TEMPLATE

Investment report

Version 1

I2- energy monitoring system and upgrades linked to 11 pilot buildings in Zagreb (PA4)

Project index number and acronym	CE51 TOGETHER
Responsible partner (PP name and number)	PP4 - City of Zagreb
Linked to pilot action (number and title)	PA4 - deliverable D.T3.2.4
Project website	http://www.interreg-central.eu/Content.Node/TOGETHER.html
Delivery date	30.11.2017

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

The main task of the smart metering system is the automatization of energy consumption readings for water and energy, entry of the said data in the City of Zagreb Energy Information System. The system schematics are provided hereunder. The basic components of the system include:

- devices (modules) for energy meter readings
- Wireless connection for data transfer to the central comunication unit in each object including repetitors
- central comunication unit for each object,
- ethernet connection of the central unit with the energy information system.

List of equipment on objects:

No.	Object	Installed equipement for:
1.	Kindergarten Gajnice; Kerestinečke žrtve 59, 10000 Zagreb, Croatia	Electricity x 1 Natural gas x 1 Water x 1
2.	Kindergarten Zapruđe; Baburičina 11, 10000 Zagreb, Croatia	Electricity x 1 Heat energy x 1 Water x 1
3.	Kindergarten Cvrčak; Turopoljska 29, 10000 Zagreb, Croatia	Electricity x 2 Natural gas x 2 Water x 2
4.	Kindergarten Vladimir Nazor, Rapska 1, 10000 Zagreb, Croatia	Electricity x 1 Heat energy x 1 Natural gas x 1 Water x 1
5.	Kindergarten Iskrica, Kruge 3, 10000 Zagreb, Croatia	Electricity x 1 Heat energy x 1 Water x 1
6.	Kindergarten Vjeverica, Gračani 9a, 10000 Zagreb, Croatia	Electricity x 1 Water x 1
7.	Elementary School Gračani, Gračani 4a, 10000 Zagreb, Croatia	Electricity x 1 Water x 1
8.	Elementary School Oton Iveković, Stjepana Pasanca 3, 10000 Zagreb, Croatia	Electricity x 1 Water x 1
9.	Elementary School Većeslav Holjevac, Siget 23, 10000 Zagreb, Croatia	Electricity x 1 Heat energy x 1 Water x 1
10.	Elementary School Grigor Vitez, Kruge 46, 10000 Zagreb, Croatia	Electricity x 1 Heat energy x 1 Water x 1
11.	Elementary School Ksaver Šandor Gjalski, Mlinarska 35, 10000 Zagreb, Croatia	Electricity x 1 Natural gas x 1 Water x 1

Investment location

NUTS 3	Address (Street, house number, postal code, city, country)	GPS coordinates
HR041, City of Zagreb, Croatia	Kindergarten Gajnice; Kerestinečke žrtve 59, 10000 Zagreb, Croatia	45.816843 / 15.873557
	Kindergarten Zapruđe; Baburičina 11, 10000 Zagreb, Croatia	45.780658 / 15.997988
	Kindergarten Cvrčak; Turopoljska 29, 10000 Zagreb, Croatia	45.806746 / 16.017806
	Kindergarten Vladimir Nazor, Rapska 1, 10000 Zagreb, Croatia	45.799789 / 15.997372
	Kindergarten Iskrica, Kruge 3, 10000 Zagreb, Croatia	45.798714/ 15.986334
	Kindergarten Vjeverica, Gračani 9a, 10000 Zagreb, Croatia	45.858460 / 15.972448
	Elementary School Gračani, Gračani 4a, 10000 Zagreb, Croatia	45.858841/ 15.973493
	Elementary School Oton Iveković, Stjepana Pasanca 3, 10000 Zagreb, Croatia	45.809784/ 15.922788
	Elementary School Većeslav Holjevac, Siget 23, 10000 Zagreb, Croatia	45.772575/ 15.971420
	Elementary School Marija Jurić Zagorka, Štefanovečka cesta 67, 10000 Zagreb, Croatia	45.821882/ 16.045716
	Elementary School Grigor Vitez, Kruge 46, 10000 Zagreb, Croatia	45.798152/ 15.987183
	Elementary School Ksaver Šandor Gjalski, Mlinarska 35, 10000 Zagreb, Croatia	45.826382/ 15.976990

Duration and process of investment implementation

Start date	End date
02.2017	05.2017

Major milestones of investment implementation

The preparations (documentation) for the public procurement procedure started in February 2017. The procurement procedure was lengthy, as there are several obligations to respect. The contract was therefore signed on June 12, 2017. The installation of the equipment started immediately after contract signing and has been completed by July 12, 2017. The installation part included communication with the service providers, as well as constant monitoring on site.
The equipment is currently in the test phase, which will be followed by on-site training for the users who are to handle the equipment. The mentioned training is planned for the months of September, possibly October, depending on the availability of the users.

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

The table hereunder provides a total account of investment per each building, including the total equipment with installation and guarantees, as well as additional installation material. The Investment costs are the following one:

OBJECT	CONTRACT VALUE	FOR PAYMENT EKONERG (30%)	FOR PAYMENT LENS (70%)	TOTAL	REMAINING TO REALIZE
1.	5.104,74 €	1.299,97 €	3.804,77 €	5.104,74 €	0,00 €
2.	4.096,26 €	1.299,97 €	2.796,29 €	4.096,26 €	0,00 €
3.	5.455,15 €	1.299,97 €	4.155,18 €	5.455,15 €	0,00 €
4.	5.190,21 €	1.299,97 €	3.890,24 €	5.190,21 €	0,00 €
5.	3.891,15 €	1.299,97 €	2.591,18 €	3.891,15 €	0,00 €
6.	3.609,12 €	1.299,97 €	2.309,15 €	3.609,12 €	0,00 €
7.	3.848,42 €	1.299,97 €	2.548,45 €	3.848,42 €	0,00 €
8.	3.848,42 €	1.299,97 €	2.548,45 €	3.848,42 €	0,00 €
9.	3.891,15 €	1.299,97 €	2.591,18 €	3.891,15 €	0,00 €
10.	3.822,78 €	1.299,97 €	2.522,81 €	3.822,78 €	0,00 €
11.	4.908,18 €	1.299,97 €	3.608,20 €	4.908,18 €	0,00 €
TOTAL exl. VAT	47.665,56 €	14.299,67 €	33.365,89 €	47.665,56 €	0,00 €
VAT (25%)	11.916,39 €	3.574,92 €	8.341,47 €	11.916,39 €	0,00 €
TOTAL with VAT	59.581,95 €	17.874,59 €	41.707,37 €	59.581,95 €	0,00 €
Additional clarification:					
EQUIPEMENT exl. VAT	29.186,10 €	0,00 €	29.186,10 €	29.186,10 €	0,00 €
VAT (25%)	7.296,53 €	0,00 €	7.296,53 €	7.296,53 €	0,00 €
EQUIPEMENT with VAT	36.482,63 €	0,00 €	36.482,63 €	36.482,63 €	0,00 €
INFRASTR. AND WORKS	18.479,46 €	14.299,67 €	4.179,79 €	18.479,46 €	0,00 €
VAT (25%)	4.619,87 €	3.574,92 €	1.044,95 €	4.619,87 €	0,00 €
INFRASTR. AND WORKS with VAT (BL6)	23.099,33 €	17.874,59 €	5.224,74 €	23.099,33 €	0,00 €
TOTAL exl. VAT	47.665,56 €	14.299,67 €	33.365,89 €	47.665,56 €	0,00 €
VAT (25%)	11.916,39 €	3.574,92 €	8.341,47 €	11.916,39 €	0,00 €
TOTAL with VAT	59.581,95 €	17.874,59 €	41.707,37 €	59.581,95 €	0,00 €

Since the dashboard procurement was obtained from a different supplier, their cost is shown in a separate table. Each object was supplied with one dashboard.

Name	Quantity	Unit price HRK	Total price HRK	Unit price EUR (con. rate 7,547)	Total price EUR (con. rate 7,547)
Dashboard	12	2.564,00	30.768,00	339,74 €	4.076,85 €
TOTAL exl. VAT		2.564,00	30.768,00	339,74 €	4.076,85 €
VAT (25%)		641,00	7.692,00	84,94 €	1.019,21 €
TOTAL with VAT		3.205,00	38.460,00	424,68 €	5.096,06 €

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

The City of Zagreb retains ownership of the equipment during the project and in the guarantee period. The objects entered in the project are owned by the City, however the object (headmaster) assumes responsibility for the maintenance and proper functioning of the equipment installed.
After project closure, the maintenance costs of the smart metering equipment (battery, connectors…) are transferred to the objects, as is the entire equipment. The software and monitoring are under the surveillance of the City Office for Energy, Environment and Sustainable Development.

Transnational effect and added value of the investment to the partnership

The **transnational relevance of the investment** is embedded in the value of the pilots: the monitoring of the The comparison of local data in real time with that of other project partners allows for exchange of information, learning from others and benefitting from experience of other project partners. The insight into consumption on different geographical areas provides a valuable added value of the investment. The other partners' challenges and communication on the problems we all face provides a valuable experience and is helpful.

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

The installed technical equipment will allow for real time energy monitoring and a faster response to possible problems. In addition, monitoring consumption in real time encourages a more effective change in the users' behavior, as they can see the effects of their actions. Among others, the main benefits to be expected include:

- a more detailed insight into the consumption of specific objects and into consumption habits of object users;
- influencing the user behavior, through the visualization of the positive habits or behavior to be corrected;
- A helpful tool for the implementation of DSM activities;
- improvement of the existing monitoring system;
- the new approach to energy: active involvement of users as opposed to a passive "bill payment";
- education of consumers and raising their awareness;
- active use of analytical and behavioral DSM and merging the two.

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

In case of natural gas readings, the equipment was required to meet the regulation concerning EX-environment conditions. All installed equipment had to be approved by the distributors in order to be installed. The required approvals had to be obtained by the provider of works and equipment installation (as described in the public procurement documentation).

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

By monitoring consumption in real time, where the system automatically informs of deviations from average values of consumption or in case of system breakdowns (such as water leakage), we can act more efficiently and quickly. In that case, we can contribute to a reduction of energy consumption directly resulting in a reduced CO2 emissions, which has a significant effect on the environment and climate. Such monitoring also allows for influencing the user behavior and also more exact recognition of the most successful measures of energy efficiency that can be implemented on objects, which shall have a positive impact on ex. health and quality of life in the city.

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

Sustainable development: the investment contributes 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 the 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 schools fellows.
Equality between men and women: Any activity based on understanding/targeting differences in patterns of consumption for women and men (e.g. awareness raising activities, design of key messages etc.) will guarantee the respect of non-discrimination and will be not used against the gender equality principle.
Environment: a profitable use of the smart meters can leverage EE retrofit investments, that could create conditions to improve the users well-being and environment conditions.

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

References to the relevant deliverables:

- D.T3.1.1 preparatory analysis of the technical and management requirements for instilling smart meters
- D.T3.2.4 PA4 design for 11 building in City of Zagreb – CRO

Additional documentation:

- Pictures of the installations
- Graphic visualization of the system

Pictures related to the smart meters installation and financial details

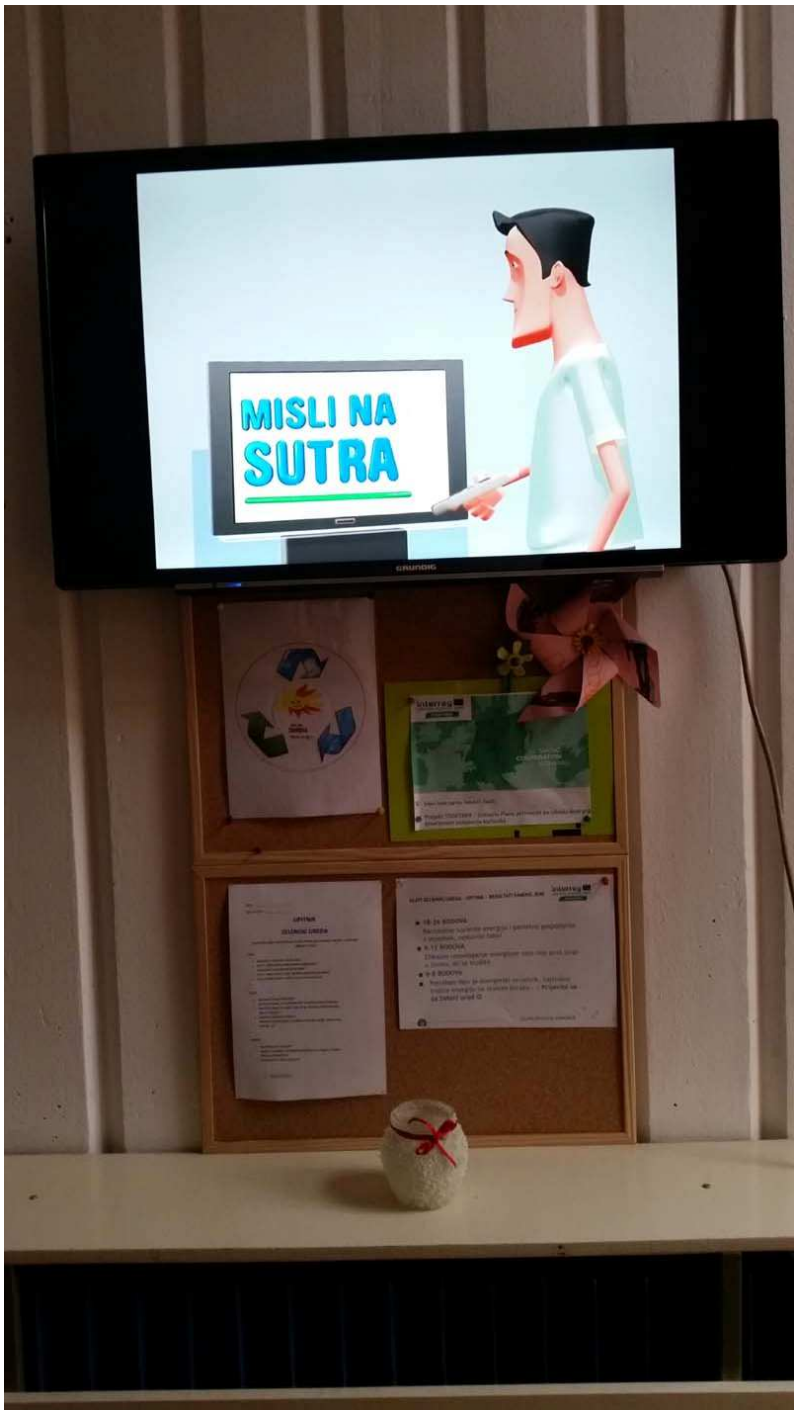
Device for the electric reading

Device for heat energy reading

Device for natural gas reading

Device for water reading

Energy information system used



Dashbaord

OBJECT	TOTAL Without VAT (kn)	AMOUNT VAT (kn)	TOTAL With VAT (kn)	TOTAL AMOUNT in EUR (July, 2017)
Dječji vrtić Gajnice Kerestinečkih žrt. 59	38.525,50	9.631,38	48.156,88	6.496,84
Dječji vrtić Zapruđe Baburičina 11	30.914,50	7.728,63	38.643,13	5.213,34
Dječji vrtić Cvrčak Turopoljska 29	41.170,00	10.292,50	51.462,50	6.942,80
Dječji vrtić Vladimira Nazora Rapska 1	39.170,50	9.792,63	48.963,13	6.605,62
Dječji vrtić Iskrica Kruge 3	29.366,50	7.341,63	36.708,13	4.952,29
Dječji vrtić Vjeverica Gračani 9a	27.238,00	6.809,50	34.047,50	4.593,35
Osnovna škola Gračani Gračani 4a	29.044,00	7.261,00	36.305,00	4.897,91
Osnovna škola Otona Ivekovića Stjepana Pasanca bb	29.044,00	7.261,00	36.305,00	4.897,91
Osnovna škola Većeslava Holjevca Siget 23	29.366,50	7.341,63	36.708,13	4.952,29
Osnovna škola Grigora Viteza Kruge 46	28.850,50	7.212,63	36.063,13	4.865,28
Osnovna škola Ksavera Šandora Gjalskoga, Mlinarska 35	37.042,00	9.260,50	46.302,50	6.246,67
PRICE	**359.732,00**	**89.933,00**	**449.665,00**	**60.664,31**
Note: a detailed list of items will be provided upon the completion of payment of the whole investment.				