Demand Side Management Tools

Interreg CENTRAL EUROPE
European Union
European Regional Development Fund
TOGETHER

D.T3.3.7 Report on PA6 by Paks in 11 buildings - offices, educational buildings, swimming pool, police office in Paks

CE51 TOGETHER

Executive summary

This template is delivered for reporting pilot actions with technical description and documentation about the combination/selection and application of the integrated measures applied in pilot buildings. Partners are required to include a presentation of their Pilot Action, providing with an overview of the implemented activities and results achieved. Each partner has to produce this report using information and content collected at local level with the support of the managers/users/negotiating panels of the involved buildings.
It is not requested to included detailed information for each single buildings involved (a part some specific information about the energy consumption) as detailed information have been already provided in the PILOT CONCEPT DESIGNS. Exemplification, reference to specific context are welcome.

Note for the authors: please provide information in all the requested text boxes. You have to consider that the provided information will serve to prepare other project documents/deliverables such as the final e-book. For that reason it is important to write clearly to create the conditions that everyone can understand and get the added value you want to share with the "external" audience.
Several content of the current template will be transferred and used for preparing the PILOT FACTSHEET compulsory for the CE programme

DEADLINE FOR SUBMITTING THE FILLED TEMPLATE TO THE LEAD PARTNER: 20 JANUARY 2019

1. Summary description of the pilot action (including investment, if applicable) explaining its experimental nature and demonstration character. Overview of the Pilot Actions implemented, general introduction. Write max 2 pages that introduce your local activities, the target group engagement, results. Please give evidence of the approaches implemented in the different buildings in particular if they are not belonging to the same category (educational, institutional, others) include some pictures in the "GALLERY"

The pilot action is composed of two main parts:

1. Defining the energy performance and lavish points, leakages, malfunctions and wrongly planned or operated parts of the pilot buildings;
2. Designing and launching actions to make up these problems and reduce energy consumption also in general by eco-conscious behavior.

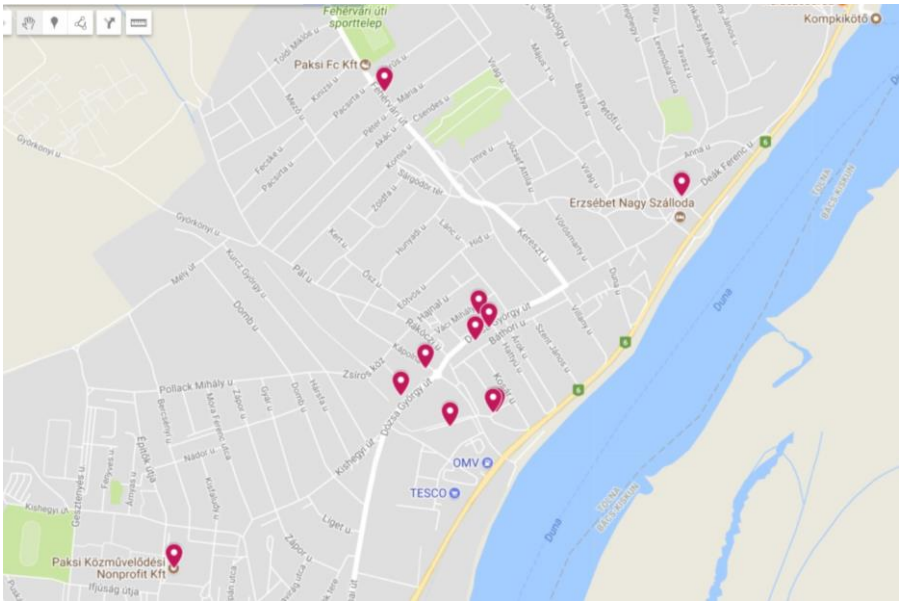
Both the first part and the second part consisted two different actions. To define the energy characteristics of the involved buildings, their energy flows had to be measured and compared in time and with other similar buildings. For this measurement the smart metering system was installed with an Energy Management Software. This investment was completed in all 11 pilot buildings of Paks in Sept 2017. Data is collected different ways depending on the energy source. In case of electricity, control meters have been installed right next to the billing meters, which are owned by the DSO an used for the official measurement of the consumption and issue the invoices in this basis. The control meters are smart meters with data transmission functions, they send the data to the server where the EMS software is running. The EMS analyses the consumption and creates reports upon requests. The consumption values and the consumption curves can be checked online and they are also projected by dashboards on the tablets installed at the 11 pilot buildings of the municipality. Gas is measured in slightly different way, as the gas meters were already available to transmit the signals, but the data was only collected by the DSO. In the frame of TOGETHER Paks has equipped these meters with wireless transmitters, which forward the consumption data to the server and the process from this point is the same as described at the electricity meters. Heat consumption is also measured at 4 buildings out of the 11 pilot sites. Heat consumption meters with wireless transmitters have been installed and providing consumption data for the server. Examples for the hardware used: district heating: Kamstrup 602, Kamstrup MC403; gas: MC602 transmitter + antenna added to existing DSO meter; electricity: ITRON ACE6000, Landis+Gyr E550, ACTARIS C114UR1D, ACTARIS SL7000, ITRON ACE3000, MC602 transmitters, OMNIPOWER 100/5 + antenna. The software was developed for energy management directly for the Municipality of Paks, already before the TOGETHER project. It was measuring the consumption of some public buildings, which are not involved into TOGETHER. The new meters of the current project have been integrated into this EMS, which is based on SAIA WEB system. The software measures heat consumption, gas consumption, electricity consumption and also water. It creates reports for periods defined by the users and also analyses the consumption in order to provide the possibility to decide what electric capacity and gas capacity is necessary at the measured

buildings. Data is transmitted by wireless transmitters. Optical data reading is also possible. Dashboards are located in each measured buildings, usually at the entrance in order to reach the maximum possible number of persons in the building. The dashboards show the current consumption measured by the meters of the buildings (It differs from building to building: electricity is measured in all buildings, but at some buildings gas or heat consumption is also measured.). Curves of different time periods can be also visualized. The dashboards are not interactive.

Once the baseline consumption data was available, we had to define where are the lavish usage points and inefficient parts of the buildings. Therefore official energy certifications have been conducted at each pilot buildings, defining the current energy category of the building, the suggested interventions (such as insulation of the building, installing solar panels on the roof) and the achievable energy category of the building.

To analyse the suggested refurbishment activities' feasibility, 3D modelling was used with a special software (ArchiCAD). The investment needs were visualized this way for the decision makers.

The identification of the necessary investments – that will be able to gain the highest cuts on energy consumption – have been followed by the demand side management actions. These actions compose the essence of the project: to show people that investments are not enough (and sometimes not possible due to financial or legal reasons) to reduce energy consumption, the participation of all building users are inevitably important and required. Therefore Municipaity of Paks organized bilateral discussions with the building managers, printed 2800 stickers for switches and taps, 60 posters in 3 versions for awareness raising, 5000 pieces of A5 leaflets with energy saving possibilities for building users, and several A3 posters that describe the functioning of smart metering and energy management. Besides, company newsletters were planned and the project's findings have been integrated into the education of the Energetic Secondary School.



1. Figure: Location of pilot buildings at Paks

2. Indicate the NUTS (Nomenclature des unités territoriales statistiques) regions concerned by the pilot action

Building	NUTS 3	Address (Street, house number, postal code, city, country)	GPS coordinates
ENERGETIC SECONDARY SCHOOL AND DORMITORY (ENERGETIKAI SZAKGIMNÁZIUM ÉS KOLLÉGIUM)	HU233 - Tolna	Paks, Dózsa Gy. út 95.	46°37'16.9"N 18°51'14.6"E
KINDERGARTEN (KÁPOLNA UTCAI BÖLCSŐDE)	HU233 - Tolna	Paks, Kápolna u.4-6	46°37'20.7"N 18°51'16.8"E
SWIMMING POOL (VÁROSI TANUSZODA)	HU233 – Tolna	Paks, Táncsics M. u. HRSZ.: 3523/6	46°37'19"N 18°51' 23""E
MEDICAL CENTRE BALNEOLOGY (PAKS GYÓGYÁSZATI KÖZPONT BALNEO)	HU233 – Tolna	Paks, Táncsics M. u. 13	46°37'10.3" 18°51'24.0"E
MEDICAL CENTRE SURGERY (PAKS GYÓGYÁSZATI KÖZPONT RENDELŐ)	HU233 – Tolna	Paks, Táncsics M. u. 13 (same address)	46°37'10.3" 18°51'24.0"E
TOWN HALL (ÖNKORMÁNYZATI ÉPÜLET)	HU233 – Tolna	Paks, Dózsa Gy. út 55-61	46°37'25.9"N 18°51'28.6
OFFICE FOR GOVERNMENT ISSUED DOCUMENTS (OKMÁNYIRODA)	HU233 – Tolna	Paks, Dózsa Gy. út 51-53.	46°37'26.9"N 18°51'31.5"E
POLICE OFFICE (VÁROSI RENDŐRKAPITÁNYSÁG)	HU233 – Tolna	Paks, Dózsa 52-54 Hrsz/cím:396	46°37'24.6"N 18°51'29.6"E
SPORT CENTER (PSE SPORTPÁLYA)	HU233 – Tolna	Paks, Fehérvári út 29.	46°37'57.9"N 18°51'07.1"E
CSENGEY DÉNES CULTURAL CENTRE (CSENGEY DÉNES KULTÚRÁLIS KÖZPONT)	HU233 – Tolna	Paks, Gagarin u. 2.	46°36'56.2"N 18°50'32.4"E
DEÁK HÁZ CULTURAL CENTRE (DEÁK HÁZ)	HU233 - Tolna	Paks, Deák F. u. 4.	46°37'41.0"N 18°52'03.5"E

3. Sustainability of the pilot action results and transferability to other territories and stakeholders. Max 2000 spaces

On one hand the maintenance of the smart metering system is ensured. It is composed of the meters (electricity, heat), communication units of the meters, tablets and the energy management system (EMS). The EMS is owned by the external expert and provided for the Municipality of Paks until at least 31 May 2024. All other listed parts of the smart metering system are owned by Paks and are activated in its bookkeeping. Paks guarantees that after the follow up period it will maintain the system by ether signing further contracts for the use of the EMS or develop another EMS. The support will be provided by the expert until 31 May 2024 as per contract. This provides the possibility to measure the affects of energy refurbishments, set new targets and visualize the results of demand side management tools. The approval of the Reinvestment plan defines actions and amounts for these refurbishments.

On the other hand, the awareness raising actions of the municipality will be continued: stickers are put to the switches and taps, posters are hanged on the walls of the pilot buildings, the info videos of the project about energy management and smart metering are available on the web and were embedded into the educational program of the Energetic School. The establishment of and information point at the Town Hall will provide continuous support for energy efficiency actions on consumer side and provide information on possible tools. The direct feedback system i.e tablets showing the consumption statistics from the EMS will be maintained in the buildings and showed for visitors, delegations and other decision makers to understand the necessity of permanent energy monitoring. energy saving tips have also been printed in thousands of copies and will be further disseminated to new workers and building users. Besides, Municipality of Paks plans to continue the cooperation with the Energetic Secondary School in shaping energy efficiency programmes for the future periods.

4. Lessons learned and added value of transnational cooperation of the pilot action implementation Max 1000 spaces

Lessons learnt are rather connected to the demand side management part of the pilot and not the investments. The specification for the smart metering could be defined quite easily, as the types of energy used by the involved 11 buildings could be identified, existing meters were listed and the recommended metering points could be defined with the involvement of the technical expert. The types of meters and communication units could be also selected by the expert on the basis of its experiences and knowledge, and the operation of the system started soundly in Oct 2017. The data collection and evaluation is managed by an EMS without problems.

The challenge was rather on human side: how to involve the building users into demand side management actions. This task might be much easier at schools, where the target group is composed of pupils and not office workers, who cannot really be motivated. Children are willing to try new activities and they contribute to the protection of their environment by pleasure. Also, they consider these actions as a game, so they are motivated to join. On the other hand, office workers are usually

overloaded with administrative works, spending their days in their working place without motivations to take part in any additional activities - especially if remuneration is not connected, they won't directly benefit from the savings. Many discussions had to be organized to convince building managers about the benefits of such pilots and find those persons who are opened for such experiences and can also function as opinion leaders. We found these persons at the Energetic Secondary School, where the education itself already contains some elements of energy efficiency. They could help us to get closer to the building users of other involved buildings, and define attractive messages and tools for DSM.

We have therefore learnt that in such projects partners should involve children, or elaborate a motivation (financial or emotional) for the users. Besides, involving some opinion leaders – not from te top management, but from the ordinary workers is crucial.

Transnational cooperation gave us the possibility to study these solutions at other partners, who live in different cultures, work among different administrative rules and have usually different living standards.

5. Describe the Strength, Weakness, Opportunities and Threats that you have registered when implementing the pilot activities. Write max 1 page

Strengths	Weaknesses
Subcontracted expert possess the necessary knowledge and technologies for maintaining the meters and the EMS Adequate wifi connections are available in the pilot buildings The management of the Municipality is keen on improving the energy efficiency of its properties, mainly public buildings Energy performance of the pilot buildings was mapped by energy certifications in details, therefore retrofitting needs are recognised The Energetic Secondary School and Dormitory showed/shows a very positive attitude to take part in the pilot, energy efficiency and eco-conscious behaviour is already a part of thei educational programme	Building users are usually not interested in saving energy, as it doesn't affect their economic situation or living standards Most employees consider it as restrictions or negative influencing of their working conditions if they are asked to take care on energy and environment The EMS have to be accessed by municipal employees as well, but their knowledge has t be improved first; at the moment the external expert is needed to collect and import the necessary consumption data Only a limited part of the employees could be involved into the pilots – e.g. it is hard to reach the caretakers, who remarkably influence the consumption It is difficult to convince decision makers to launch DSM campaigns, as their payback and positive economic effect cannot be introduced easily (like at a refurbishment)

Opportunities	Threats
Paks is in the focus of energy policies and energetic developments in Hungary, therefore it can serve as an opinion leader in DSM campaigns and smart meterings, which might start a multiplier effect at municipalities Kindergartens and schools can be involved into the continuation of the pilots, where the willingness of the building users to change their habits is much stronger The smart metering system can be integrated into the future smart grid of Paks and the micro region, fostering decentralised energy production and the exploitation of RES By regular campaigns the mind-set of employees can be turned to eco-conscious in medium terms New buildings can be easily involved into the EMS The pilots and their continuation support the achievement of the climate and energy targets of Paks defined in its SEAP and Local Agenda 21 The information point set at the Municiplity will be able to share practices and give advices to building managers and also employees of the public buildings Paks works together with ca 20 other municipalities in the micro region to set up a smart grid system, these municipalities will be able to easily take over the technologies and DSM solutions from Paks Smart metering provide the possibility for the city to revise its energy contracts and the contracted capacities to save costs	The info point at Paks won't work in long terms as other duties will need all capacities of the appointed person The management of the municipality will focus only on investment projects as the calls of Structural Fund programmes support these activities and their payback is more visible Funds won't be available to maintain the smart metering and EMS system after the sustainability period Staff members involved in TOGETHER may be removed and/or moved to other departments, without passing the knowledge gained in TOGETHER for newcomers

Before pilot implementation Implementation of the pilot activities and implementation of the energy audit

September 2017- December 2018 Implementation of the pilot and use of the smart meters. The baseline is calculated on the basis of the historical data (if available) or on the basis of the energy audit

January 2019 Reporting and data elaboration

February - April 2019 Elaboration for the Political level (reinvestiment plan And action plan

Follow up: PPs and APS continue to use the smart meters even after the closure of the monitored period

7. Total energy saved (in kWh) within the monitoring period, which is one year (please considered your pilot buildings altogether)

Electric consumption - 10.715 kWh

Thermal consumption: - 250.715 kWh

The consumption of the buildings has raised, as it is also influenced by the weather conditions and changes in operating. The results of the pilots can be detected only in a longer period.

ELECTRICITY								
Building	total net heated floor area	baseline consumption (before the pilot action)	baseline period (before the pilot action)	consumption after pilot action	monitored period after pilot action	kWh/ m2 after pilot	Baseline calculation Indicate whether the baseline is calculated by smart meters or bill audit	1. Indicate add all problems with measurements and collecting data
	m2	kWh	start date, end date	kWh	start date, end date			
H-7030 Paks, Kápolna u 4-6. KINDERGARTEN	1090	144488	2016.08-2017.08	58385	2017.09-2018-09.	53,56	bill audit	None
H-7030 Paks, Táncsics köz 1. MEDICAL	1873	318750	2016.08-2017.08	306570	2017.09-2018-09.	163,67	bill audit	None
H-7030 Paks, Táncsics Mihály u. 13. SWIMMING P.	1188	110161	2016.08-2017.08	103296	2017.09-2018-09.	86,95	bill audit	None
H-7030 Paks, Dózsy György út 55-61. TOWN HALL	890	97795	2016.08-2017.08	103812	2017.09-2018-09.	116,64	bill audit	None
H-7030 Paks, Dózsa György út 51-53. OFFICE OF GID	789	43400	2016.08-2017.08	131838	2017.09-2018-09.	167,09	bill audit	None
H-7030 Paks, Dózsa György út 52-54. POLICE	1245	40852	2016.08-2017.08	42083	2017.09-2018-09.	33,80	bill audit	None
H-7030 Paks, Dózsa Gy. út 95.ENERGETIC SCHOOL	3450	214 026	2016.08-2017.08	220292	2017.09-2018-09.	63,85	bill audit	None
H-7030 Paks, Táncsics Mihály u. 13. BALNEO	3960	665892	2016.08-2017.08	663310	2017.09-2018-09.	167,50	bill audit	None
H-7030 Paks, Fehérvári út 19. SPORT CENTER	766	113508	2016.08-2017.08	119906	2017.09-2018-09.	156,53	bill audit	None
H-7030 Paks, Gagarin u. 2. CSENGELY CULTURAL	2424	26008	2016.08-2017.08	38419	2017.09-2018-09.	15,84	bill audit	None
H-7030 Paks, Deák Ferenc u. 2-4. DEÁK CULTURAL	1450	12276	2016.08-2017.08	9960	2017.09-2018-09.	6,86	bill audit	None

GAS								
Building	total net heated floor area	baseline consumption (before the pilot action)	baseline period (before the pilot action)	consumption after pilot action	monitored period after pilot action	kWh/ m2 after pilot	Baseline calculation Indicate whether the baseline is calculated by smart meters or bill audit	2. Indicate add all problems with measurements and collecting data
	m2	kWh	start date, end date	kWh	start date, end date			
H-7030 Paks, Kápolna u 4-6. KINDERGARTEN	1090	191546	2016.08-2017.08	252958,3	2017.09-2018-09.	232,07	bill audit	None
H-7030 Paks, Táncsics köz 1. MEDICAL	1873	1496611	2016.08-2017.08	1576471	2017.09-2018-09.	841,68	bill audit	None
H-7030 Paks, Táncsics Mihály u. 13. SWIMMING P.	1188	752199	2016.08-2017.08	842180	2017.09-2018-09.	708,9	bill audit	None
H-7030 Paks, Dózsy György út 55-61. TOWN HALL	890	186458	2016.08-2017.08	191941	2017.09-2018-09.	215,66	bill audit	None
H-7030 Paks, Dózsa György út 51-53. OFFICE OF GID	789	436845	2016.08-2017.08	463055	2017.09-2018-09.	586,88	bill audit	None
H-7030 Paks, Dózsa György út 52-54. POLICE	1245	156789	2016.08-2017.08	167548	2017.09-2018-09.	134,57	bill audit	None
H-7030 Paks, Dózsa Gy. út 95.ENERGETIC SCHOOL	3450	2381581	2016.08-2017.08	2244501	2017.09-2018-09.	650,58	bill audit	None
H-7030 Paks, Táncsics Mihály u. 13. BALNEO	3960	705698	2016.08-2017.08	715487	2017.09-2018-09.	180,67	bill audit	None
H-7030 Paks, Fehérvári út 19. SPORT CENTER	766	405897	2016.08-2017.08	422746	2017.09-2018-09.	551,88	bill audit	None
H-7030 Paks, Gagarin u. 2. CSENGELY CULTURAL	2424	368547	2016.08-2017.08	394587	2017.09-2018-09.	162,78	bill audit	None
H-7030 Paks, Deák Ferenc u. 2-4. DEÁK CULTURAL	1450	191546	2016.08-2017.08	252958	2017.09-2018-09.	174,45	bill audit	None

8. What the baseline refers to? (audit, historical data etc.? You have to indicate what type of data was used. Please, give a short description about the type of data used.

The baseline values refer to the consumption of the preceding 12 month period. The smart meters are in operation from 1 Oct 2017, therefore the period 9/2016-8/2017 was analysed as baseline. As the baseline values can be defined by bill auditing, the closing date of the baseline period have to be identical with the date of issuing of the annual final invoice, which is August in each year.

9. Do you have some issues with gathering the consumption data? Have you lost some data? (for various reasons such as the router stopped working, the wrong predefined constants in concentrator, same basic arithmetic issues that programmers did wrong by mistake, etc). How did you solve it?

We haven't faced such problems.

10. How have you solved this problem ? what are the advices and suggestions that you might stress out so the others that will replicate similar investments could use them?

Not relevant.

11. Describe the investment costs and indicate what are they
OPEX – Operating Expense costs that are the ongoing costs for running the system
CAPEX – Capital expenditure costs of developing or providing non-consumable parts for the product or system.

The contract has defined the following items:

1. Procuring and installing smart meters, tablets and necessary permissions, deadline: 30 Sept 2017, amount: 9.926.651 HUF + VAT = 40.459,73 EUR (VAT: 27%, exchange rate for reporting: 311,59 HUF/EUR)
2. Support activities, deadline 31 May 2018, amount: 1.400.000 HUF + VAT = ca. 5.706,22 EUR (depending on exchange rate)
3. Support activities, deadline 31 May 2019, amount: 839.820 HUF + VAT = ca. 3.423 EUR (depending on exchange rate)

Total amount: 49.588,95 EUR
ERDF (85%): 42.150,60 EUR

12. Total energy metered from the installation (fully working) to December 2018

Energy was measured from 1 Oct 2017. In the 10/2017 -9/2018 period 1.797.871 kWh electricity consumption and 7.524.432 kWh gas consumption was measured by the smart meters of the project.

13. How many Building Alliances were signed? Please provide information about the involved pilot buildings/institutions that agreed to officially sign a building alliance and give an overview of their terms of reference (e.g. energy reduction goal, % of division of the energy savings etc).
Has been the building alliance internally disseminated and shared with all the buildings players (e.g. teachers, students, janitors etc)
How have you informed all the interested buildings players about the alliance and its aims and conditions? *In case you have not signed the Building Alliance, please describe the reasons and the alternative measures you have adopted.*

We have informed the partners about the purpose and function of the Building Alliance at the local launching event on 5 Jul 2017 at Paks, where the managers of the pilot buildings and several external attendees – even from other countries - have participated. We have considered this event as a great possibility, because its presentations have introduced and highlighted the importance of smart metering (which was launched at Paks from 1 Oct 2017) together with some foreign experts, who have arrived to the Steering Committee meeting of an Interreg Europe project on smart metering, called SET-UP. Hearing also the aspects of French, Spanish, Portuguese, Lithuanian and English experts was more convincing for the building managers than listening only the presentations of the representatives of Paks Municipality and the University of Pécs. On the other hand the manager of Paks and UP could describe in details the planned functioning of the smart meters, the methods of data collection, registering, reporting upon request, and finally their role in establishing a solig cooperation among the management of the settlement – i.e. the Municipality, the owners of the pilot buildings (next to the Municipality of Paks some buildings are owned by the State and the foundation of the nuclear power plant), the building managers and involved energy experts – such as the operator of the energy management system. At the event we have traced out the meaning content and purpose of a Building Alliance, and all participants have agreed that as they are responsible for different roles at building management and decisions, they have to cooperate permanently to reach tangible energy efficiency goals. However, as they have very limited competences at their organisations on these fields without the right to sign such holistic supporting documents, and their employers are not taking part officially in such initiatives to bear additional obligations, official alliances cannot be signed. Therefore the participants have agreed that the manager of Paks, who will be also appointed for the info point of the pilot actions, will serve as a hub among these actors, and they will all study the documents of the project that describe the recommended demand side management actions, their measured or

expected results and the reinvestment plans of the savings. If approved by their management in the future, they will be opened to apply the DSM pilot actions during after the termination of the project as well. the first part of this decision was implemented already, as in 2018 the project's DSM actions have taken place at these buildings.

14. Describe the unexpected positive events/situations that you have registered during the implementation of the pilot activities.

What changes in user behaviour can be experienced and how it was measured? *Please provide information and give examples/specific references*

The specification for the smart metering could be defined quite easily, as the types of energy used by the involved 11 buildings could be identified, existing meters were listed and the recommended metering points could be defined with the involvement of the technical expert. The types of meters and communication units could be also selected by the expert on the basis of its experiences and knowledge, and the operation of the system started soundly in Oct 2017. The data collection and evaluation is managed by an EMS without problems.

The challenge was rather on human side: how to involve the building users into demand side management actions. This task might be much easier at schools, where the target group is composed of pupils and not office workers, who cannot really be motivated. Children are willing to try new activities and they contribute to the protection of their environment by pleasure. Also, they consider these actions as a game, so they are motivated to join. On the other hand, office workers are usually overloaded with administrative works, spending their days in their working place without motivations to take part in any additional activities - especially if remuneration is not connected, they won't directly benefit from the savings. Many discussions had to be organized to convince building managers about the benefits of such pilots and find those persons who are opened for such experiences and can also function as opinion leaders. We found these persons at the Energetic Secondary School, where the education itself already contains some elements of energy efficiency. They could help us to get closer to the building users of other involved buildings, and define attractive messages and tools for DSM.

We have therefore learnt that in such projects partners should involve children, or elaborate a motivation (financial or emotional) for the users. Besides, involving some opinion leaders – not from te top management, but from the ordinary workers is crucial.

Transnational cooperation gave us the possibility to study these solutions at other partners, who live in different cultures, work among different administrative rules and have usually different living standards.

15. The energy monitoring system installed

Please write this part with a simple language that everyone can understand. Write max 2 pages

Paks has contracted an expert company (Energy Profit Ltd) to install the smart meters and operate their monitoring system, which has been delivered in Sept 2017. The smart meters are activated and owned by the Municipality of Paks, project partner of TOGETHER and it is also responsible for the maintenance for 5 years after the closure of the project. This paragraph was inserted into the contract of the subcontractor, which will carry out the maintenance tasks during the project and its follow-up period.

The meters are measuring electricity, gas and heat consumption in 15 minutes intervals. These data are transmitted to the Energy Management System (EMS) and stored on the server of the company responsible for smart metering. The EMS analyses the consumption and creates reports upon requests. The software was developed for energy management directly for the Municipality of Paks, already before the TOGETHER project. It was measuring the consumption of some public buildings, which are not involved into TOGETHER. The new meters of the current project have been integrated into this EMS, which is based on SAIA WEB system.

The software measures heat consumption, gas consumption, electricity consumption and also water. It created reports for periods defined by the users and also analyse the consumption in order to provide the possibility to decide what electric capacity and gas capacity is necessary at the measured buildings. Data is transmitted by wireless transmitters. Optical data reading is also possible. Data is checked by the subcontracted company, which also prepares reports upon requests. Access is provided also for the building managers and the management of the project. The consumption values and the consumption curves can be checked online and they are also projected by dashboards on the tablets installed at the building.

16. Describe how the dashboard/data visualisation is operated and what is the feedback that receive the buildings' visitors. *Whom is addressed the dashboard to? habitual visitors or occasional visitors? Please describe the target. Provide information Do it in max 1 pages and include some pictures in the "GALLERY"*

Dashboards are located in each measured buildings, usually at the entrance in order to reach the maximum possible number of persons in the building. The dashboards show the current consumption measured by the meters of the buildings (It differs from building to building: electricity is measured in all buildings, but at some buildings gas or heat consumption is also measured.). Curves of different time periods can be also visualized. The dashboards are not interactive.

17. Relevant for D.T3.3.10 about the involvement of the target groups

Describe the involvement of relevant Target Groups in the implementation of your Pilot Action

Report on the target groups' involvement in Pilot Actions from the negotiation to its assessment

Please write at Detail what, when, who and how. *Do it in max 1 pages and include some pictures in the "GALLERY"*

Target group of pilot action are building users: managers, office staff, janitors, technicians, and also the visitors of the buildings. We can list by name the managers and the energy experts and technicians of these buildings (see next question), while the visitors represented a secondary, indirect target group not involved directly in the energy efficiency actions (e.g operating electronic equipment in shorter periods, switching off the lights, etc), but they could also follow the consumption of these building via the tablets installed at the entrances.

18. Relevant for D.T3.4.1 about the SUPPORTING STRUCTURE

Describe your LOCAL SUPPORTING STRUCTURE (how it is composed, who are the members etc)
Describe the actions/decisions realised by the Local Supporting Structure that you have organised for supporting the pilot actions.
Please write max 2 page with completed information or in any case an adequate information
Detail what, when, who and how

Members involved from the pilot the buildings, by name:

Szabó Péter mayor of Paks; Town Hall
Misoczki Anikó head of department, Municipality of Paks; Town Hall
Neiner András project manager, Municipality of Paks; Town Hall
Koch László manager, Energetic Secondary School;
Csanádi Zoltán director, Energetic Secondary School;
Nagy János teacher, Energetic Secondary School;
Péger János energy manager, Energetic Secondary School;
Vájer Attila director of maintenance company (DC Plusz Ltd) Kindergarten, Kápolna str.
Schmidt József building engineer, Kindergarten, Kápolna str
Ruff Zoltán building engineer, Kindergarten, Kápolna str
Bognár István architect, Paks Swimming Pool
Béndek Tibor building engineer, Paks Swimming Pool
Feil Gábor building engineer, Paks Swimming Pool
Dávid Béla chief engineer, Paks Medical Center (Balneology)
Tóth Máté engineer, Paks Medical Center (Balneology)
Vájer Máté technical expert, Town Hall
Molnár Tibor technical expert, Town Hall
Haag Ferenc manager, DC Therm Ltd- energetic maintenance of Office of Government Issued Docs
Pumerschein József manager, DC Therm Ltd - energetic maintenance of Office of Gov. Issued Docs
Csocsó György, manager, Police Station of Paks

Schneidler László, energy referent, Police Station of Paks
Simon Zoltán building engineer, Paks Sport Association
Pál Béla, manager, Csengey Dénes Cultural Center
These directly involved persons have participated at different meetings, where the targets of the project, the operation of smart metering, the planed pilot actions (posters, newsletters, signs, etc.) and also their detailed graphic layout have been discussed. Unfortunately it was not possible to procure prices from other sources and organise competitions for the workers of these buildings, but the participants all agreed that in they will keep this case possibility in mind and in case of future financing (internal or external) they will implement it.

19. Expected impact and benefits of the pilot action for the concerned territory and target groups and leverage of additional funds (relevant for INDICATORS)

The benefits will bring economic gains for the building maintainers, and raise the living standards of the building users: Statistics show that by smart metering 5-15% of the energy consumption can be saved in buildings. The building users are informed about the consumption levels and patterns and also about the optimal level of energy consumption. After comparing the two levels, they are motivated to reduce their consumption. This reduction will result in energy cost savings and it will contribute to the achievement of the climate protection goals of the EU.
The smart metering system makes it possible for Paks to analyze its energy consumption in the involved public buildings, and define energy reduction measures. The municipality has also delivered some energy certifications for all of these buildings, and the certifications include a chapter on the recommended energy efficiency interventions, as an obligatory part. The results of these interventions can be monitored by the Municipality by the smart meters (reduction in heat consumption due to new insulations or replacement for doors and windows, reduction in electricity consumption due to the rationalization of use of lighting and replacing old luminaires to LED).
TOGETHER also suggests tools for these activities – such as competitions, online and offline awareness raising campaigns, remuneration, etc. By reducing their heat, gas and electricity consumption, there buildings contribute to the decreasing of the GHG emissions and contribute to the climate protection goals of Hungary and the EU.
The pilot also serves as an awareness-raising tool, as the tablets at the entrances show the energy consumption characteristics to all interested building users and for visitors. As these buildings are visited by plenty of people (Town Hall, cultural center, swimming pool, medical facilities), the investment makes it possible to reach the majority of the population of Paks and also the surrounding settlements.
Besides, the smart metering data together with the certifications provide guidelines and reliable baseline values for future refurbishment projects – funded by Settlement and Territorial Development

Operational Programme (actions 3.2.1, 3.2.2), Environment and Energy Efficiency Operational Programme (priority 5) or other EU funds.
Benefits therefore can be summed up as follows: The possibilities of identifying energy leakage points and also malfunctions, setting the priorities for energy refurbishments and promoting the savings for the inhabitants will support Paks and other settlements in ranking their energy investments to achieve the highest possible positive impact and to inform the building users and visitors about energy saving actions who will become multipliers of this eco-conscious thinking.

20. Describe if any of the involved administrations have invested own resources (e.g. for retrofitting the pilot buildings and or for extending the smart meters system in the involved buildings or in other buildings) already during the pilots implementation . Indicate if any of the involved administrations have taken a commitment to invest own resources . Please give numbers, dates and describe shortly the type of levered investment

Own resources were not invested so far, but the municipality plans to retrofit some of its buildings under the calls of the Territorial and Settlement Development Operational Programme. The energy audits (certifications) of TOGETHER have revealed the refurbishment priorities, the 3D models gave some technical solutions for their implementation and the smart meters will provide reliable baseline data for the investments. The energy certification of the building before the investment is an obligatory submission document of these tenders, therefore TOGETHER has directly supported the submission of these future projects.

21. Full time employee (relevant for INDICATORS). Indicate if you have hired new staff for the implementation of the pilot actions and if the contract will be renovated after the end of the project

We haven't hired any new employees. The role of coordinating the pilots was dedicated to an employee of the Municipality (Mr András Neiner).

PHOTO GALLERY

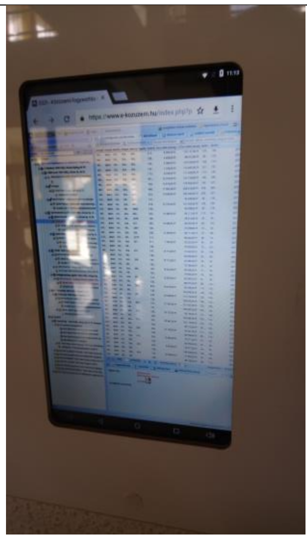
(please make sure that people included in the pictures have given you their informed consent giving you consent to publish the pictures)


Környezeti nevelés iskolákban


HITELES ENERGETIKAI TANÚSÍTVÁNY
ÖSSZESÍTŐ LAP


Tűzoltó készülék
KAPCSOL LE!


Környezeti nevelés iskolákban



TAKING COOPERATION FORWARD

TOGETHER PROJEKT

Okos mérés és takarékosabb fogyasztók: a középületek energiafogyasztásának csökkentését segíti Paks Város Önkormányzata

Az energiafogyasztás csökkentése klímavédelmi és gazdasági szempontból egyaránt fontos feladat. A Nemzetközi Energiaügynökség (IEA) adatai szerint az épületek az Európai Unió végső energiafelhasználásának több mint 40%-ért felelősek, a középületek energiafogyasztásának mérséklésével ezért jelentős megtakarításokat érhetnek el az állami intézmények és a helyi önkormányzatok. A költséges szigetelést, nyílászárócserét, gépészeti rendszer felújítását tartalmazó beruházásokra azonban nem mindig áll rendelkezésre elegendő forrás, azonban léteznek olyan megoldások, amelyekkel szinte költség nélkül érhető el 5-10% energiamegtakarítás. Ez a témája az Interreg Central program által támogatott TOGETHER nemzetközi projektnek, amelyben Paks Város Önkormányzata olasz, cseh, szlovén, horvát, lengyel, és szlovák partnerekkel közösen vesz részt 2016 júniusa - 2019 májusa között.

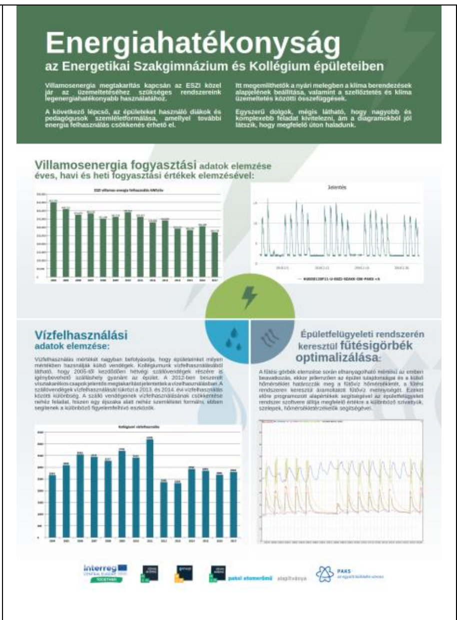
Az energiafogyasztás mérsékléséhez először meg kell vizsgálnunk, hogy pontosan mennyi energiát fogyasztunk és ez időben miként oszlik el. Így feltárhatók az olyan pazarló fogyasztási szokások, mint a felkapcsolva felejtett világítás, fölöslegesen működtetett légkondicionáló, éjszakára is bekapcsolva hagyott berendezések, túl magas hőfokra állított termosztátok. Sokan nem tudják, hogy a termosztát értékének 1C-kal történő csökkentése 6-7%-os fűtési energia-megtakarítást eredményez. Méréssel emellett a meghibásodott eszközök is észlelhetők, és például egy csőtöréssel - azaz hirtelen megnövekedett vízfogyasztással - kapcsolatos vészjelzés jelentős kártól mentheti meg a tulajdonost. A közintézmények általában havi átalányszámlákat és éves elszámoló számlát kapnak szolgáltatóiktól, amiből még a pontos havi fogyasztási értéke sem olvashatók ki, a fogyasztás jellemzőinek meghatározásához pedig ennél sokkal gyakoribb - óránkénti, vagy még sűrűbb időközönként mért adatokra van szükség. A projekt keretében ezért 2017 szeptemberében tizenegy paksi középületben került telepítésre okos mérő, amely eszközök 15 perces gyakorisággal szolgáltatnak adatot az épületek villamos-energia-, gáz- és távhő fogyasztásáról.

Második lépésként minden közintézményben a fogyasztói szokások átalakítását ösztönző akciókat szervez az Önkormányzat, amelynek során az épületet használó személyek energiatakarékossági tanácsokat kapnak a szakemberektől, majd különböző játékok, versenyek keretében csökkentik fogyasztásukat. Ehhez a projekt sokféle eszközt kínál: az óvodákban foglalkoztató füzetet kapnak a gyerekek, akiknek be kell jelölniük az energiafogyasztókat és el kell dönteniük, hogy a füzet főszereplője - Hümér a troll - mikor viselkedik helyesen. Az energetikai szakközépiskolában a tanulók megismerhetik az okos mérés és az ahhoz kapcsolódó energiamenedzsment rendszer műszaki hátterét, egyéb közintézményekben a vezetőség versenyeket rendez emeletek, vagy szervezeti egységek között. A legtöbb energiát megtakarító csapat jutalomban - például egy kávégépben - részesülhet. A fogyasztók emellett folyamatosan követhetik a bejáratoknál kihelyezett monitorokon az épületek energiafogyasztását.

Csökkentsd Te is iskolád fogyasztását, használd a vizet és az energiát felelősségteljesen!

PAKS az együttműködés városa

További tájékoztatás: Neiner András, pályázati referens
Telefon:75/830-564 (564 mellék) e-mail: palyazat@paks.hu




Jelenlét -172
Hónap
9 hónappal ezelőtt
100
80
60
40
20
2016.12.5.
2016.12.12.
2016.12.19.
2016.12.26.