

D.T3.5.3 EVALUATION REPORT OF PILOT ACTION

ITALY (City of Udine)

Version 1
09 2019





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.

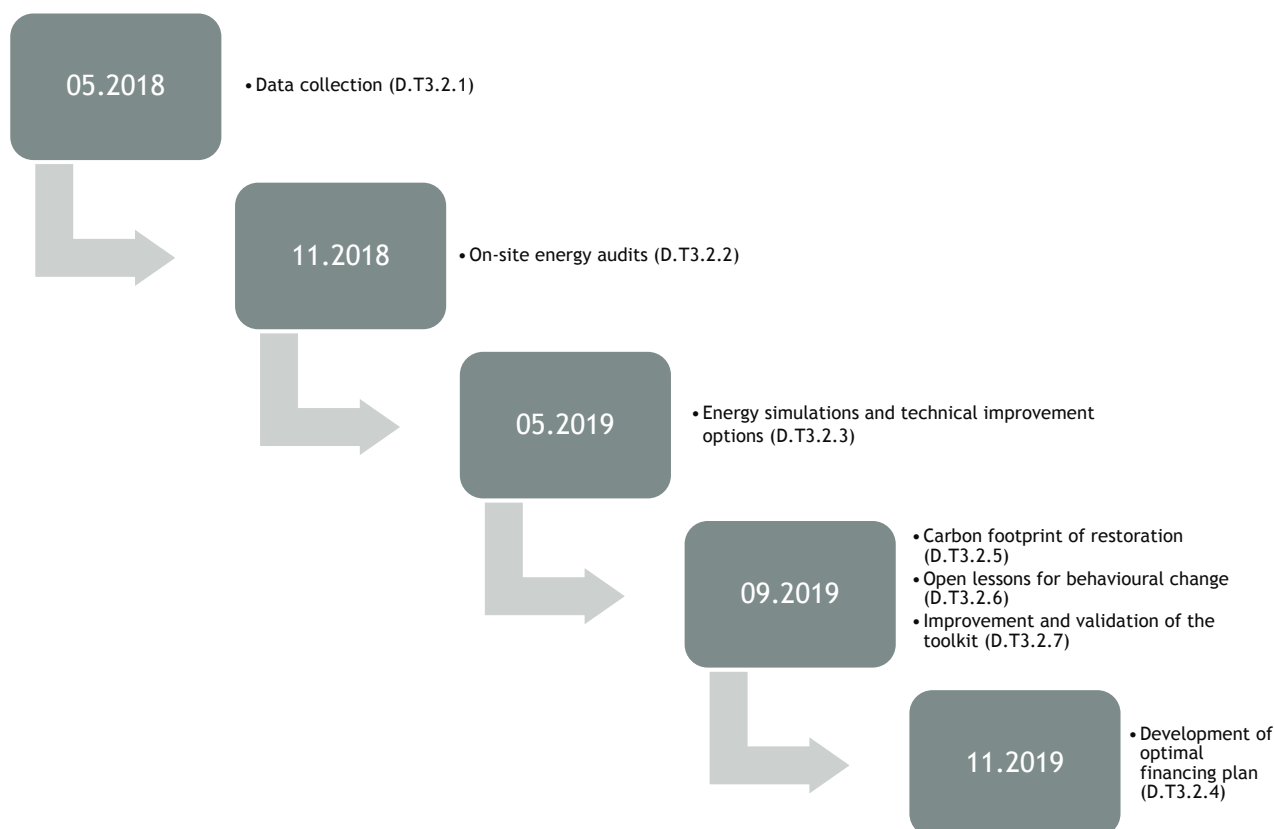


The aim of activities 1-3 was to collect on-site data and perform calculation using traditional energy auditing approach usually used in a given country. Results got in this process have been considered then as a reference level for apps validation and improvement within activity 7. When developed, ERE 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
IT_01	LEA D'ORLANDI	via Della Roggia, n.52, Udine, 33100
IT_02	E. FERMI	via Pradamano, n.21/23, Udine, 33100
IT_03	M. B. ALBERTI	via Baldasseria Media, n.25, Udine, 33100
IT_04	P. ZORUTTI	via XXX Ottobre, n.17, Udine, 33100
IT_05	G. MARCONI	via Torino, n.49, Udine, 33100

1.3. Pilot timeline





1.4. Partners involved in Pilots

- > **Partner name: City of Udine**
 - Country: Italy
 - Partner type: institutional
 - Partner description: City of Udine, located in the middle of the Friuli-Venezia Giulia region, with population over 99 thousand, in the last years has been a forerunner on sustainability issues. At the time being, Udine is committed to: implementation of retrofit actions on its own buildings, historic buildings in particular; improvement of local regulations with energy efficiency and sustainability aspects; participatory processes and communication campaigns on urban issues; EU initiatives such as Covenant of Mayors, implementation of SEAP and update to SECAP; participation at EU projects on energy and environmental sustainability.
 - Main role and duties in Pilots: institutional partner, coordinating collaboration with schools.

- > **Partner name: Energy Management Agency of Friuli Venezia Giulia - APE FVG**
 - Country: Italy
 - Partner type: external
 - Partner description: APE FVG is a technical organization with operational capacity in the field of energy efficiency, renewable energy systems and energy planning. APE FVG was established in 2006 as a non-profit association with legal personality. It provides guidance on EU relevant policy frameworks and promotes the uptake of EU strategies by local stakeholders. Main competences are: promotion of stakeholders' participation in sustainable energy projects, dissemination of best-practices, increase of energy knowledge through awareness campaigns, empowerment of decision- and policy-making processes.
 - Main role and duties in Pilots: subcontractor responsible for audit conducting.



2. Pilot evaluation

2.1. Pilot implementation

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

Preliminary data collection provided by local pilot partners was significant in order to make it possible to understand the as built situation of each building (climatic data, materials, HVAC system, energy bills,..). The participation of expert team in selected on site audits was the basis for transnational network of experts that will remain active beyond project end. Energy simulations and technical improvement options based on on-site energy audits presented a positive approach and results. Furthermore, open lessons for behavioral change of school staff and students were a interesting and good experience. During the introduction and games, students were actively involved in the discussion and participated with enthusiasm.

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

Advantages consists in a common and complex methodology. The App is user friendly and designed for LA/Schools/technical staff to support nZEB strategies available in national languages to facilitate diffusion. Despite several projects focused on energy efficiency of public buildings and in particular on schools, no one faced in an integrated way environmental, financial and technical aspects. FEEDSCHOOLS stands on integrating these aspects in a holistic and user friendly approach.

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

The strongest pilot activity consists in on site energy audit that was the basis of improvement options. Pilot schools have been visited and energy audits have been conducted. As a result, reports describing building energy performance have been drafted. Based on on-site energy audits results, improvement options have proposed energy efficiency measures so that nZEB standard could be reached. Instead, I can't identify the weakest activity.

4) What were main difficulties with the pilot implementation?

Main difficulties have been found in the preliminary data collection. Calculation of energy consumptions was difficult because of the differentiation in three functional zones in schools (classrooms, sport hall, canteen). Sometimes building technical schemes are not available as well as some historical energy consumption data. For example, natural gas expenses are calculated based on the analysis of provider's invoices because Municipality of Udine has got a flat-rate contract with this provider. Another difficult aspect have consisted in the calculation of savings and simple pay-back periods for each energy efficiency measure.

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

One of the aspects that should be avoided is the repetition of some data. Splitting audit reports into three parts (data collection, on-site audit, improvement options) you have to repeat same data many times so it is likely cause of errors.

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 pilots focused on the 3 school infrastructures which follow a standard procedure although different issues have been faced: data collection, on site energy audits, improvement options, optimal financing schemes, carbon footprint, open lessons for behavioural change of school staff and students, improvement and validation of the Apps. The transferability of the Apps will be guaranteed by the harmonization and the adaptation to the local characteristics without losing its standardization. As the pilots have been conducted in most climate zones of central Europe, it could be used and implemented in the whole Central Europe area, beyond the involved territories.

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

Pilots have taken place in 6 countries: Croatia, Czech Republic, Hungary, Italy, Poland, and Slovenia. 8 schools from each country have been involved, meaning 48 for each pilot. The local authorities, local school administrators, and sectoral agencies have been involved in the working groups in each country. Open lessons to teachers, students and other school staff have focused on behavioural change. Finally, the evaluation of the pilot actions was done by transnational visits to the sites and a peer review of the transnational expert team.

3) What was the local stakeholder engagement?

Pilot activities have been the main means to involve Local Authorities. The Municipalities staff have been involved in the pilots thanks to the dissemination of hard facts and figures collected during the audit report, and they have increased their knowledge on the management of schools buildings towards the NZEB directive adoption. Sectoral agencies and local authorities were involved in the definition and collection of the preliminary data related to climate, energy and environment. School staff, local and regional public authorities have also contributed in the development of local needs analysis which will be the basis for the technical contents of the App. Open lessons targeted students, teachers and school staff.

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

In order to facilitate the development of renovation plans which will use novel energy saving technologies in public building the 3 aspects of economic, energy saving and environmental performances were addressed in a holistic way developing specific tools. 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.

2.1. Transnational added value

1) Did the pilot action address an issue that clearly profits from a transnational approach, as compared to national actions?

Central Europe regions need a common and long-term strategy to remove barriers that prevent diffusion of a mass Nearly Zero Energy Building renovation activities, which reduces carbon footprint of building stock while improving the growth of local jobs. Directive 2010/31/EU on the energy performance of buildings (EPBD) and directive 2012/27/EU on Energy Efficiency are the main legislative instruments at EU level for improving the energy efficiency of European buildings. A multidisciplinary approach was followed to evaluate technical solutions in their economic, social and environmental aspects. The Covenant of Mayors partnership have developed interesting solutions at local level but only a transnational approach like FEEDSCHOOLS is fundamental in order strengthen public sector capacity to get innovative funding and disseminate experiences and good practices on a wider geographical scale.



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

The innovative tools developed with FEEDSCHOOLS project are going to lead to new policies and strategies that were initially validated local in different geographical environments and then will be shared among partners and disseminated to national authorities and policy makers, to be dealt with in an integrated and holistic manner. Transnational cooperation in this field is pivotal for conceiving relevant strategies and action plans and reaching the critical mass and the links useful for the economies of scale. The definition of transnational tools and opportunities is ensuring a greatest impact in the target regions and the possibility to leverage funds for future investments from public and private funds.

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

Pilot action has explored and utilized supranational synergies and complementarities. Synergies with Covenant of Mayors initiative, which is a European network of Local and Regional Authorities launched by EC to support SEAPs. Moreover, the evaluation of the pilot actions has done through transnational visits to the sites and a peer review of the transnational expert team.

2.2. 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?**

Pilot actions have addressed identified challenges with holistic approach considering financial, environmental and energy aspects of NZEB renovation of public buildings, training needs of local staff, behavioural change and policies influencing Sustainable Energy Action Plans. The pilots have been followed by related school's renovation plans (consisting of technical improvements and related economic feasibility) drawn up in collaboration with local municipality technical departments. The plans will help accessing ERDF funds that several EU Regions deliver to LA for buildings that have already developed technical and economically viable renovation plans.

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

FEEDSCHOOLS pursues improvement of public sector capacities by developing a transnational and holistic support toolkit with 2 user friendly Apps (1 for energy and resource efficiency (ERE App) and 1 for financing models), a web database of innovative best practices for nZEB renovation and on-line trainings all presented in a unique integrated web - platform.

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

The tool is fully usable by other organizations of the involved regions considering its user friendly and harmonized characteristics. It was documented by guidelines and manuals and it can be used by all countries with similar climatic conditions and building characteristics and performances. The user friendly apps working on android systems, designed for widespread use by Local Authorities technicians, consultants and school managers.

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

Pilot activities have been characterized by a joint work methodology to guarantee a harmonized and tangible outcomes for local stakeholders. Their outcome was improvement and validation of the



Apps (Financial App and ERE App), development of optimal financing schemes, open lessons focused on behavioural change of school staff and students and issue of renovation plans based on the developed best practices database.

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

The improvement options recommended in the pilot will deliver outcomes in a short term. The toolkit for NZEB renovation of schools will be available after the end of the project on ENEA web site. The tool will be fully usable by other organizations of the involved regions considering its user friendly and harmonized characteristics.

3. Summary

Central Europe regions need a common and long-term strategy to remove barriers that prevent diffusion of a mass Nearly Zero Energy Building renovation activities, which reduces carbon footprint of building stock while improving the growth of local jobs. FEEDSCHOOLS project addresses identified challenges with holistic approach considering financial, environmental and energy aspects of NZEB renovation of public buildings, training needs of local staff, behavioral change and policies influencing Sustainable Energy Action Plans. It's innovative approach, holistic and transnational, supports Local Authorities and schools in all steps of designing a strategy for nZEB renovation using harmonized transnational tools and methods. Apps and database were presented in an integrated web-based toolkit to facilitate its dissemination, application and durability also beyond the project end. Pilot actions 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. Preliminary data collection provided by local pilot partners was significant in order to make it possible to understand the as built situation of each building (climatic data, materials, HVAC system, energy bills,..). Main difficulties have been found in this preliminary phase. Calculation of energy consumptions was difficult because of the differentiation in three functional zones in schools (classrooms, sport hall, canteen). Sometimes building technical schemes are not available as well as some historical energy consumption data. For example, natural gas expenses are calculated based on the analysis of provider's invoices because Municipality of Udine has got a flat-rate contract with this provider. Another difficult aspect have consisted in the calculation of savings and simple pay-back periods for each energy efficiency measure. The strongest pilot activity consists in on site energy audit that was the basis of improvement options. Pilot schools have been visited and energy audits have been conducted. The participation of expert team in selected on site audits was the basis for transnational network of experts that will remain active beyond project end. Moreover, based on on-site energy audits results, improvement options have proposed energy efficiency measures so that nZEB standard could be reached. Energy simulations and technical improvement options presented a positive approach and results. Furthermore, open lessons for behavioral change of school staff and students were a interesting and good experience. During the introduction and games, students were actively involved in the discussion and participated with enthusiasm. Only one aspects should be avoided, which consist in the repetition of some data. Splitting audit reports into three parts (data collection, on-site audit, improvement options) you have to repeat same data many times so it is likely cause of errors.