

D.T3.5.3 EVALUATION REPORT OF PILOT ACTION

Poland

Version 1
09 2019

Research work was co-financed from the funds for science in 2017-2020 allocated to the implementation of an international co-financed project.



Ministry of Science
and Higher Education
Republic of Poland





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. Additionally, experts from Austria took part in evaluation of energy audit reports. 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.

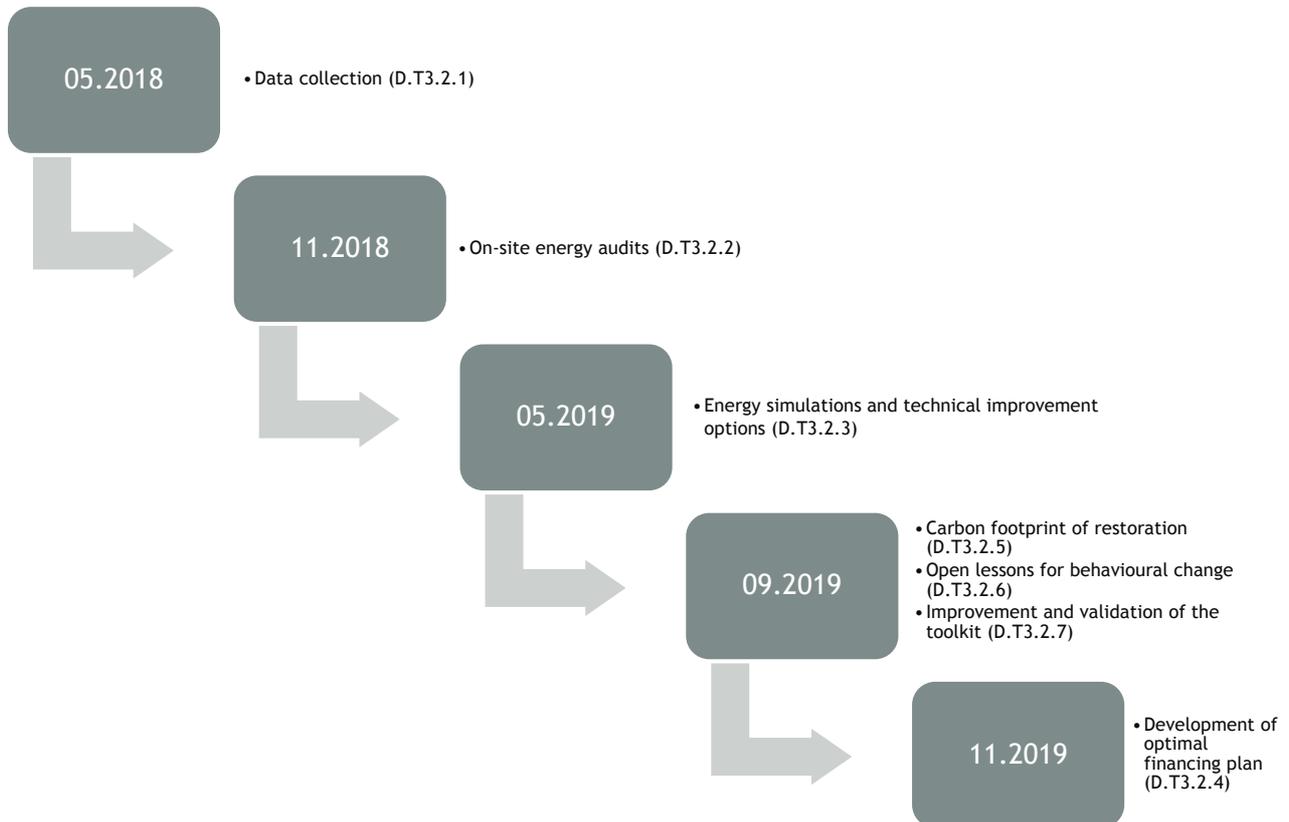
The aim of activities 1-3 was to collect on-site data and perform calculation using traditional energy auditing approach usually used in a given country. Results got in this process have been considered then as a reference level for apps validation and improvement within activity 7. When developed, ERE 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
PL_01	Szkoła Podstawowa Nr 61	Białobrzaska 27, Warsaw
PL_02	Szkoła Podstawowa 340, budynek B	Lokajskiego 3, Warsaw
PL_03	Szkoła Podstawowa 378	Bartnicza 8, Warsaw
PL_04	Szkoła Podstawowa 341	Oławska 3, Warsaw
PL_05	Szkoła Podstawowa 77	Samogłowska 9, Warsaw
PL_06	Szkoła Podstawowa Nr 28	Gościeradowska 18/20, Warsaw
PL_07	Szkoła Podstawowa Nr 277	Suwalska 29, Warsaw
PL_08	Szkoła Podstawowa Nr 26	Miedziana 8, Warsaw



1.3. Pilot timeline



1.4. Partners involved in Pilots

- > **Research and Innovation Centre Pro-Akademia**
 - Country: Poland
 - Partner type: technical
 - Partner description: RIC Pro-Akademia is a non-profit research organisation based in Central Poland. RIC Pro-Akademia's main field of experience is sustainable energy and energy efficiency. Since its establishment in 1996 Pro-Akademia has successfully implemented over 200 research and advisory projects for EU institutions, Polish local and central authorities as well as industry.
 - Main role and duties in Pilots: technical partner coordinating Pilots and supervising work done by the subcontractor.

- > **City of Warsaw**
 - Country: Poland



- Partner type: institutional
 - Partner description: City of Warsaw is the capital and the largest city of Poland, with a population of 1.7 million and around 3 million live within the agglomeration. The city's target, committed in the Sustainable Energy Action Plan, is to reduce CO2 emissions by 20% and energy consumption by 20% by 2020 compared to 2007.
 - Main role and duties in Pilots: institutional partner, coordinating collaboration with schools.
- > **Olaff Energy**
- Country: Poland
 - Partner type: external
 - Partner description: Olaff Energy is a private company based in Warsaw, providing professional assistance and expertise in the field of energy auditing and energy efficiency improvement of buildings, factories and processes.
 - Main role and duties in Pilots: subcontractor responsible for conducting audits and open lessons

2. Pilot evaluation

2.1. Pilot implementation

1) Which part(s) of the pilot did go well? Which could be improved?

All Pilot activities related to proposing improvement measures (data collection, audit, improvement options), as well as lessons for behavioural change went well. Pilots allowed for preparation of a complex renovation scheme for schools, aimed at reaching the nZEB standard, which is still not popular in Poland. Furthermore, thanks to open lessons, awareness of building users related to energy consumption have been raised.

On the other hand, activities related directly to testing and using the ERE App could be improved in the future by changing a timeline of the pilot. Application modules for financial schemes and carbon footprint should be available earlier, so that there is more time for implementing further improvements thanks to Pilot results.

2) What advantages and disadvantages do you find of FEEDCHOOLS approach, compared to other energy efficiency programmes?

The strongest advantage of the FEEDSCHOOLS approach was the aim to reach nZEB standard thanks to proposed energy efficiency measures. Since the nZEB concept is not popular yet in Poland, this was an impulse for stakeholders involved in the process to start thinking about going beyond the typical energy efficiency modernisation. Another positive aspect was a complex approach to an audit, covering not only technical aspects related to building's physics, but also but also financial scheme, carbon footprint, and open lessons for behavioural change.

The major disadvantage of the FEEDSCHOOLS approach was dividing an audit into three subprocesses summarised in three separate reports, which are usually in a single document (data collection, on-site audit, improvement options). Another difficulty was differentiation of three functional zones in schools



(classrooms, sport hall, canteen), which for Polish schools, located usually in a single compact building, was not useful.

- 3) Which of the seven pilot activities do you consider as the strongest? Which one the weakest?

The strongest activity was Improvement options, as it allowed school owners and managers for getting a renovation plan which is more ambitious than typical audit and allows for reaching nZEB standard, which will be a “must have” in the future.

The weakest part was the carbon footprint calculation. It was done in the ERE App, which has a limited list of renovation options applied. As a result, only effects related to envelope modernisation have been considered. It was not possible to evaluate renovation options such as heating source modernization, lighting modernization or installation of PV system.

- 4) What were main difficulties with the pilot implementation?

No difficulties have been observed.

- 5) Are there any elements of the pilot that in your opinion should be avoided in the future?

The pilot timeline should be revised, so that it allows for at least two loops of providing feedback for the ERE App developers on specific parts of the application. School buildings should be considered as a whole whenever possible, not a group of sub-parts (e.g. classrooms, sport hall, canteen).

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?

The FEEDSCHOOLS pilot tested a comprehensive approach for preparation/ planning of public building modernisation into nZEB. It includes energy audit to identify technical measures that should be implemented, development of financial scheme so that the best option for financing the work is applied, calculation of carbon footprint of modernisation, and trainings for building users so that they could benefit from an improved building. All these aspects are important, yet rarely implemented in investments that are currently run. Successful implementation of the FEEDSCHOOLS pilot showcased that all these elements may and should become a part of a standard European approach for transformation of existing buildings into nZEBs.

- 2) Did the pilot action have a clear European dimension in terms of its implementation?

There is a clear European dimension standing behind the Pilots. The aim of the pilot actions was to facilitate the implementation of the Energy Performance of Buildings Directive, that requires Member States to develop long-term renovation strategies for renovation of existing building stock into nZEB. As this is challenging for all MS, pilot actions help at the preparatory stage of the renovation process.

- 3) What was the local stakeholder engagement?



Local stakeholders were enthusiastic to the pilot activities. In particular school authorities and technical staff responsible for building maintenance were interested in results of energy audits, as this allowed them to get to know what and how to modernise to improve thermal comfort in their building and reduce energy costs. Students taking part in open lessons reacted positively as well. They actively participated in open lessons and engaged in activities such as development of energy saving plan for their school.

- 4) Did the pilot action reflect societal, scientific and/or economic needs, calling for an integrative, coordinated approach? Which ones in particular?

Considering the societal needs, the pilot action answered them by providing lessons on behavioural change for building users. People are often crucial for maintaining results of the technical improvement of a building, as their behaviour may affect energy consumption both positively and negatively. It is important to raise awareness and teach them how to use energy in a reasonable manner.

From the scientific point of view, the pilot allowed for comparison of different approaches for energy auditing applied in six Central European countries and critical review of them. This may be a starting point for a development of a common European approach.

Economic needs are also addressed by the pilot, as development of the financing scheme of a modernisation was one of the main activities.

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?

Application of NZEB standard in neither modernisation of existing buildings nor erecting new ones is still not popular in Poland. Depth of building energy performance improvement is driven by authorities providing grants and subsidies and depends on requirements specified in the grant agreements. Usually it is required to decrease energy consumption by more than 50%, and no requirements regarding final building energy performance are set. Similarly, no obligation for RES installation is specified. Thus, transnational approach such as FEEDSCHOOLS, focused on reaching NZEB standard, is clearly beneficial for Polish stakeholders, as it shows benefits of deeper modernisation, raises awareness, and allows for experience sharing with more experienced experts.

- 2) Did the pilot action contribute to avoiding duplication at the national, and creating critical mass at the Central European level?

The pilot showcased that European countries developed and apply different approaches to energy auditing and nZEB. It is possible to utilize experiences gathered during pilots when implementing new provisions of Directive 2018/844 (amending EPBD). In particular, it is possible to avoid duplication at national level when developing new approach for existing building renovation, and also for energy performance assessment.

- 3) Did the pilot action explore and/or utilize supranational synergies and complementarities? Which ones in particular?

The pilot explored the following synergies / complementarities:

- Partners with different professional background and from different countries developed the pilot activities, consisting of technical, financial, and sociological aspects.



- The common methodology for audits was developed based on experiences of seven countries participating in the FEEDSCHOOLS project.
- Transnational expert team tested the common approach during international audits.
- Audit reports have been developed following the common approach, then reviewed by experts from other countries, and updated according to remarks from energy auditors from six Central European countries.
- The Transnational Expert Team was created consisting on 14 experts from seven countries. This network will utilise experiences from the project in the future, e.g. by developing common projects in the field of energy efficiency.
- Data collected during the project may be used in future projects.

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?

In societal dimension, the pilot action helped in raising awareness among city managers about NZEB concept and benefits that it may bring. As there is still no legal requirement to modernize building to NZEB standard in Poland, FEEDSCHOOLS pilot can build a bottom-up movement towards more advanced building modernisation than usually applied in Poland.

In technical dimension, the ERE App can be a tool that will help decision makers to take decision on modernisation of a building to the NZEB standard instead of usual approach.

From the scientific point of view, pilot showcased that there is a need for a common approach to energy auditing in EU countries, as there are essential differences among Member States making comparison between countries complicated.

- 2) Did the pilot action establish structures or processes that facilitate future collaboration of partners in Central Europe? Which ones in particular?

Participation of energy auditors in international audits allowed for experience sharing and better understanding of different approaches to energy auditing in central European countries. This might be used in a future for next projects and closer collaboration between experts.

- 3) Can the improvement options recommended in the pilot action be conducted with the current capacities and resources of the local stakeholders?

As Financial Schemes (D.T3.2.4) shows, modernisation of each school participating in Pilots requires a subsidy to be financially profitable. Furthermore, reaching the NZEB standard requires application of advanced technologies, such as mechanical ventilation with recuperation. While it is a standard solution in new buildings, it might be challenging to apply it in already existing buildings. It is needed to develop an installation project to verify whether it is feasible.

- 4) Has the pilot action delivered tangible outcomes for local stakeholders? Which ones in particular?

Two groups of stakeholders received tangible outcomes in particular. The first group are local authorities who own school buildings. They received renovation schemes, consisting of proposal of technical



improvements in building and financial scheme of renovation. This may help them in faster modernisation of buildings. The other group benefiting from pilots are participants of open lessons, as they learnt how to save energy and got new knowledge.

- 5) Are the improvement options recommended in the pilot action likely to deliver outcomes in a relatively short term (< 2 years)?

Building modernisation is a long-term investment, with payback time often exceeding 20 years. There are however some investments that bring profits in much shorter time. This includes in particular heating control automation (1÷2 year payback period).

3. Summary

The aim of the Pilot activities in Poland was to test the FEEDSCHOOLS approach and the toolkit in Polish conditions. The main advantage of the pilot was the aim to reach nZEB standard thanks to proposed energy efficiency measures, mainly because the nZEB concept is not popular yet in Poland and this was an impulse for stakeholders involved in the process to start thinking about going beyond the typical energy efficiency modernisation. Other strength was its complex approach, covering not only technical aspects related to building's physics, but also but also financial scheme, carbon footprint, and open lessons for behavioural change. Finally, a possibility to utilise experiences from other countries was also a great advantage.

The weakest part of the pilot was its timeline, as time for testing financial and carbon footprint apps was very limited.