D.T3.5.3 EVALUATION REPORT OF PILOT ACTION

Czech Republic

Version 1
04 2020

1. General information about the pilot

1.1. Aim of pilot activities

Pilot programme is a small-scale version of a larger project. It allows testing proposed approach, identifying problems and preventing them from escalating. When identified, problematic issues might be solved, and the programme adjusted. Pilots reveal unforeseen challenges and help the staff involved in the programme to get prepared for a full-scale implementation. The aim of evaluation of pilot programmes is to verify whether objectives defined for the pilot phase are met, and to propose recommendations how to improve the programme before launching it in a full-scale. It is done by reviewing activities performed and evaluating whether they allowed for achieving the objectives.

The aim of FEEDSCHOOLS pilot activities was to test and evaluate the FEEDSCHOOLS toolkit: ERE App, Financial App, and the database of best NZEB practices. When validated, apps should allow non-experts for development of an energy renovation plan for school. ERE App should provide qualitative data on current energy performance of a building and compare it with other buildings in a given country in terms of energy consumption. It should be followed by a list of improvement measures that would allow for reaching the nZEB standard. Data on energy savings, emissions avoided, financial costs, and carbon footprint of a renovation should be also available. Using these results, the Financial App should suggest an optimal financing plan, i.e. combination of using own funds, credit/loans, subsidies, ESCO and PPP. Database of best practices should allow for getting more information about innovative solutions that have been successfully implemented in other public building in the Central Europe region.

Pilots have taken place in 6 countries: Croatia, Czech Republic, Hungary, Italy, Poland, and Slovenia. 8 schools from each country have been involved. In each school three different functional zones were targeted: classroom, sport hall, and canteen. Pilot consisted of the following activities:

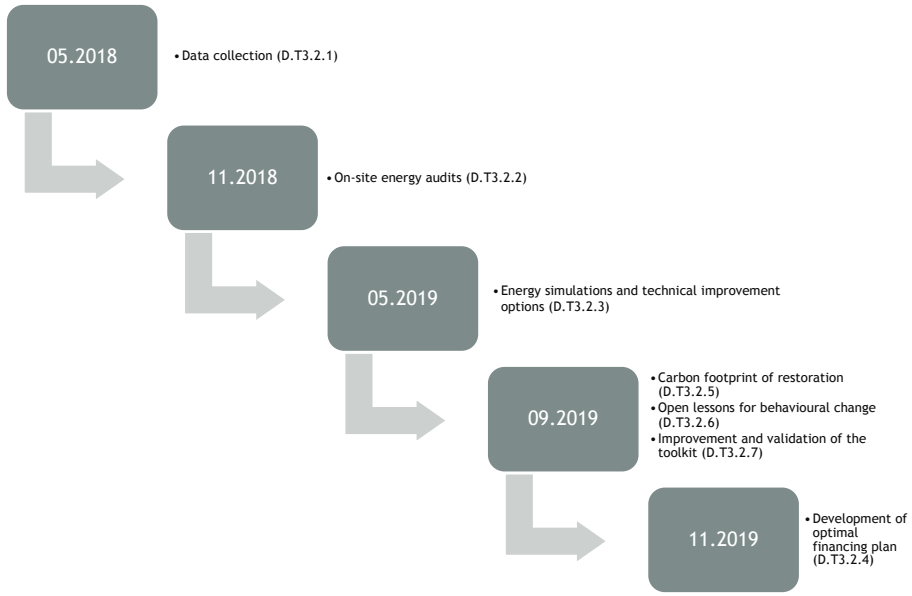
1. Data collection – preliminary data, such as historical energy consumption and building technical schemes, have been collected.
2. On site energy audits – pilot schools have been visited and energy audits have been conducted. As a result, reports describing building energy performance have been drafted.
3. Improvement options – based on on-site energy audits results, energy efficiency measures have been proposed so that nZEB standard could be reached.
4. Optimal financing schemes – using the Financial App, plans of financing the renovation measures have been proposed.
5. Carbon footprint of restoration - using the ERE App, the improvement of building carbon footprint has been calculated.
6. Open lessons for behavioural change of school staff and students – in each school participating in the project lessons activating energy saving behaviour have been organised. Lessons targeted students, teachers and technical staff.
7. Improvement and validation of the apps – results of the ERE App and Financial App have been compared with results of on-site audits, so that Apps could be improved.

The aim of activities 1-3 was to collect on-site data and perform calculation using traditional energy auditing approach usually used in a given country. Results got in this process have been considered then as a reference level for apps validation and improvement within activity 7. When developed, ERE App was used for development of financing plan (activity 4) and carbon footprint calculations (activity 5).

1.2. Schools selected for pilot activities

School ID	Building name	Street, number, city and postcode
CZ_01	ZŠ Louny Prokopa Holého	Prokopa Holého 2632, Louny
CZ_02	ZŠ Jablonec nad Nisou - Rýnovice	Pod Vodárnou 88/10, Jablonec nad Nisou
CZ_03	Elementary school Komenského	Komenského 668/13, 708 00 Ostrava-Poruba
CZ_04	Elementary school of Gen. Zdeňka Škarvady	Porubská 831/10, 708 00 Ostrava-Poruba
CZ_05	Elementary school of Gen. Píky	Gen. Píky 2975, 702 00 Moravská Ostrava a Přívoz
CZ_06	Elementary school Kosmonautů 15	Kosmonautů 2217/15, 700 30 Ostrava-jih
CZ_07	Elementary school Michálkovice	U Kříže 28, 715 00 Ostrava - Michálkovice
CZ_08	Elementary school V. Košaře	Václava Košaře 121/6, 700 30 Ostrava-jih-Dubina

1.3. Pilot timeline



1.4. Partners involved in Pilots

- Partner name: ENVIROS, s.r.o.
  - Country: Czech Republic
  - Partner type: technical / institutional / external: technical partner
  - Partner description: limited private company providing technical consultancy since 1994 in energy efficiency and environmental projects in the EU and the Czech Republic;

    ENVIROS develops for its clients from private and public sector:
    - energy audits, energy assessments, energy action plans, energy studies,
    - energy management implementation,
    - energy efficiency projects financing advisory,
    - other.
  - Main role and duties in Pilots: development of comprehensive pilot projects activities consisted of coordination activities, communication activities, data collection, onsite energy audits, improvement option proposal, financial scheme proposal, calculation of carbon footprint, open lessons conducting.

- Partner name: City of Louny (founder of the elementary school Prokopa Holého in Louny)
  - Country: Czech Republic
  - Partner type: technical / institutional / external: institutional partner
  - Partner description: coordinating collaboration with the school management
  - Main role and duties in Pilots: Initial (introductory) communication with the school management, partial presentation of the project to the management before the actual audit preparation, continuous control during the processing of the energy audit, all proposed energy-saving measures were consulted with the City.

- Partner name: City of Jablonec nad Nisou (founder of the elementary school Rýnovice in Jablonec nad Nisou)
  - Country: Czech Republic
  - Partner type: technical / institutional / external: institutional partner
  - Partner description: coordinating collaboration with the school management
  - Main role and duties in Pilots: Initial (introductory) communication with the school management, partial presentation of the project to the management before the actual audit preparation, continuous control during the processing of the energy audit, all proposed energy-saving measures were consulted with the City.

- Partner name: City of Ostrava (founder of the elementary school Komenského, elementary school Zdeňka Škarvady, elementary school Gen. Píky, elementary school Kosmonautů 15, elementary school Michálkovice and elementary school V. Košaře)
  - Country: Czech Republic

- Partner type: technical / institutional / external: institutional partner
- Partner description: coordinating collaboration with the school management
- Main role and duties in Pilots: Initial (introductory) communication with the school management, partial presentation of the project to the management before the actual audit preparation, continuous control during the processing of the energy audit, all proposed energy-saving measures were consulted with the City.

2. Pilot evaluation

2.1. Pilot implementation

1) Which part(s) of the pilot did go well? Which could be improved?
2) What advantages and disadvantages do you find of FEEDCHOOLS approach, compared to other energy efficiency programmes?
3) Which of the seven pilot activities do you consider as the strongest? Which one the weakest?
4) What were main difficulties with the pilot implementation?
5) Are there any elements of the pilot that in your opinion should be avoided in the future?

Ad 1) During the elaboration of 8 pilot projects, we encountered parts that went well, such as introductory meetings with school management, our on-site visits or proposals of energy efficiency measures. We can say that representatives of all audited schools were interested in improving of existing conditions, reducing energy costs and reducing their carbon footprint. Thanks to the excellent teamwork of all the consortium partners, the energy audit report took a very detailed and chronological order. While adhering to the structure of the report and copying the procedure for processing energy audits according to the legal requirements in individual countries, it was very clear to process the reports and to fulfill their content. The one of the positive aspects is a complex approach to an audit including not only proposal of improvement options but also financial scheme, carbon footprint, and open lessons for behavioural change.

Ad 2) We consider a differentiation of three functional zones in schools (classrooms, sport hall, canteen) as a negative aspect of the FEEDSCHOOLS approach, as the energy consumption is not metered separately for each zone, so the energy consumption used in the energy audits have only a theoretical form. They were calculated based on the best assumptions and technical parameters. Also the lack of nZEB definition (inaccurate interpretation of nZEB standard) can complicate the precise elaboration and designing of measures. A certain lack of clarity may also be caused by dividing the document into three parts, collecting data, on-site audit including audited object description and proposing measures. In the Czech Republic, all parts are processed within one report when preparing energy audits in accordance with the Czech current legislation.

Ad 3) As the strongest activity we consider on-site energy audits and proposing the energy saving options because our experiences lie especially in energy audit and energy saving studies. As the weakest or the most challenging we find the open lessons for behavioural change of school staff and students. People generally understand the idea of saving energy and hence reducing their carbon footprint, but it is sometimes difficult to find tools to change their behaviour at work (in the office, at school) where energy saving is not directly related to their own personal costs.

Ad 4) Main implementation difficulties were noted in the fact that the city as the founder of the school has earmarked certain funds for these energy saving measures. The opinions of the school management

did not always coincide with those of the city representatives. The implementation of measures leading to the classification of a building as nZEB can be very costly and economically ineffective (long payback period).

Ad 5) We think that the process of elaboration of energy audits (pilot projects) was designed correctly and very suitable in terms of chronology of processing. Representatives of schools and cities appreciated both the procedure itself and the content of the reports and the diversity of the proposed measures.

2.2. Relevance

1) Did the pilot action test procedures, instruments and ways of co-operation, that may become part of standard tools and instruments for energy performance improvements of school buildings towards nZEB standard in Central Europe ? Which ones in particular?
2) Did the pilot action have a clear European dimension in terms of its implementation?
3) What was the local stakeholder engagement?
4) Did the pilot action reflect societal, scientific and/or economic needs, calling for an integrative, coordinated approach? Which ones in particular?

Ad 1) n/a

Ad 2) Each out of 8 energy audit report provides a preliminary overview of a current state of school buildings selected to the FEEDSCHOOLS project, in terms of their energy consumption and climatic data, furthermore, the proposal of energy saving measures and calculation of energy savings, costs and greenhouse gas emissions in case of implementation of measures leading to meeting the nZEB standard. Processing in the participating European countries was very similar.

Ad 3) In project were involved the school managers, technicians of the schools and local authorities from respective municipal authority department representing the school owners.

Ad 4) Most of schools in the Czech Republic, as well as schools selected for the Feedschools project, which were built in the second half of the last century, face similar shortcomings. The vast majority of the building structures do not comply with current legislative requirements (as these have been tightened in recent decades following European legislation). The replacement of equipment (e.g. heat sources) and implementation of other measures depend on the financial budget of the school founder, the city. Therefore, the pilot action reflects the requirements of current legislation and the social needs of building users.

2.3. Transnational added value

1) Did the pilot action address an issue that clearly profits from a transnational approach, as compared to national actions?
2) Did the pilot action contribute to avoiding duplication at the national, and creating critical mass at the Central European level?
3) Did the pilot action explore and/or utilize supranational synergies and complementarities? Which ones in particular?

Ad 1) Methodology of energy audit processing in the Czech Republic is given by Decree 480/2012 Coll. The Decree clearly sets out the scope and content of the energy audit report. Within the framework of the pilot projects, the energy intensity of individual sub-areas related to the energy-related area (expressed in kWh/m^2) was evaluated in addition to the existing current legislation and primary energy in the state

before and in the state after the implementation was quantified. Another added value that clearly profits from transnational approach is the possibility of comparing the approach and performing calculations for individual measures.

Ad 2)

Commented [MK1]: Please what is meant by this question?

Ad 3) Yes, given that building requirements classified as nZEB are transposed into the national legislation from the European Energy Performance of Buildings Directive (EPBD III), frequent supranational synergies occurred during the development of pilot projects. In particular, the building envelope had to meet very strict criteria of low heat transfer coefficient of constructions (external walls, roof, windows and other openings). Measures often included the design of a renewable energy source, which guaranteed the saving of energy produced from conventional sources. Another positive measure used in almost all countries was the replacement of lighting with LED sources.

2.4. Impact

1) Did the pilot action impact on societal, economic, scientific, technological and/or political drivers of importance to the goals and objectives of the Energy Performance of Buildings Directive? Which ones in particular?
2) Did the pilot action establish structures or processes that facilitate future collaboration of partners in Central Europe? Which ones in particular?
3) Can the improvement options recommended in the pilot action be conducted with the current capacities and resources of the local stakeholders?
4) Has the pilot action delivered tangible outcomes for local stakeholders? Which ones in particular?
5) Are the improvement options recommended in the pilot action likely to deliver outcomes in a relatively short term (< 2 years)?

Ad 1) Since 2002, when the first European directive dealing with complex energy management in buildings has been reflected in the Czech legislation, there have been several changes to the minimum energy performance requirements of buildings. The EPBD covers a broad range of policies and supportive measures that will help national EU governments boost energy performance of buildings and improve the existing building stock.

The pilot action could contribute positively to the long-term strategy of the Directive (EPBD) that by 2050 a sustainable, competitive, secure and decarbonised energy system needs to be set up in Europe.

Ad 2) Pilot action has in some way set up possible cooperation processes in meeting the legislative requirements of European regulations and commonly implemented in national legislation. In particular, these are very similar procedures for processing energy audits and proposing energy saving measures.

Ad 3) Experience from the pilot projects suggests that due to the long payback period and the high level of investment costs, implementation will not be possible without the financial assistance of stakeholders or founders or national and regional subsidy programs.

Ad 4) Yes, the pilot action delivered the valuable outcomes for local stakeholders. The energy audits included draft measures, their economic analysis and a simple payback period for the given option. Thanks to them, it was possible to show the extent and scope of proposed measures and how financially demanding they are.

Ad 5) All recommended measures bring savings already in the first year after implementation. However, their payback period varies. Energy-saving measures leading to the nZEB standard are very costly and usually return in decades. The payback period of the recommended option is most influenced by structural measures, without which it is almost impossible to reach the nZEB standard. The payback period of the

measure is also influenced by other sub-indicators such as investment cost, energy prices, operation of equipment and, last but not least, user behaviour.

3. Summary

Within the Feedschools project, 8 elementary schools were selected as representatives of school facilities. Their common indicator was approximately the same age of buildings, therefore great potential to improve both the thermo-technical properties of the buildings and an increase in the standard. During several phases of the project, it was necessary to overcome obstacles such as:

- lack of technical documentation for buildings and equipment (heat sources, ventilation equipment, cold sources, etc.);
- absence of secondary metering of individual parts of buildings (classes, kitchen and gymnasium), energy consumption were calculated as theoretical values based on technical data and information from the responsible persons.

On the other hand, we consider our company's stable background and the possibility to use our previous experience with energy audits both in buildings and in industry. Another positive aspect was the cooperation with the school management, which in all cases had a huge interest in carrying out energy audits and identifying potential areas where there is potential for energy savings or operational cost savings.

In general, cooperation with other partners was also very beneficial as it was possible to compare approaches to elaboration of energy audits in individual countries and to evaluate the calculations of typical measures with other partners.