

# OUTPUT FACT SHEET

## D.T3.3.2 PA1 design for 20 buildings in Treviso

Project index number and acronym	CE51 TOGETHER
Lead partner	Province of Treviso
Output number and title	D.T3.3.2
Investment number and title (if applicable)	I1 - Investment in an energy monitoring system for pilot actions in 20 public buildings
Responsible partner (PP name and number)	Province of Treviso
Project website	<a href="https://www.interreg-central.eu/Content.Node/TOGETHER.html">https://www.interreg-central.eu/Content.Node/TOGETHER.html</a>
Delivery date	31.12.2018
Summary description of the pilot action (including investment, if applicable) explaining its experimental nature and demonstration character	

The pilot actions are based on the introduction of the concept of Behavioural and analytical demand-side management (DSM). Behavioural DSM focuses on educating consumers and encouraging individual participation to attain energy saving, whereas analytical DSM finds opportunities for saving energy through equipment monitoring and data analytics. PA1 wanted to trigger this process of change or, better yet, for change, by focusing on all users who live and manage buildings, giving them an instant measure of the effectiveness/ineffectiveness of activities undertaken. The first activity to stimulate awareness is visualization; for this reason, immediate and objective evaluation is provided, in the case of Project TOGETHER, by investments in devices for the real-time detection and monitoring of electrical and heat consumption. Two modes of system interventions were carried out and are detailed in the Investment fact-sheet, available on the website. The pilots have been concretely involved in a project of technological and behavioural experimentation. While technological experimentation consists in the installation of devices, as well as in the relevant training and the increased ability to analyze consumption scenarios, behavioural experimentation comprises a series of activities common to all the buildings and for specific activities defined by the single Negotiating Panel. The process can be summarized as follows:

1. Establishment of a **mixed work group**, composed of as many subjects as represent the building and sub categories of users, called the **Negotiating Panel**;
2. Implementation of a **SWOT survey** of issues concerning buildings realized by the working group;
3. implementation of **energy audits** that suggest a list of necessary interventions to improve energy efficiency in each building;
4. **Verification and analysis** by the working group of the results of energy audits;
5. **Acquisition of skills** and knowledge to leverage the potential of sensors;
6. Identification of **critical points** and definition of an Action plan per pilot building, including technical, financial and Demand Side Management activities;
7. Verification and monitoring of the energy curves and consumption targets;
8. **Approval of a building alliance** stating a goal of energy reduction to be achieved within a certain testing period. The specific activities of each institute reflect the contents of the intervention plan defined by each negotiating panel on the basis of a framework of suggested interventions, to include “nudges” through the process of training, animation and support triggered by the TOGETHER team. Social investments chosen and conceived by the members of the various Negotiating Panel range from the establishment of an Energy Team to the production of posters/leaflets, as well as the production of videos and signage and the organization of internal awareness events, which, just like “gentle pushes” do, activate processes of reflection and behaviour change.

**TARGET GROUPS** 1. **staff working** in the 2 institutional buildings involved in the project for a total of 80 persons; 2. **end-users** of the public buildings **actively involved** in the project: 300 students, 40 teachers, 20 auxiliary staff; 3. Approximately **5,000 students**, staff, teachers and visitors targeted by the peer to peer activities and communication campaign organised in the single pilot buildings and targeted by the info point installed at the premises of the pilot buildings

**RESULTS** 20 **tested action plans** oriented to integrate demand side management tools with the use of advanced tools to monitor energy consumption; 1 **user oriented dashboard** dialoguing with the end users; 20 **Negotiating panels**. It is a group of people on a specific object/building who work together in a joint effort to reach the set goals of energy saving, thereby achieving mutual benefit; 17 **signed Building Alliances** out of 20 buildings: the effort to reduce energy consumption is a shared effort; 1 **Energy Performance Integrated Contract** launched in October 2018 capitalising the experience and data acquired thanks to the implementation of the pilot actions, pros and cons. The contract is published in the Official Gazette of the Italian Republic and represents the condition for continuing the supporting activities with regard to the 10 Associated partners involved in the project.

**NUTS region(s) concerned by the pilot action (relevant NUTS level)**

ITH34, Treviso

The pilot action implemented in the Province of Treviso consists of a set of integrated measures to be tested on 20 buildings, of which 8 high schools, 4 secondary schools, 6 primary schools and 2 institutional buildings.

1. I.C. Casale sul Sile, Scuola primaria "Rodari"
2. I.C. "Mandela", Scuola primaria "Dante"
3. I.C. "Minerbi", Scuola primaria "Valeri"
4. I.C. Casier, Scuola secondaria "Vivaldi"
5. Ponte di Piave, Scuola primaria "Moro"
6. Town Hall of Carbonera
7. I.C. Quinto, Scuola secondaria "Ciardi"
8. I.C. 3, Scuola secondaria "Brustolon"
9. Town hall of Conegliano
10. I.C. Silea, Scuola primaria "Vivaldi"
11. I.C. S. Lucia di Piave, Scuola primaria "A. Canova"
12. I.C. Paese, Scuola secondaria "Casteller"
13. Liceo "Marconi" di Conegliano
14. Scuola Enologica "Cerletti", Conegliano
15. I.T.T. "Mazzotti", Treviso
16. I.S. "Giorgione" Castelfranco V.to
17. I.I.S. "Palladio", Treviso
18. I.P.S.I.A. "Galilei" Castelfranco V.to
19. Istituto Agrario "Sartor", Castelfranco V.to
20. Liceo "Da Vinci", Treviso

Investment costs (EUR), if applicable

The investment is made of up of 2 core parts:

- BL5, that is, thematic equipment for a total amount of € 60.538,55 (VAT included)
- BL6, that is, works for the installation of the procured thematic equipment for a total amount of € 21.829,50 (VAT included). Moreover, the contract includes the terms of reference for a service of:
  - support and service for constantly monitoring the on-line monitoring system and its correct functioning
  - training and assistance for a total amount of € 9.387,66 (VAT included, covered by BL4)

The cost of the total investment (including only the thematic equipment and related works) is € 82.368,00 covered by the ERDF for the amount of € 65.894,40.

WORKS	costs per unit	units	subtotal	VAT	total
works related to the integration of a new sensor in existing smart meters	€ 570,00	4	€2.280,00	€ 501,60	€ 2.781,60
installation of new smart meter	€1.180,00	12	€14.160,00	€ 3.115,20	€ 17.275,20
security social charge	€527,50	1	€527,50	€ 116,05	€ 643,55
works for completing the installations	€ 925,53	1	€925,53	€ 203,62	€ 1.129,15
Subtotal					€ 21.829,50
<b>THEMATIC EQUIPMENT</b>					
pulse counter	€ 311,10	4	€1.244,40	€ 273,77	€ 1.518,17
electromagnetic flowmeter:	€1.332,00	4	€ 5.328,00	€ 1.172,16	€ 6.500,16
pair of xm9:	€273,00	4	€1.092,00	€240,24	€ 1.332,24
pair of sensors	€154,40	4	€ 617,60	€135,87	€ 753,47
flowmeter interface for Xmeter	€496,00	4	€1.984,00	€436,48	€ 2.420,48
metering software	€125,00	4	€500,00	€110,00	€ 610,00
X meter in a junction box	€1.499,50	12	€17.994,00	€ 3.958,68	€ 21.952,68
Quanto-meter	€600,00	12	€7.200,00	€1.584,00	€ 8.784,00
Monitor and PC	€420,00	12	€5.040,00	€ 1.108,80	€ 6.148,80
Monitoring software	€716,67	12	€8.600,04	€ 1.892,01	€ 10.492,05
other related material	€21,72	1	€ 21,72	€4,78	€ 26,50
Subtotal					€ 60.538,55

**Expected impact and benefits of the pilot action for the concerned territory and target groups and leverage of additional funds (if applicable)**

Max. 2.000 characters

The main **expected impact** of the pilot action was to clearly demonstrate how human routines and practices can make a difference in energy efficiency programs and how crucial it is to engage the building community when adopting energy efficiency strategies. The whole chain of building users have to co-operate together within the scope of their role and socialize with energy and its consumption.

None of them has to be afraid of lacking the necessary power of agency to act for energy efficiency. Energy efficiency does not imply that all the building end users gain an eco-attitude to improve their routine in relation to energy consumption, or that they improve their behaviour for a pure environmental attitude. Energy efficiency calls for a diffused sense of responsibility in terms of improvement of the Public Administration capacity to do better with less, for organizational and procedural skills, for energy management skills, as well as for the engagement of “civic society” to contribute to the public efficiency.

The expected impact was to show to the building owners and managers the relevance of “measurement” when planning energy efficiency plans, “playing with energy” through the use of smart meters (i.e. investment).

One of the expected impacts was to register energy savings during the project implementation and to sign as many Building Alliances as possible, tailored made for each involved building. Each building owner has agreed with the building management level:

- the minimum level of reduction to be achieved
- the maximum amount to be divided in case the goal is attained
- the percentage to assign to the building management in case the minimum goal is attained.
- the monitored period
- the monitored consumption: electricity and/or heating
- the role of the parties in the implementation of the Action plan

Energy savings have been registered in the monitored period even if it is still possible to improve the results, considering that in some of the monitored buildings consumption increased instead of decreasing. 17 Building Alliances out of 20 pilot buildings were signed. Only 2 Associated Municipalities were unable to sign the respective alliances.

In terms of **benefit**, the experimentation of the new technical equipment installed, combined with behavior-based energy efficiency programs provided a concrete opportunity for improving the current energy monitoring system that is mainly based on a “passive” payment of the monthly bills, without a critical verification of the real consumption and the reasons leading to a specific energy consumption.

The **leverage effect** generated by the project in terms of investments in technological improvement is about € 100,000:

- 3 Municipalities (i.e. Casale sul Sile, Paese and Quinto di Treviso) out of 10 have invested own resources to improve the EE of their pilots, for a total amount of about € 60,000. 5 Municipalities out of 10 (i.e. Silea, Mogliano, Paese, Conegliano and Casier) had to invest own resources for adjusting the pilot buildings’ heating system for a total leveraged funds of € 18.000. Ponte di Piave invested € 5.325,30 for integrating the new monitoring system with another sensor monitoring the water.

The two most common types of interventions covered by them are: the substitution of existing lamps with new LEDs and the installation of thermostatic valves. The Municipality of Ponte di Piave implemented stronger interventions: roof insulation and window refurbishment thanks to regional funds and own funds for a total investment of € 200,000.

The Municipality of Quinto di Treviso launched a financing project for the street lights (not strictly linked to Project TOGETHER, but, in general, to the Priority 2 objective of the program). The technical decision was partly achieved by the interest aroused by the project towards more daring contractual formulas. The Municipality of Conegliano is preparing the documents to launch a new Contract for the energy facility management of its buildings inspired to the ToR of EPIC.

**Sustainability of the pilot action results and transferability to other territories and stakeholders.**

Max. 2.000 characters

The sustainability of the pilot actions is strictly interlinked with the nature of the investment. Both the Province and the Associated partners will continue to use the smart meters as they afford a concrete opportunity to improve their energy monitoring system that was - before the installation of the sensors - chiefly based on a “passive” payment of the monthly bills, without a critical verification of the real consumption and the reasons leading to a specific energy consumption. The establishment of a Negotiating Panel in each pilot building, co-responsible for finding solutions to improve the state of the art in terms of life style of the buildings, can be considered a measure capable of being adopted and used in other frameworks and contexts. The Negotiating Panel is set up under the condition of having a strong political and technical pledge and belief in this type of measures. This latter condition is the main objective of the thematic work-package T4 aimed at formalising approval of the Action Plan for the energy efficiency, related to the large scale application of the tested measures.

The deployment of smart meters has a strong potential in energy reduction programs based on user engagement. However, in practical terms, it is not possible to transfer the technology “per se” but only the knowledge acquired about the specific type of technology. In some partners’ regions, the introduction of such pivotal technology represents a “first”, not only at city level but also at regional/national level, at least in the public building sector. At the same time, our project is neutral from a technological point of view. As a matter of fact, the behaviour-based energy efficiency programs can be implemented even when smart meters are not available. It is clear that programs based on the combination of social and technical components are much more reliable and technically correct, but an Administration could start from the lowest step: map, involve the building users and create the necessary conditions to start a basic assessment of the consumption profile and the building life style. Afterwards, it could benefit from the stock of tools made available by the TOGETHER project to tailor ad hoc paths for engaging building users until the formalisation of a building alliance, where a goal of energy reduction is planned and monitored. A tutorial showing how smart meters work is available on the project website together with other tutorials produced in order to instil energy efficient behaviours. Moreover a new video is under production with the aim of showing other potential administrations how to successfully implement the TOGETHER processes.

### Lessons learned and value added of transnational cooperation of the pilot action implementation (including investment, if applicable)

Max. 1000 characters

It is possible to summarize the lessons learned as follows:

- the daily tasks and the many different duties that technical experts and officers of the small organization (such as the Associated Municipalities in Treviso) have to carry out stifle their spirit of innovation and of understanding how the energy management system could be improved;
- the engagement of end users in energy efficiency programs based on their involvement is demanding and requires a high level of interdisciplinary knowledge to pilot the process;
- some segments of the building communities do not accept to be involved as they view involvement not as an opportunity but as an additional burden;
- the more you are attached to your working place and environment, the more you are available to change your behaviour and at least not to hamper the process of change.

Transnational cooperation plays a crucial role in the delivery of the local training material in the partners’ regions as:

- it produced a common framework of reference in a much more cost-effective way compared to individual efforts, and it achieved economies of scale;
- it introduced an interdisciplinary approach to energy efficiency never tested before in all the partners’ regions;
- it helps to make use of wider and more diverse pools of knowledge and experience

**Contribution to/ compliance with:**

- relevant regulatory requirements
- sustainable development - environmental effects. In case of risk of negative effects, mitigation measures introduced
- horizontal principles, such as equal opportunities and non-discrimination

Max. 2.000 characters

The characteristics of the systems used for the pilot buildings comply with the laws and regulations in force as at the date of the contract, in particular with:

- the requirements of the fire department and local authorities;
- the requirements and indications of ENEL (DSO) and the gas company;
- the provisions of the Law (DM 37/2008), IEC standards, EC regulations.

The works concerning installation of the equipment have been carried out by subjects with the appropriate requirements: SOA qualification (OS30 - Cat. 1^). Prior to execution of the works, appropriate documents proving fulfilment of the abovementioned requirements have been provided, together with a copy of the Operational Security Plan.

Sustainable development: the pilot actions combined with the investment contribute to: stimulating market transformation towards more efficient buildings; mobilising public & private investments, rationalizing public expenditure; participants will be stimulated to adopt more efficient behaviour that can be replicated in other contexts (e.g. at home).

Equal opportunity: The use of monitors for the visualization of the consumption data (real-time based) does not exclude the possibility that disabled people, such as the visually impaired, can be involved in the use of energy monitoring data, as it is possible to remotely extract the data and transform them into excel tables and graphs that can be explained by other colleagues and/or schoolmates. Negotiating Panels were established without any gender limitations or pre-fixed quota. It has to be underlined that in the Italian school system most of the teachers are women. The percentage of male of female students depends on the type of schools.

Equality between men and women: Any activity based on understanding/targeting differences in patterns of consumption by women and men (e.g. awareness raising activities, design of key messages etc.) must ensure respect for non-discrimination and is not to be used against the gender equality principle.

Environment: a profitable use of smart meters combined with demand side management activities can leverage EE retrofit investments that could create conditions to improve the users' well-being and environmental conditions.

**References to relevant deliverables (e.g. pilot action report, studies), investment factsheet and web-links**

**If applicable, additional documentation, pictures or images to be provided as annexes**

Max. 1.000 characters

References to the relevant deliverables:

- D.T3.1.1 preparatory analysis of the technical and management requirements for instilling smart meters
- D.T3.2.1 PA1 design for 20 building in Treviso - Italy
- D.C.6.4 video guidelines to promote the transferability of the TOGETHER approach (under realization)
- D.C.4.7 infographic tutorial containing guidelines on how to read and use smart metering systems
- D.C.4.4 Project e-book (under realization)

Additional documentation:

- Pictures (no faces)
- Power point presentations
- Amateur videos recorded in the pilot buildings available on the Facebook profile of the project