cycle Assessment (LCA) and kWh savings;
- Financial App. The toolkit will simplify the energy audit process allowing significative economic and time savings while choosing the more advantageous renovation option taking in account also carbon footprint of renovation activities. The toolkit will be targeted to Municipalities, energy managers, schools technical staff and decision makers.

App is based on a preliminary analysis and data collection on energy (climatic data, typical construction characteristics and energy performances, best retrofitting practices) and environmental characteristics (materials, CO_2 emission factors) of the school buildings.
The toolkit for NZEB renovation of schools is available on the web site https://www.segreto.eu/feedschools-v0_1/index.php . The tool is fully usable by other organizations of the involved regions considering its user friendly and harmonized characteristics. There are also guidelines and manuals and it can be used by all countries with similar climatic conditions and building characteristics and performances.
Aiming at inflow of private (non-public) funds, sharing knowledge on successful financing mechanisms that will allow public bodies to afford costs of NZEB renovation of public buildings, financial app will select most promising approaches at a regional and national level by setting up different financing models according to regional characteristics, regulations and best practices.

The main challenges will be to collect dana and involve experts at preparation level.

As a first step, the energy consumption for heating per year detected by the bills relating to the previous 3 years need to be collected. The fuel consumption of three years is added together and divided by 3 obtaining the annual average fuel consumption. The same will be done for electricity. The data of annual consumption of fuel and electricity, should be registered in specific tables in the app.

The gross floor Area is obtained from the drawings, if they are available, or the building is measured from the outside. In the gross heated volume, the external walls must be included and the not heated parts of the buildings must be excluded (undergrounds, attics, stores, garage...).

If the school building consists of several buildings, Volume will be the sum of the volumes of the individual building.

The dispersing surface is obtained from the sum of the individual surface of the gross heated volume V (walls, roofs, ground floor slabs). Is not considered as a dispersing surface all walls or slabs that are connected to other heated buildings. If the school consists of several buildings S will be the sum of the dispersing surfaces of the individual buildings.

To compare heating consumption, it is necessary to consider the climatic differences in the Country and the Municipality in which the school buildings are located. According to this issue, consumption is released from climatic differences through the use of hating degrees day (HDD). It is obtained as the sum of the positive differences between the internal comfort temperature and the outdoor daily average temperature: the sum is extended to all the heating days of the winter season.

The normalization factor Fh depends from the operational hours of the school. The factor Fh will be subsequently multiplied for the specific heating consumption and for the specific electricity consumption. These data can be collected from energy audits.

Data for each building (general data, parmeters of building construction and systems, energy consumption) are usually available in enery audits, which in generaly all school objects already have. Data is necessary for the calculation of energy efficiency with different renovation options in the web toolkit.

In the actual version

It will be necessary to use the help of external experts to enter data and investment costs in the App, if they are not liste din energy audits.

It would be good to expand different public buildings typologies so that results can be obtained through one tool, ie so that the local government can gain a better insight into the energy condition of its buildings, so that a priority list of buildings for renovation can be determined.

Suggested tehnical improvements of toolkit:
- expand climate data for other countries and municipalities
- create a mobile app to make it more widely available
- use consumption dana for one year, not for three as needed now
- there are not all heating sources covered, it will be good to implement other heating sources (e.g. in continental Croatia there are schools which are using district heating)
- In Renovation options module it would be good to have more options for selecting elements of walls, roofs (more types).
- There is not an option to change heating source, such as change of fuel oil to more energy efficient heating pumps which are running on electric energy

3. Adaptation and implementation of (technical solution) O.T2.1 - App for innovative Financing mechanisms

The Financial App is useful to public operators to identify optimal financing mechanisms for finalizing of schools renovation plans.

It is integrated in the toolkit with ERE App and database. The App is fully usable by other organizations of the involved regions considering its user friendly and harmonized characteristics. It is documented by guidelines and manuals and it can be used by countries subjected to similar financial conditions.
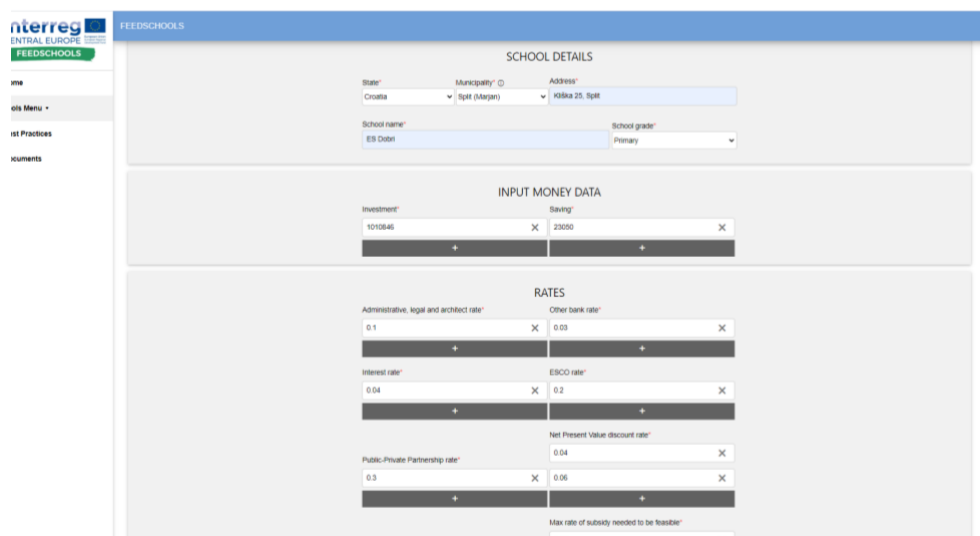
Within FEEDSCHOOLS project, a calculation model for school buildings has been developed aiming at analyzing different available financing models and deciding on the optimal model.

Calculation parameters (Interest rate Discount rate, Life cycle of EE renovation, Administrative, legal and architect cost, Other bank cost, ESCO cost, PPP cost), like available grant rates or loan interest rates are obtained through **feedback of Project partners** in Feedschools, and to implement in this project it should be updated for countries not covered by Feedschools.

The analysis included 5 models (Budget financing, Loan financing, ESCO financing, PPP financing and Combination od ESCO and subsidy.

To apply the financial module, user add information about school, investment, saving and Country.

Then the calculation is returned. An indicator (green, yellow or red face) is also inserted next to the result: it indicates whether the final solution is feasible, almost feasible or not feasible
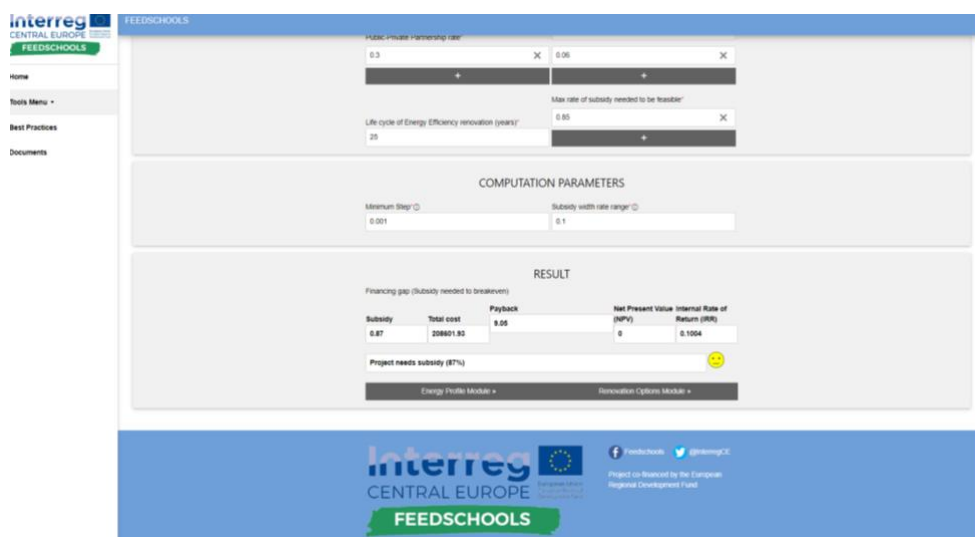
Figure 1. Feedschools – ERE App Financing Module

4. Adjustment of (non-technical solution) O.T4.1 - E-learning

As a part of the FEEDSCHOOLS project, many documents, training materials and e-learning presentations as well as methodologies and applications were developed. Thanks to them, the competences of project participants, stakeholders and other trained people were raised. Most of the materials have been published and are available online or from the project partners for the duration of the project. The aim is to disseminate these documents to potential interested groups such as school managers, local authorities, consultants, students and technicians as well as to ensure permanent access in future.

All mentioned documents are kept on the project website, the e-learning materials are available at ENEA training platform, while the ERE App and the Financial App is freely accessible also on web

Figure 2. Feedschools – Face to face trainings

Feedschools e-learning and face to face courses had aim at training city energy managers, Local authorities (LA) and technicians and at developing joint policy recommendations and action plans.

The e-learning curricula was developed and implemented in ENEA e-learning platform which assures availability of the course after the project end.

All working material developed for these trainings is available on web site https://formazione.enea.it/feedschools.php .

A specific e-learning course is set up with modules concerning energy, environmental and financial issues. The training curricula is developed by technicians and experts.

Face to face trainings involving direct stakeholders was organized in each partner country aiming at reaching actors of energy efficiency issues. The trainings was done in national languages, so it can be implemented in this Project.

5. Conclusions

The Innovative web based Feedschools toolkit is composed of: an energy resource efficiency APP (ERE); a Financial APP and a database on novel EE technologies and good practices. It helps transnational technicians and non-expert users to select optimized energy renovation plans targeted to nZEB.

The Financial App is useful to public operators to identify optimal financing mechanisms for finalizing of schools renovation plans, and it is integrated in the toolkit with ERE App and database. The App is fully usable by other organizations of the involved regions considering its user friendly and harmonized characteristics. It is documented by guidelines and manuals and it can be used by countries subjected to similar financial conditions.