# TEMPLATE

## Investment report

Version 1

# I5 - Investment in an energy monitoring system for pilot actions in 11 public buildings in Paks (PA6)

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|---|---|
| Project index number and acronym | CE51 TOGETHER |
| **Responsible partner (PP name and number)** | Municipality of Paks – PP9 |
| **Linked to pilot action (number and title)** | D.3.2.6 - PA6 design for 11 offices, educat, swimming pool, police & medical centers in Paks HU. Report + EN summary |
| **Project website** | http://www.interreg-central.eu/Content.Node/TOGETHER.html |
| **Delivery date** | 30 Sept 2017 |

**Description of the investment (including technical characteristics) explaining its embedding into the linked pilot action**

Smart metering investment was completed in all 11 pilot buildings of Paks. 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.

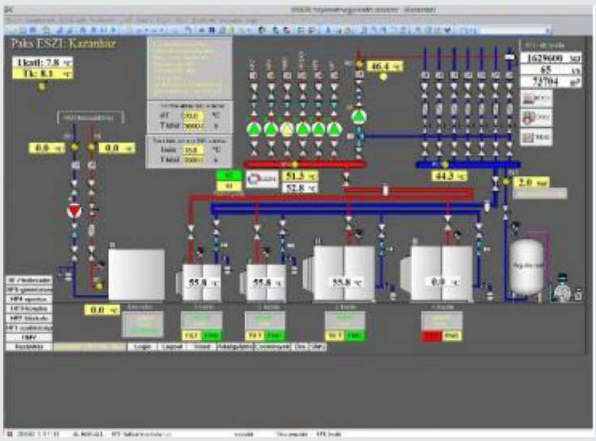
Heat consumption is also measured at 4 buildings out of the 11 pilot sites. Heat consumption meters with wireless transmitters have been installed and providing consumption data for the server.

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.

| Investment location | | |
|---|---|---|
| **NUTS 3** | **Address (Street, house number, postal code, city, country)** | **GPS coordinates** |
| HU233 - Tolna | Paks, Dózsa Gy. út 95. | 46°37'16.9"N 18°51'14.6"E |
| HU233 - Tolna | Paks, Kápolna u.4-6 | 46°37'20.7"N 18°51'16.8"E |
| HU233 - Tolna | Paks, Táncsics M. u. HRSZ.: 3523/6 | 46°37'19"N 18°51' 23""E |
| HU233 - Tolna | Paks, Táncsics M. u. 13 | 46°37'10.3" 18°51'24.0"E |
| HU233 - Tolna | Paks, Táncsics M. u. 13 (same address) | 46°37'10.3" 18°51'24.0"E |
| HU233 - Tolna | Paks, Dózsa Gy. út 55-61 | 46°37'25.9"N 18°51'28.6 |
| HU233 - Tolna | Paks, Dózsa Gy. út 51-53. | 46°37'26.9"N 18°51'31.5"E |
| HU233 - Tolna | Paks, Dózsa 52-54 Hrsz/cím:396 | 46°37'24.6"N 18°51'29.6"E |
| HU233 - Tolna | Paks, Fehérvári út 29. | 46°37'57.9"N 18°51'07.1"E |
| HU233 - Tolna | Paks, Gagarin u. 2. | 46°36'56.2"N 18°50'32.4"E |
| HU233 - Tolna | Paks, Deák F. u. 4. | 46°37'41.0"N 18°52'03.5"E |

| Duration and process of investment implementation | |
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| **Start date** | **End date** |
| 14.02.2017 | 30.09.2017 (support will be provided until 31.05.2024) |
| **Major milestones of investment implementation** | |

The 11 public buildings have been selected during the preparation phase of TOGETHER. In the 2nd semester market search has been conducted to select the adequate expert for the installation of the system. The contract was signed on 14 Febr 2017. As next step, the energy flows of these buildings have been examined in details and the operating metering systems have been mapped. On this basis the external expert has consulted with the project manager and defined the locations of the new submetering points and types of meters. The data flows have also been discussed and the compatibility with the EMS of the expert & its functions was checked. At first billing meters were planned to be equipped at the premises for the measurement of electricity, but the DSO (E.On) rejected to integrate these meters to its system, therefore control meters have been installed right next to the billing meters. Gas meter communication units and heat meters for the monitoring of the district heating have also been installed. The system was completed by one tablet at each building, which are mounted on the walls of frequented places of these buildings. The system operates from 30 Sept 2017.

## Investment costs (Total costs and ERDF in EUR) including a break-down of main cost items

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

## Ownership and durability of the investment (e.g. maintenance, financing)

The system 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.

## Transnational effect and added value of the investment to the partnership

The investment made it possible to explore the challenges, functions, advantages of different smart metering systems in different countries. The investment of Paks showed, that setting up a smart metering system might be hindered by the Distribution System Operator, which is not interested in integrating new metering elements into its system, which is quite rigid. Billing meters are managed by SAP application, and it is very time-consuming to make any changes in that system. On the other hand the ownership of the meters may also lead to a conflict: when Paks intended to replace the current billing meters to smart meters, the DSO stipulated that the new meters should be paid by Paks but they have to become the property of the DSO. This was not manageable due t project reporting and bookkeeping rules, therefore Paks decided to use control meters. These meters are installed right next to the billing meter, but they forward energy data in every 15 mins to the EMS, what the billing meters don't do. In case of differences between the two meters surveillance of the billing meter can be asked. This experience was introduced to the partnership at the SC meeting in Budapest (3-4 Oct 2017).
Also, process of the meters and the related services could be compared with other partners' SM systems. This comparison was done by University of Maribor in the 3rd period of the project on the basis of the data received from each partner.

## Expected impact and benefits of the investment for the concerened territory and target groups and leverage of additional funds (if applicable)

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).
The investment also serves as an awareness raising tool, as the tablets at the entrances show the energy consumption characteristics to all interested building users and also 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.

## If applicable, compliance with relevant regulatory requirements (e.g. environmental, building regulations, authorisations)

Environmental, construction permits were not necessary. Only agreements had to be made with the users of the involved buildings, that they allow Paks to install the meters. These agreements were managed. As control meters are used in all cases, DSO permissions were also not necessary.

## Contribution to sustainable development - potential effects of the investment on the environment and climate. In case of negative effects, mitigation measures conducted

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. 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.

## Consideration of other horizontal principles such as equal opportunities and non-descrimination (e.g. barrier-free accessibility)

At the buildings all men and women, disabled and minorities are informed in equal way about the energy consumption and they are all involved to the related pilot actions without any discriminations.

## References to relevant deliverables (e.g. pilot action report, studies) and web-links If applicable, additional documentation, pictures or images to be provided as annex

The system is described in the following documents:

- TOGETHER_ partners notebook for the PR3_PP9 Paks
- Description of smart meters/investment