CONSUMING LESS ENERGY TOGETHER

An inside story

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Foreword

This e-book comes as a collection of results from the Interreg CE funded project TOGETHER, which has been operational between June 2016 and May 2019 in 7 EU Member States – Croatia, Czech Republic, Hungary, Italy, Poland, Slovak Republic and Slovenia – and 8 regional areas, involving 85 pilot buildings and mobilizing a population of 10,000 building occupants and local stakeholders.

TOGETHER stands for "Towards a Goal of Efficiency through Energy Reduction", remarkably calling for a synergy of efforts and a combination of diverse initiatives as the only realistic way to success when trying to increase energy efficiency by reducing its usage. Indeed, consuming less energy, rather than just using it more wisely, is a very ambitious target in itself. In the case of TOGETHER, it was made even more challenging by the particular settings the project pilots have been framed within: non-residential buildings, owned by the public sector and used for free by a wide variety of occupants, having heterogeneous goals, needs and behaviours, and one only thing in common: none of them pay the building's energy bills by their own pockets, making the economic incentives to a more responsible energy consumption largely ineffective.

Starting from this situation, made even more complicated by the geographical spread of involved buildings and communities, the project partnership has managed to fulfil its promise by delivering an intelligent combination of technological, organisational and behavioural measures for Demand Side Management, where intelligence must be understood in the twin meaning of "data driven" and "occupant focused" interventions.

By a significant extent and with very good persistence across time, these initiatives have led to measurable gains in terms of energy consumption, billing costs and emissions reduction in the built environments involved. These outcomes are even more noteworthy, if one also considers that the actual conditions of many buildings are negatively affected by old age, unsustainable costs or lack of finance to support infrastructural renovation, and in some cases the constraints of historical and cultural heritage protection.

All in all, we consider the evidence gathered and presented in this e-book as a good starting point for both researchers and practitioners interested in learning about novel and effective approaches to group based behavioural change interventions in non-residential buildings.

Antonio Zonta
Project Manager
Province of Treviso

Introduction

Every project is a journey. We are proud to guide you through ours.

It all started about seven years ago, here in Treviso, with the first edition of what has later become known as the 'Green Schools Competition': a contest among local public schools, and classes within each, to showcase concrete initiatives in the direction of ecologically sustainable and energy responsible behaviours. Not just goodwill propositions or commitments to a better future, but documented achievements of purposeful actions, in terms of learning, change and impact.

For us here the Green Schools Competition has meant a lot in terms of financial savings – more than 6 million Euros, or 20% of the initial spend – on the cost of energy supplies to the schools involved in the experimentation. Just another piece of evidence that, if appropriately directed and guided, the building occupants – students in this case – can do a lot by themselves and even more when their efforts in changing behaviour are joined by some targeted infrastructural investments.

Thanks to these achievements and the participative model supporting them, in 2014 the Province of Treviso won the acknowledgment of the European Network of Living Labs, the Brussels based NGO gathering the best worldwide experiences of user engagement in innovation processes. We saw that as an important milestone, but also as an encouragement to proceed even further ahead.

In late 2015, after three years of work and having grasped the low hanging fruits, we were not yet satisfied in full. After an initial experience with the Italy-Slovenia cooperation programme, we felt ready to lead a more ambitious endeavour – in terms of geographical spread, but also number of buildings and variety of target users and stakeholder communities – which resulted into the project we are talking about now.

Not everything went as we had wished, but the lessons learnt and shared with likeminded partners from 6 other countries, some of which are reported in this e-book, and the consistent evidence of effectiveness of the TOGETHER educational methods and engagement tools in influencing individual and group behaviours of the public building occupants involved in our pilots, have reassured us of two things: that a lot can and must be done in complementing energy efficiency measures with demand side management aspects, and that the positive impacts of so doing can justify the efforts – to a very large extent – irrespective of the initial level of maturity of the participant communities.

Indeed, and to quote the 'Treviso Manifesto', popularised about a year ago in the context of one of the dozens of public initiatives organised by TOGETHER at national and international levels in the partner regions, an Integrated Energy Efficiency Strategy, giving appropriate room to behavioural stimuli alongside infrastructural investments and organisational interventions, is highly demanded for the European Public Sector's owned buildings. In that regard, the next step in the long journey towards deeply innovating the current energy management systems will be to take stock of the key results of projects like ours and promote their mainstreaming into national and European policies, legislations and soft regulations.

The Lead Partner's Project Team
Antonio Zonta, Federica Giandolo and Marina Coghetto
Province of Treviso

Contents

OVERVIEW

Facts and findings 9
How to read this e-book 11

CONTENTS OF THE I PART

Our main achievements 13
How we made it 27
The TOGETHER Manifesto 35
The key elements of the TOGETHER Toolkit 39
Interactive map of Europe showing the different locations of the pilots 41
Pilot summary reports 43

CONTENTS OF THE II PART

The many faces of the TOGETHER prism: True stories from the partner regions 69

The 8 Central European regions involved in TOGETHER

Facts and findings

Project title:	Towards a Goal of Efficiency Through Energy Reduction
Acronym:	TOGETHER
Starting date:	1st June 2016
Ending date:	31st May 2019
Number of partners:	8
Number of countries:	7
Number of team members engaged:	About 30
Number of pilot buildings:	84
Number of users/stakeholders involved:	10.000+
Value of public investments mobilized:	Circa € 330.000,00
Number of DSM tools analysed:	50+
Number of new tools delivered:	12
Number of training paths provided:	8
Number of project leaflets released:	4
Number of newsletters issued:	6
Number of public events organised:	50+
Number of advocacy meetings held:	20+
Total energy saved (lighting):	139.531,50 kWh
Total energy saved (thermal):	745.068,56 kWh

The logos of TOGETHER partners

How to read this e-book

The literature on management science is quite clear (and consolidated) in drawing the distinction between a project's outputs, outcomes and impacts. Outputs are named those intended and direct achievements that usually become visible at the end of the related activities. For instance, making a leaflet available in all languages of the programme is a task implying creative writing, graphic design, translations, printing and distribution. In the case of TOGETHER, its activities have been presented in detail in the periodic reports, and most of its outputs are freely downloadable from the official website - www.interreg-central.eu/together - thus we had little interest in duplicating the effort of overviewing them here.

Outcomes and impacts are another story. Both are related to the changes, hopefully not provisional or short-lived, that a project has brought about by fulfilling its goals within and outside the target communities. Both outcomes and impacts, but especially the former, may materialise as intended or unintended. Both can be positive or negative. Both, and especially the latter, usually become visible (if ever so) after the project's end.

This e-book is an early attempt – as it comes up even before the project's end – to go beyond the description of TOGETHER activities and outputs and to show some evidence of its positive outcomes and impacts – with a special eye on replication potentials. Ideally, we would be happy if the reader could be stimulated by her or his interaction with these e-pages to start a personal journey in the

mare magnum of our project results, searching those with the best likelihood of becoming reusable and being reused in his or her context. That would certainly stand quite high among the outcomes and impacts of our endeavour. Indeed, most of the efforts we have provided across the three years of project's lifetime were aimed at ensuring the replication – possibly on a broader scale – of our key achievements, in the same or in other territorial contexts.
This is also why a similar level of attention has been paid to both the innovative processes we were experimenting and to the barriers and constraints we were meeting and facing along the way.

Distilling the drops of knowledge, experience and wisdom accumulated during the project has given life and substance to this e-book, which is structured in two main sections: the first summarizes our main achievements – especially at pilot level, in the 8 participant regions - and describes how we have gotten to them. The second is a collection of 'true stories' from the pilots themselves, having the purpose of communicating the atmosphere and suggesting the direction that – post project – the involved communities are going to take.

The information provided herein was current at the time the e-book was released. For any update or further integration, the interested reader is cordially invited to contact us at:

europa@provincia.treviso.it

Happy reading!

The TOGETHER management team
-on behalf of all project partners-

Our main achievements

There are at least two ways of reading through the project achievements in a synthetic manner: one is to go back to the original TOGETHER proposal's intervention logic – as it was communicated to the evaluators of the Interreg CE call in 2015 – and check whether and to which extent its goals have been fulfilled during the 36 months of project's lifetime. Another approach is to create a sort of logical 'hierarchy' of project outputs, highlighting each other's dependencies and which of them can be immediately reused – either stand alone or in combination – in a different local context to realize which tactical or strategic purposes related to innovative management of energy efficiency in collaboration with public building users. In the next pages, we will adopt these two approaches in sequence.

The following **Table 1** describes the project's intervention logic. With this term we point at the connections between its stated goal(s), outputs and activities. As TOGETHER has achieved most of its intended aims, the main source of information for the second column is just the application form prepared for the Interreg CE programme call. On the third column we added a comment with some evidence to document that achievement, usually available for download at the following URL: https://www.interreg-central.eu/Content.Node/TOGETHER.html for the interested reader to retrieve the associated contents more promptly. For a matter of clarification, we hereby highlight the connections between the items listed on the different rows of the first column as shown below:

Goal(s) → Sub-goals → Outputs → Activities → Sub-activities

The sub-activities consisted in a detailed investment plan supporting the deployment of the project pilots in a way that will be described further below. Globally, the value of these investments has been in the range of € 330.000,00 in the 8 regions participating in the project.

Table 1. The project's intervention logic.

Goal(s)	**Encourage Central European public bodies to adopt managerial Energy Efficiency solutions for their buildings, involving users in energy management practices and reaping benefits in terms of payback and public money savings.**	**In retrospect, these goals have been achieved, as witnessed by the 8 pilot reports (summarized herein), procuring global energy savings of about 884.600 Kwh - and counting - in 85 public buildings located in 7 Central European countries. The energy savings were estimated based on measured data, excluding the effect of smaller renovation in some of the buildings and the seasonal variations.**
Sub-goals	SG-A) Establish an enabling environment and a managerial system for more advanced and integrated Energy Efficiency operations in the public sector, strengthening capacities through institutional & human resource development.	The first instrumental sub-goal has been realised in the 8 pilot communities, according to their specificities and in compliance with a single and replicable approach to capacity building, sharing and implementing good practice examples.
	SG-B) Promote an improved policy framework and political buy-in supporting regulatory and policy instruments finalised to maximize Energy Efficiency in public infrastructures and buildings.	The second instrumental sub-goal consists in the scaling up and out of the pilot results and derives from the successful fulfilment of the project purposes in the different partner locations.

Outputs	O-A.1) Interdisciplinary transnational training model & didactic toolbox for energy efficiency related managerial competencies.	9 versions have been issued with country/region specific adaptations.
	O-A.2) Residential Train the Trainers Master & local training paths to build energy efficiency related managerial competencies/knowledge.	1 Master Course in English + 8 local modules in the native languages of the countries/regions.
	O-A.3) Toolkit containing 3 Energy Management System models.	Delivered in English. The models cover 3 building categories: schools, institutional (office) & other purpose buildings.
	O-A.4) Toolkit containing 4 integrated financial and contracting tools.	Delivered in English. The tools include: an EPIC (Energy Performance Integrated Contract) model, a set of guidelines for energy governance, a set of subsidy & incentive schemes, and a collection of financial instruments to be used jointly with the Demand Side Management tools (see O-A.5 below).
	O-A.5) Toolkit containing 3 Demand Side Management tools.	Delivered in English. The DSM tools include: an analytical method, the related concepts of Building Alliance and Negotiating Panel, and a plug-n-play set of communication and persuasion techniques to procure behavioural changes in the users of the buildings.
	O-A.6) Pilot actions for improving the energy performance of public buildings in involved public bodies.	8 regional pilots as explained above.
	O-B.1) Transnational strategy on how to increase Energy Efficiency in public buildings through integrated approaches.	Including a set of policy recommendations at EU, national, regional, and local levels.
	O-B.2) Comprehensive Policy Package to improve Energy Efficiency in public buildings at	8 updates of the existing Energy Plans at local and regional levels.

	local level through a larger-scale implementation.	
Activities	A-A.0) Creation of an integrated Library of Technical, Financial and DSM measures.	Available online at: http://www.pnec.org.pl/en/together-library
	A-A.1) Development of the inter-disciplinary Transnational Model including a Didactic Toolbox to be adapted at local level.	Leading to output O-A.1)
	A-A.2a) Master Train the Trainers targeting PPs' technical experts for improved in house competencies.	Leading to output O-A.2)
	A-A.2b) Training of target groups.	Leading to output O-A.2)
	A-A.3) Design and development of 3 Smart Energy Management Systems and 1 pilot concept template.	Leading to output O-A.3)
	A-A.4) Design and development of 4 integrated financial and contracting tools.	Leading to output O-A.4)
	A-A.5) Design and development of 3 Demand Side Management tools.	Leading to output O-A.5)
	A-A.6a) Preliminary activities for pilot action. Setting up of automatic energy monitoring measures.	Leading to output O-A.6)
	A-A.6b) Pilot planning based on pilot concept design & tools developed.	Leading to output O-A.6)
	A-A.6c) Pilot implementation and assessment of the achieved energy savings based on energy monitoring systems.	Leading to output O-A.6)
	A-A.6d) Evaluation of pilot action results and continuous peer support.	Leading to output O-A.6)
	A-B.1a) Dialogue with local and regional experts, stakeholders and other target groups.	Leading to output O-B.1)

	A-B.1b) Codification of the building's governance practices into a Transnational Strategy.	Leading to output O-B.1)
	A-B.2a) Elaboration of the Reinvestment Action Plan based on payback and energy saving.	Leading to output O-B.2)
	A-B.2b) Elaboration of the Action Plan for Energy Efficiency in Public Building Stock.	Leading to output O-B.2)
	A-B.2c) Bridging "doers" and "thinkers" for an increased political pledge.	Leading to output O-B.2)
Sub-activities	A-A.6.1) Investment implementation.	Installation or upgrade of dedicated Smart Energy Monitoring Systems in: -20 pilot buildings in Treviso (PA1) -10 pilot buildings in Czech Republic (PA2) - 4 pilot buildings in Maribor (PA3) -12 pilot buildings in Zagreb (PA4) - 9 pilot buildings in Polish cities (PA5) -11 pilot buildings in Paks (PA6) - 9 pilot buildings in Hegyvidek (PA7) - 6 pilot buildings in Slovakia (PA8)

The following table and diagram visualize the logical 'hierarchy' of TOGETHER outputs, having in mind their possible replication in real-life conditions. Taken together, these outputs constitute the permanent legacy of the project and their reuse potential – either stand alone or in combination – will become clearer with the analysis of their interdependencies.

Table 2 below clusters the project outputs (numbered as above) according to their nature – the term 'material' referring to concrete tools, 'immaterial' to activities/strategies – and the possibility of reusing or replicating them in other contexts than those they are originating from. The investments in Smart Energy Metering Systems, though natively 'ad hoc', can also be replicated in other public

buildings of the same or different country. Same goes for the Comprehensive Policy Package to improve Energy Efficiency, which has to do with the scaling up and out phase of TOGETHER results.

Table 2. Overview of project outputs.

	Material	Immaterial
Replicable	O-A.6.1) Smart Energy Metering Systems	O-A.2) Residential Train the Trainers Master & local training paths to build energy efficiency related managerial competencies/knowledge. O-A.6) Pilot actions for improving the energy performance of public buildings in involved public bodies. O-B.2) Comprehensive Policy Package to improve Energy Efficiency in public buildings at local level through a larger-scale implementation.
Reusable	O-A.0) Integrated Library of Technical, Financial and DSM measures. O-A.1) Interdisciplinary transnational training model & didactic toolbox for energy efficiency related managerial competencies. O-A.3) Toolkit containing 3 Energy Management System models. O-A.4) Toolkit containing 4 integrated financial and contracting tools. O-A.5) Toolkit containing 3 Demand Side Management tools.	O-B.1) Transnational strategy on how to increase Energy Efficiency in public buildings through integrated approaches.
«Ad hoc»	O-A.6.1) Smart Energy Metering Systems	O-B.2) Comprehensive Policy Package to improve Energy Efficiency in public buildings at local level through a larger-scale implementation.

More interestingly, however, the graph below outlines the interrelations – and to some extent, the time and logical dependencies – between the same outputs, no longer for the project's intervention logic, which was presented in Table 1, but adopting the perspective of a novice user willing to use the project results in a new and different context.

The staged and convergent process shown on the left-hand side of **Figure 1** – which can also be abbreviated as PIANO, from the initials of the five steps displayed therein – outlines the essential components of the TOGETHER approach to energy efficiency in public buildings.

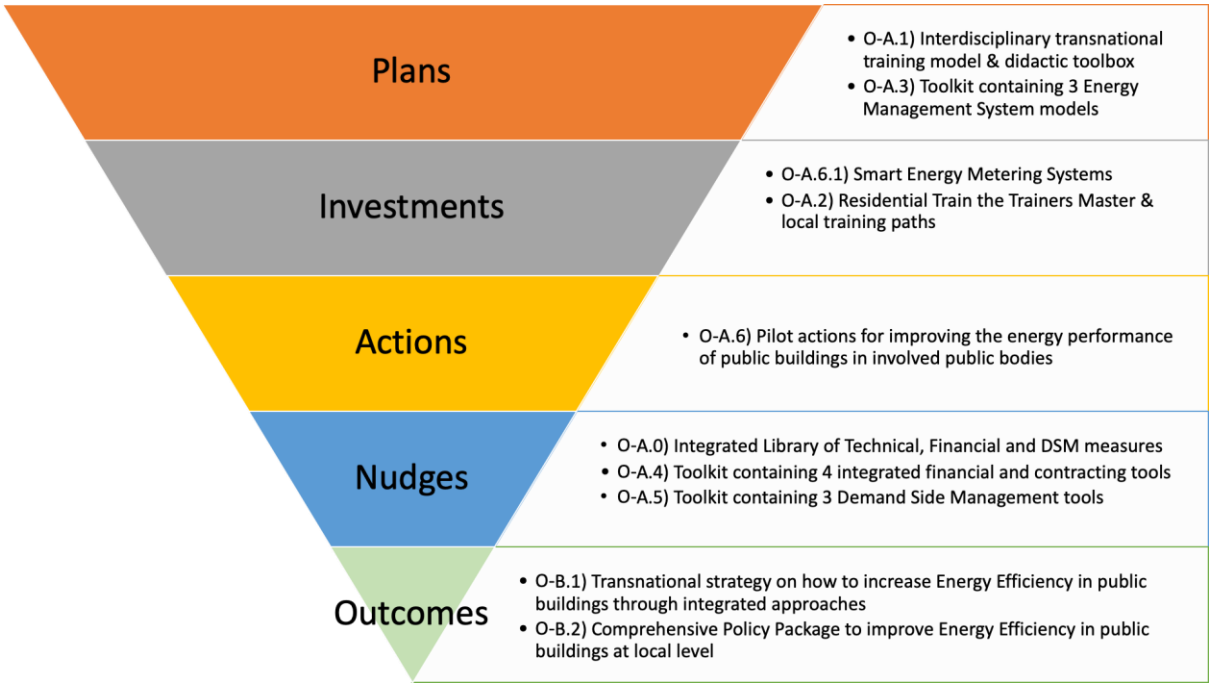


Figure 1. Overview of project outputs.

Let's summarize these steps here below.

Plans

P stands for **Plans**, but also for Problem. Which problem? Basically, the uneven distribution of incentives between a public building's owner and its occupants, as far as energy saving is concerned. Why is this relevant? The answer becomes clear

if we think of our homes. There - generally speaking - the building's occupant is also the one who pays for its energy bills. Thus, the incentive not to waste energy resides with the same person who consumes and pays for it. Ok, this is not exactly true in all cases – just think of a family with children, who need to be trained on energy saving by their parents. Well, this is exactly the problem that TOGETHER has faced. And – as the figure above shows – it tackled the problem as a training challenge, with output O-A-1 aimed to increase the competencies in energy management of the public building occupants. And the problem has been modelled in three different ways, slightly different from one another, depending on the public building's category: school, institutional (office) & other purpose (functional) – such as a gym or theatre. This is output O-A-3 mentioned above.

If that is all true, why naming stage 1 "Plans" rather than "Problem"? Because of the logic of reuse we have adopted in this representation. Reuse of what? Like we said, most of the project outputs are replicable and transferrable, and some have already started being adopted in other contexts. Here the message is therefore: if you are a building owner, start by making plans and the achievement of your next steps will be greatly facilitated. During TOGETHER, we have spent quite a lot of time in planning – maybe too much according to some of us – but it was needed to some extent, because that was the first time that such a structured approach to energy saving was designed and implemented. For future adopters, a reference guide such as this eBook may help save some planning time dedicated to design and facilitate the move to implementation. However, we remain convinced that without

a careful planning effort, none of the following steps would materialize in the desired fashion and we will immediately explain why.

Investments

I stands for **Investments**, but also for Interest. Which interest? The one of the public building owner, to dedicate some time (which is also part of the investment) and put some financial resources forward to tackle the uneven distribution of incentives that has been depicted before. Why do we speak of interest? Because we think we have demonstrated in the course of our project, that there would be a concrete return in terms of energy savings – and therefore, reduction of financial costs for the building owner who pays for the energy bills – if some of the measures gathered in the online library labelled as output O-A.0 were actually implemented. This undoubtedly needs some financial investment – of which however, with the progress of experience and practice, it should become more and more feasible to calculate the expected rate of return.

However, as we spoke of Investments, we need to be linear and clarify what we are talking about. On the one hand, material investments – such as the installation (or upgrade) of Smart Energy Metering Systems in the buildings at hand. On the other hand, immaterial investments, such as the organisation of residential courses for the buildings' energy managers and lead occupants. Indeed, Energy Metering Systems have existed in the state of the art since quite long and many know a lot about their potential. However, within TOGETHER we have added the qualification of "Smart", not because of some super powered technology, but in relation to their integration with Smart Visualisation Systems. In fact, it is our belief and experience,

that the old saying “what can be measured can be done” applies to energy saving in public buildings as to other domains of management science. But visualisation is required to make complex measures of energy consumption available to building occupants - the ones who can do more in terms of energy saving – in terms that are easy to understand in their behavioural implications. In fact, one has to keep in mind that these people are typically not too smart in terms of knowledge of engineering and applied physics. And incidentally, why should they be? What we are interested in at this stage, is to increase their level of awareness of the importance of the topic – it is the collective behaviour of building users that makes its energy performance – and augment their capacity of monitoring the global effects of their behavioural changes across time.

Of course, no visualisation without guidance can ever be fully understood, and this is why proposed investments should also cover the organisation of training courses for the various types of public building occupants (just think of a school: there we have principal, teachers, students, administrative and technical staff, but also parents, external suppliers, etc.). Based on the experience of TOGETHER, it usually proves a key advantage if some lead occupants of a building are identified from the start (in a school: the principal and some professors) and involved in a dedicated training path, such as the one labelled as output O-A-2 above.

Actions

Once the target buildings have been identified and equipped with the energy meters and a certain number of occupants have been trained to understand the meaning of the smart visualisations provided, the time is ripe to start some concrete action, in

the direction of mobilising the whole building community and drive it towards some degree of behavioural change in the direction of energy saving. This is obviously far easier to be said than effectively done. Not by chance, the TOGETHER pilot actions, leading to output O-A-6, were actually split in four activities: preparation, planning, implementation and assessment of results (+ a fifth activity dealing with support and monitoring).

Why such structured **Actions** and activities are required? Because it has been proven and well documented within our project, that in order to move ahead from the level of individual problem awareness – "we must consume less energy, because it's good for the environment" - to that of concrete and hopefully permanent change – "let's continue saving energy together" - far more efforts than simply the distribution of (visual) information to building's occupants are needed. In that sense, even a careful preparation and planning is not enough, and the following step introduces a number of "nudges" – the way we have called them – based on a combination of rational and emotional incentives, the impact of which has been a subject of action-research all along the project, within several implementation trials.

Nudges

A wide collection of **Nudges** – behavioural stimuli and organisational elements, which may counteract the natural reluctance of human beings to change their behaviours and are supportive of the planned energy saving initiatives of the preceding stage – has been provided as a permanent legacy of TOGETHER. These include, first of all, and not limited to, an online library of technical, financial and DSM (Demand Side Management) measures, which we have labelled as output O-A.0

in the figure above. Additionally and more importantly, a toolkit labelled as output O-A.4 of the project has been made available, containing four integrated, financial and contracting tools, in particular: a model of EPIC (Energy Performance Integrated Contract), a set of guidelines for energy governance of the public buildings, an overview of subsidy & incentive schemes, and a collection of financial instruments. Finally, output O-4.5 contains three specific DSM tools: an analytical method, the related concepts of Building Alliance and Negotiating Panel, and a plug-n-play set of communication and persuasion techniques to procure and support behavioural changes in the different users of the buildings. The message here is: a tool for everyone and different nudges for different characters (rational, emotional, etc.) of the people having a role in the energy saving trials.

Outcomes

The **Outcomes** of the project have been manifold. Some of them are summarized in O-B.1 and O-B.2 – the Transnational strategy on how to increase Energy Efficiency in public buildings through integrated (i.e. socio-technical) approaches and the Policy Package to improve Energy Efficiency in public buildings at local level. As stated, the implementation of project pilots has led to global savings in the order of 884.600 KWh in less than 1 year of trials, involving about 10.000 building users in 8 Central European regions. Above and beyond the energy savings, however, a permanent legacy of the project lies in the creation – or recreation, where it was already existing, such as in the province of Treviso – of a local culture that is not only more aware and informed about energy efficiency related issues than it used

to before, but also more ready to collaborate and be engaged in further activities, even after the project's end.

Because saving energy is not a one-off engagement, but a new mind-set that is meant to become more and more widespread in the involved communities!

Do you play PIANO? We do! (from the TOGETHER tutorial, available at: https://www.facebook.com/TogetherPRTV2016/videos/2430173810346198/

How we made it

It's always difficult to standardize creative processes and original approaches to innovation, even more when they involve people and places in such a heterogeneous collection of environments as those participating in our project. However, we felt the need to activate a thorough reflection on the do's and the don'ts in order to make the PIANO process as smoothly replicable as possible. The synthesis of our vision is displayed in the figure below.

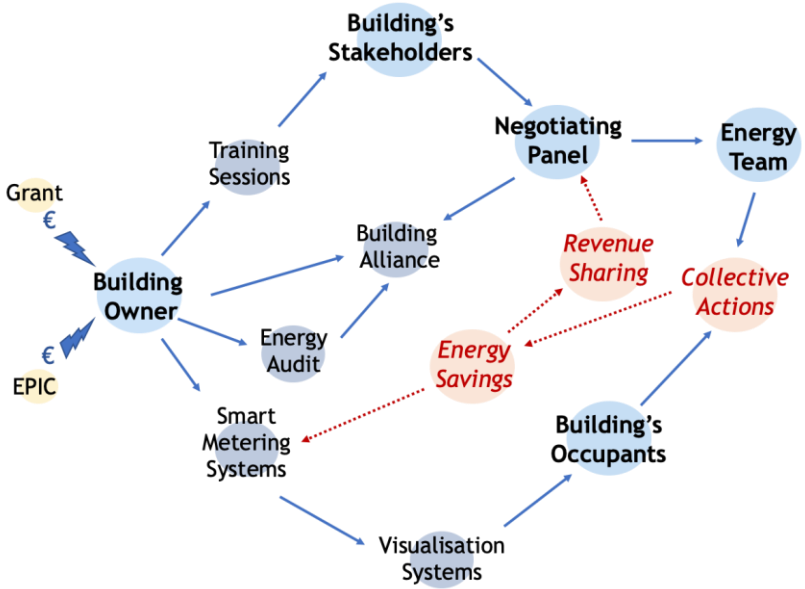
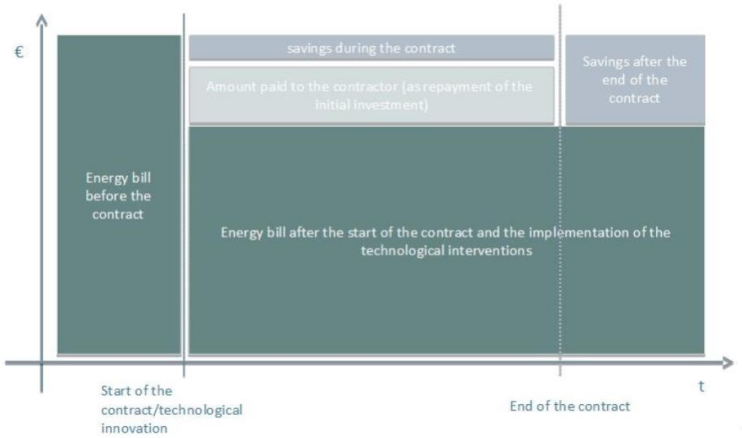


Figure 2. The PIANO process in action.

The starting point, in our case, was the EU **Grant** that made the project possible. However, we are pretty sure that – although very helpful – cash availability is not an essential prerequisite.

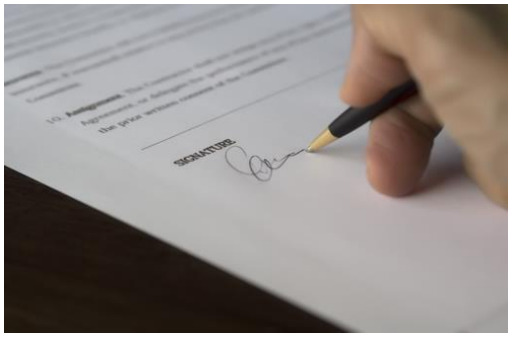
Take the experience of the Province of Treviso: years before the approval of TOGETHER, the Green Schools competition – still operational today - was initiated in the context of a "conventional" contract for energy management, which foresaw the organisation of exemplary and instructive activities in the participating school buildings, involving selected teams of students and professors as 'front runners' and agents of change.



It's within that contract that the financial resources were retrieved to ignite the process, and one of the key outputs of this project, as we already mentioned in the previous section, has been a reusable template of **EPIC** (Energy Performance Integrated Contract) including specific provisions for the promotion of energy saving through a smart combination of 'hard' and 'soft' investments to promote deep user engagement and behavioural change.

Given the available (financial and/or contractual) resources, what has to be done first by a **Building Owner** willing to have a try with our methods and tools? As the figure above shows, basically four things:

- The organisation of dedicated **Training Sessions** on such topics as energy efficiency through DSM (Demand Side Management) for all the **Building's Stakeholders**,



- The negotiation and signature of a **Building Alliance** with a representation of the Building's Stakeholders – that we called the **Negotiating Panel** – based of the results of
- An **Energy Audit** of the Building, helping to assess the critical aspects and the preconditions for future energy saving actions and followed by
- The installation of **Smart Metering Systems** (not disjoint from appropriate **Visualisation Systems**) to measure and share the building's energy consumption records with the whole community of **Building's Occupants**.

Indeed, doing these things takes time, not just for their execution, but to ensure the needed level of preparedness in the stakeholder community. However, in our experience we are talking about a few

months, certainly not years, and the practical advantage of ‘digging the ground’ before seeding or fertilising it has been enormous in our experience.
Incidentally, the project has provided reusable training materials and a template for the Building Alliance, which can be easily taken up and adapted to the specific conditions of the case at hand.

Why an Alliance for the Building? To mobilize and motivate all members of the community involved in a Building’s life – no one excluded: for instance in the case of a school, not only teachers and pupils, but also principals, admin and technical staff, external suppliers, parents etc. – and define a revenue sharing model between the Building’s owner, who pays for the energy bills and would take the most immediate advantage from any progress in energy saving behaviour, and the stakeholders who, at various title, can make a difference in their use of the Building itself. The essence of the Building Alliance is to identify key areas for improvement – based on the results of the Energy Audit – in the global energy management of a building, which may require the active engagement of the building’s occupants. The idea is to follow up on those improvement areas with appropriate energy efficiency initiatives, which are to be listed in the Building Alliance, at least to the highest level, and to “negotiate” the best revenue sharing model (50-50 or else) to make the financial benefits of energy reduction available to everyone, possibly in proportion to their efforts and achievements.

In the experience of TOGETHER, the advantages of signing a Building Alliance are at least twofold:

1) To formally reward the engagement of Building's Occupants in concrete and specific energy consumption reduction actions;
2) To distribute the payoffs and awards according to a predefined rule, after, and not before, the efficiency gains have materialized into lower energy bills.

The second advantage is as important as the first and constitutes one of the building blocks of the project's methodology, which differentiates it from other comparable approaches. In fact, a well-known issue related to behavioural incentives is that people tend to match their engagement with the amount of the expected payoff. Additionally, a sort of inertia makes it so that bigger and bigger rewards have to be promised across time, in order to keep the level of engagement steady, up to a level where even an increased payoff does not even produce a corresponding extra effort. Against this background, the promise of revenue sharing (ideally, in equal parts, 50-50) irrespective of the actual gains, brings with it the possibility of sharing the risk of ineffectiveness of proposed actions between the Building Owner – who will bear no costs in case of failure – and all the Stakeholders of the Building, who will be held responsible for the results of their actions, and behave as if they were really feeling like that.

Of course, the enforcement of a revenue sharing mechanism like the one suggested in the Building Alliance requires a credible and neutral Third Party stepping in on due time to communicate the actual levels of savings and to distribute the benefits according to the agreed rule. This may not be as immediate as one can think of, considering that in most cases a Building Owner has a privileged access to the information based on which the rewards should be calculated.

Also for that reason, in the course of the TOGETHER pilots we experienced the benefit for the project's sake of having not only a Smart Metering System in place, but also a Visualisation System – an ad hoc software creating histograms and flow charts in almost real time out of the building's consumption data, and putting them on display in crowded places such as lounges, canteens and meeting rooms, so that the trends of energy efficiency and indirectly the outcomes of **Collective Actions** could become known to the majority of Building Visitors and Occupants.

As far as the specific contents of those actions are concerned, a wide variety of proposals and ideas have materialized during the project and have been implemented in the different pilot locations. A detailed list and description would be out of scope here, but we recommend looking at the reports prepared by the project partners, which are downloadable from the official website of TOGETHER (https://www.interreg-central.eu/Content.Node/TOGETHER.html), and the "true stories" forming the second part of this publication.

Methodology wise, and as **Figure 2** above shows, those energy saving initiatives have been realised by the Building's Occupants and Visitors under the supervision of an **Energy Team**, appointed by the Negotiating Panel and composed by representatives of all the major stakeholder categories of the Building. Their benefits in terms of revenue sharing have been quantified according to the rules stated in the Building Alliance and ultimately materialised in two alternative ways – cash or kind – after one year of experimentation, using the previous year's consumption data as benchmark.

However, above and beyond the energy savings and the resulting financial benefits, what is relevant to note in terms of outcomes is the (re) creation of a local culture, more environmentally sensitive, prone to collaboration and socially responsible than it used to be.

Overall, we consider the process depicted and commented in this section easy to replicate and very fruitful in terms of results.

The TOGETHER Manifesto

Mid way through the project, the early results of the TOGETHER pilots were so encouraging that we decided to launch a public reflection and live discussion on their implications for a new concept of (User) Integrated Energy Efficiency of Public Buildings, which we liked to name "**Energy Efficiency 2.0**".

The discussion and reflection took place in the context of a national workshop held in Treviso on 7 February 2018, landing into the signature of the so-called "Treviso Manifesto" (meant for an Italian audience), the full English translation of which can be retrieved online here: https://www.interreg-central.eu/Content.Node/TOGETHER/TOGETHER--Manifesto-EN.pdf


Energy Efficiency 2.0*
Measurement, behaviour and CO2 footprint in public buildings
Manifesto

The key concept of the Manifesto – which also explains the use of the word "Integrated" – is that a stand-alone approach to increasing the Energy Efficiency of Public Buildings, focused on purely technical aspects such as the renewal of obsolete infrastructures, certainly yields good results but does not grasp the full potential of introducing, in parallel to or in substitution

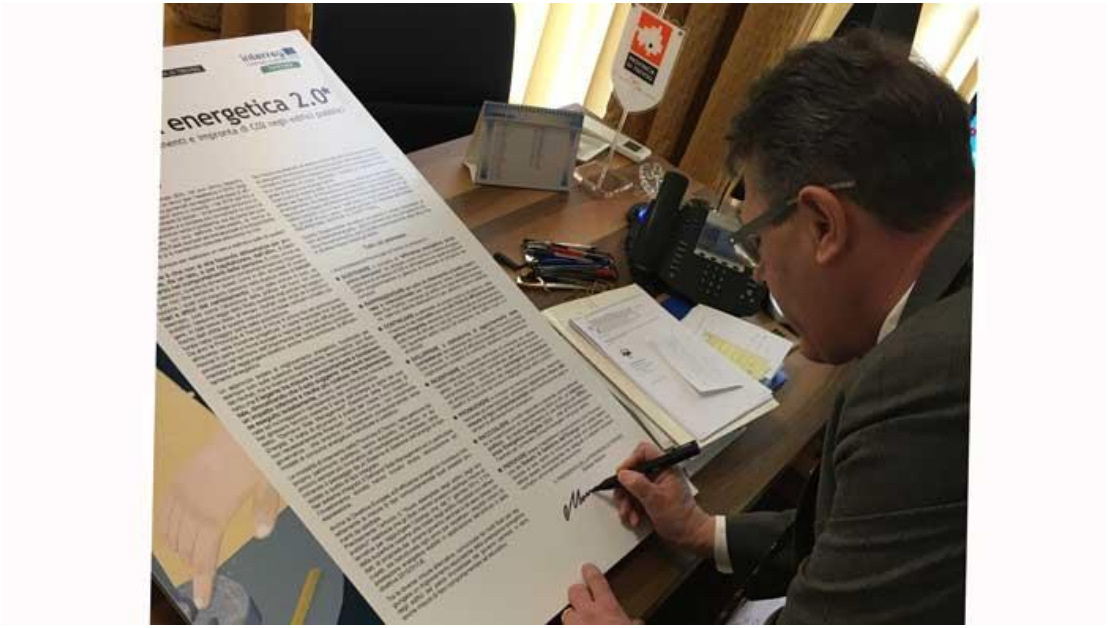
for some ‘hard’ investments, specially designed measures to encourage behavioural change of building’s occupants.
Additionally, ‘soft’ investments may be the only viable alternative to no action at all, whenever the frail status of public budgets prevents the commitment of building owners to the required extent of technical interventions.

Even the European Directive on Energy Efficiency of Public Buildings (2010/31/EU) has recognized the relevance of educational and behavioural change measures, as alternative solutions to the restructuring of central government buildings required to meet the obligation that at least 3% of them every year are made to comply with the minimum energy performance requirements set out by Article 4 of the same Directive.
The experience of the Province of Treviso and other partners in the adoption and implementation of DSM (Demand Side Management) methods and tools within the TOGETHER project pilots is so positive that allows speaking of a viable transition from a **stand-alone** type of Energy Management System to an **Integrated** version of it.

Behavioural measures, however, need to be supported on a continuous basis to be structured and work adequately and consistently. This requires, among other things, an appropriate legislation or regulation that endorses and systematizes existing efforts and contributes to spreading and scaling out to more and more implementation cases.

A possible idea would be to create an obligatory profile of Energy Efficiency Manager in each public building, similar to the Responsible of Risk Prevention and Protection, but with a specialisation in facilitating and managing the integration of behavioural measures with other, more conventional, restructuring and renewal interventions.

The President of the Province of Treviso, Stefano Marcon, signing the Manifesto (February 2018)



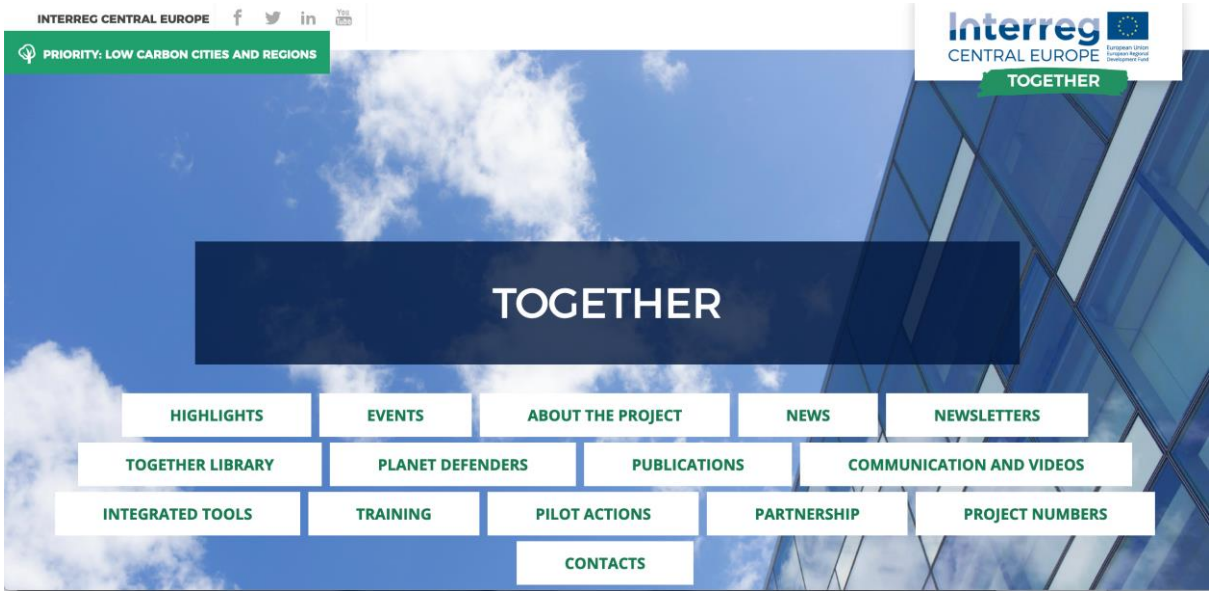
The key elements of the TOGETHER Toolkit

To summarize, the key elements of the TOGETHER Toolkit that the project has delivered to the public domains can be retrieved at the following links:

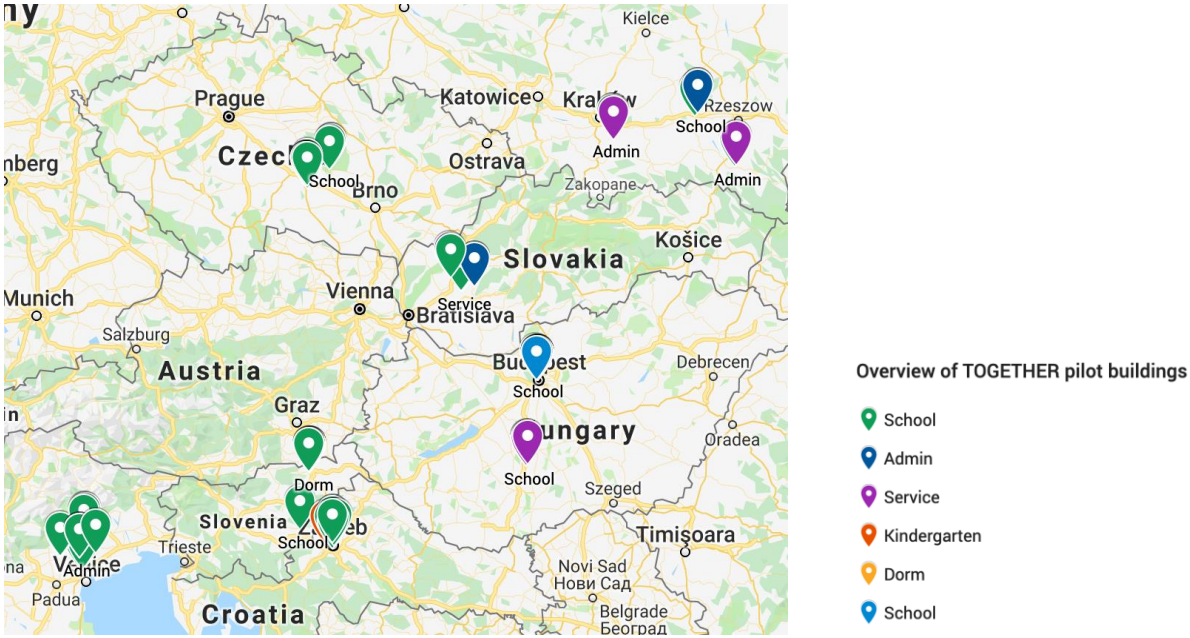
https://www.interregcentral.eu/Content.Node/TOGETHER.html

http://www.pnec.org.pl/en/together-library

The official website of the project



Interactive map of Europe showing the different locations of the pilots



The above map can be accessed online at the following URL:

https://www.google.com/maps/d/u/0/viewer?hl=en&mid=1Fy58HG59VZxM3-6rOK-JwDzNGSg&ll=48.43729001483957%2C18.78729518749992&z=6

Pilot summary reports

Additional evidence and reports from the pilot locations can be retrieved here:
https://www.interreg-central.eu/Content.Node/TOGETHER/Pilot-actions-snapshot.html

Summary report from Treviso, IT

More evidence here: https://www.interreg-central.eu/Content.Node/TOGETHER/PP1.pdf

The Province of Treviso has been working on a cluster of buildings that are owned and managed either directly or by involved Associated Partners, for a total of 20 including 6 primary schools, 4 lower secondary schools, 8 upper secondary schools, and 2 institutional buildings. The TOGETHER pilot actions triggered a process of change of all users who lived and managed those buildings, by giving them an instant measure of the effectiveness/ineffectiveness of the activities undertaken, thanks to some initial investments in devices for the real-time detection and monitoring of electricity and heat consumption.

Two types of smart meter solutions were implemented:

A) Installation of new metering devices in the 12 buildings belonging to the 10 Associated Municipalities;

B) Enhancement of existing metering devices in 4 buildings belonging to the Province of Treviso.

Collected data on energy consumption accrued to the Province's IT server and leveraged an already operating visualisation system, which has now become a support infrastructure for the 10 municipalities in which it was tested for the first time.

All these pilot buildings have been concretely involved in a wide range of technical, organisational and behavioural measure experimentations, including, though not limited to, selected investments in infrastructure renewal, a deep revision of the current use of the building spaces, the use of serious games, school competitions, creation of posters and other graphic/video tools to communicate the correct behaviours to adopt, gentle pushes, analyses of consumption data, surveys on building use, peer education initiatives.

The project enabled a huge transfer of know-how to the building communities and put an end to a stand-alone energy management practice based on the passive payment of energy bills and on the automatic fulfilment of demands for more energy coming from the various building communities.

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Summary report from Zagreb, HR

More evidence here: https://www.interreg-central.eu/Content.Node/TOGETHER/PP4.pdf

City of Zagreb

The TOGETHER project in Zagreb included the participation of 12 buildings, of which 6 kindergartens and 6 primary schools. The main aim was to encourage behavioural change in children (as they were the main target group), as well as raise their awareness concerning the issues of energy and energy saving. Aside that, the project activities and their implementation were designed so as to include adults (mostly the building staff and teachers, as well as the children's parents) and encourage them to change their attitude towards the issues of energy consumption, waste and saving.

To achieve those aims, the City of Zagreb first organized and implemented two onsite training workshops- one in a kindergarten and one in a primary school included in the project – and then three advocacy meetings and eight stakeholder group meetings in order to present the project results.
At the beginning of the project, the schools and kindergartens formed Energy teams - groups of students, teachers, principals and caretakers who took it upon themselves to monitor activities implementation in the building as well as to work with other individuals (both children and adults) and raise their awareness, thereby permanently changing the behaviour of building users.

Some of the activities organized included: production of films, integration of additional topics – such as the connection between energy saving and environmental protection, or between energy saving and sports – into the project activities, organizing “eco patrols”, creating promotional and awareness raising campaigns, etc.

The project pilots also included a daily monitoring of energy, water and heating consumption data, using the measurement devices provided – luxmeter, energy consumption meter and thermometer – as well as an educational game developed for the purposes of the project, “Planet defenders”, which was received quite well, as it allowed the topic to be presented to children in a fun and interactive way.

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Summary report from the Vysočina region, CZ

More evidence here: https://www.interreg-central.eu/Content.Node/TOGETHER/PP2.pdf

Energy Agency Vysočiny

The Czech pilot activities were aimed at increasing the energy efficiency of 10 educational buildings. Due to fact that the Czech Associated Partner – Vysočina Region - owns all the high schools and gymnasiums in the region, EAV as project partner decided to work on that typology of buildings.

To start with, a number of meetings were held with the school principals, who were happy to share their issues and problems in relation to the buildings. Thanks to EAV's liaison with the Region, those issues were immediately translated in terms of action requirements for the building owner, e.g. necessity of energy retrofitting and/or other interventions.

The following step was to analyse in depth the existing technical equipment of each building (heating, cooling, lighting systems, etc.) to prepare for smart meter installation. Not all of the buildings were equipped with a smart metering system for automatic data collection; in five of them, manual procedures were preferred – janitors and caretakers gathering consumption data on a weekly basis. Electricity, Gas and Heating data were all considered as relevant for the Czech case.

Later on, EAV initiated some raising awareness campaigns in the buildings. For the whole duration of the pilot, students were introduced to project related issues and could gain knowledge and advice in the fields of energy efficiency and waste management. After the project's end, an additional interest has emerged in water consumption and savings.

Pilot implementation was different in the various school buildings based on the respective community interests. EAV used an Energy audit toolkit as a practical example for students. For instance, gymnasium students have learnt how to work with thermo cameras, multifunctional meters, laser distance meters, IR thermometers, and clamp multimeters. In addition, they became acquainted with other metering systems with which EAV work on a daily basis too: CO2 meters, Humidity meters, Lux meters, etc. In the buildings where smart metering systems were installed there are public displays, where students could see the consumption data and act accordingly. In school buildings with manual data collection, students were made acquainted with consumption data on a monthly basis.

The pilot activities were carried out in close cooperation with teachers and schoolmasters, who worked with students on evaluating monitored data and giving appropriate feedback. Some teachers took benefit from the TOGETHER study materials and this has helped EAV in enforcing energy efficient habits.

Cooperation with school caretakers were very close too. Due to fact that they know their buildings very well, we needed them during installation of smart metering systems. We were in touch with them on a daily basis.

The involvement of pupils was supported by educational stories (mainly the Planet defenders' interactive game, which is commonly used in English language as a combination of English language and physics teaching), posters, labels, notice boards etc. Another important activity was the exchange of experiences between students from various pilot schools, when they could meet each other. Study visits for some students were organised to that purpose, in cooperation with the Chamber of Commerce of the Vysočina region, which covered the costs of the trips.

The pilot action activities were disseminated to Kindergartens using educational stories for children ("troll workbook") in combination with EAV's Hedgehog mascot, which helped children in non-verbal way to understand what was being explained to them.

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Summary report from Maribor, SI

More evidence here: https://www.interreg-central.eu/Content.Node/TOGETHER/PP3.pdf

The University of Maribor decided to run the pilots in 7 own buildings (2 educational and 5 dormitories). Only in 4 of them a smart metering system was installed, but consumption of energy was analysed in all buildings using existing measurement systems. The new smart metering systems consisted of: regulation equipment, smart meters, electric cabinets and fine material. Each of the four buildings had their own system that was not combined with any other, assuring that each worked independently, without external interferences.

One educational building, the Faculty of Energy Technology, was in Krško, while the other 4 were student dormitories and one larger building hosting 3 faculties: the Faculty of Education, the Faculty of Arts and the Faculty of Mathematics and Natural Sciences.

Targets groups in buildings included:

1. Students and visitors of Students' Dormitories;
2. Staff in the Students' Dormitories (Management and Technical staff);
3. Students and visitors of four Faculties (two buildings);
4. Lecturers, tutors and other employees at Faculties.

Student dormitories did not host permanent in-house staff from the Faculties, and the students living therein as tenants of rooms had a big turnover, so that despite the longer presence or stay of some

of them, we are talking about buildings that feature most of the characteristics of functional or institutional buildings.

With the pilot we wished to trigger behavioural change in all people who live in and/or manage the buildings, by giving them an instant measure of the outcomes and of the effectiveness/ineffectiveness of energy savings activities undertaken by them. This has required the execution of investments in devices for real-time detection and monitoring of electricity and heat consumption, enabling immediate visualization and thus facilitating objective evaluation. The following parameters have been acquired:

- Fuel consumption,
- Heat consumption,
- Consumption of energy for domestic hot water preparation,
- Consumption of water and
- Indoor comfort (temperature, humidity and illumination).

However, the core activity of the project has been the implementation of behavioural and organisational interventions that have led to a more aware and rational use of energy by users. The main goal was to achieve energy efficiency in all pilot buildings. Behavioural measures and communication were oriented to raise awareness of public buildings' users (managers, employees and end-users: students, visitors) and change their behaviours to achieve more efficient use of energy.

Behavioural changes were achieved by:

- informing and raising awareness of target groups (users) by displaying data on Big screen (LCD) at the traffic places (entrance in building, hallway) with all relevant measured data (temperature, humidity, current energy consumption, current water consumption, …);
- established TOGETHER Energy Info Point – presenting general data; data on electricity consumption and heating;
- implementing training on monitoring systems to raise awareness of owners/managers/users of public building on the amount of saved energy from particular behaviours:
    - turning on/off lighting, computers… - users;
    - the potential for new investments and measures based on the consumed energy per square meter – owners;
    - the possibility for optimization of operational parameters (e.g. heating curve: supply temperature vs. outdoor temperature) – managers;
- creating and disseminating posters, labels (11 types for saving energy: electricity, water, heating) and tips on energy efficiency for owners, for managers and users of public buildings translated into Slovene language;
- organising Negotiating panels where presenting project activities and results, discussed how to raise awareness of owners/managers/users of public buildings and looking for solutions for increase energy efficiency in those buildings;
- creating graphic/video tools to raise awareness and published then on project website and UM/FE website;
- implementing Multichannel campaign:

(1) uploaded interactive game Planet Defender and Green Encyclopaedia in Slovene language the website http://www.planetdefenders.si/ to be accessible to wider public;
(2) Competition “Saving Energy TOGETHER”.

Regarding organisational interventions, all the negotiating panels have considered the possibility of a better organisation to achieve more efficient uses of energy and possible savings.

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Summary report from Hegyvidék, HU

More evidence here: https://www.interreg-central.eu/Content.Node/TOGETHER/PP7.pdf

The Municipality of Hegyvidék has been working on a cluster of public buildings that are either owned and used by the Municipality or owned but used by renters, for a total 9 pilot buildings that are:

- 1 drawing (secondary school), renters
- 3 kindergartens,
- 1 headquarter building of the Municipality
- 2 office buildings, renters
- 1 sport centre with swimming pool, partly rented
- 1 cultural centre

Technological experimentations within those buildings consisted in the installation of smart devices, accompanied by relevant training sessions to achieve an increased ability to monitor and analyse consumption scenarios. In turn, behavioural experimentations have comprised a series of pilot activities common to all the buildings and other more specific, defined by the individual working groups.

Pilot activities were organised according to the following steps:

1. Establishment of a mixed work group, composed of as many subjects representing the building and sub-categories of users, called Negotiating Panel. The Negotiation panels (Energy commandoes) role was to identify energy leaks in their own buildings, to support behavioural change with taking actions;
2. Implementation of energy audits that have suggested a list of necessary interventions to improve energy efficiency in each building. These suggestions had been presented to the negotiation panel;
3. Implementation of a survey of issues concerning building use realized by the working group called Energy commandoes (social audits);
4. A series of trainings carried out on the basis of common Together Training Package;
5. Verification and analysis by the working group of the results of energy audits and surveys;
6. Acquisition of skills and knowledge to leverage the potential of sensors;
7. Identification of critical points and definition of an intervention plan (organizing workshops, creating communication materials etc.);
8. Implementation of awareness raising activities, workshops in each pilot buildings with active communication;
9. Using the results of the awareness raising activities, workshops to implement interventions in each building;
10. Preparation of the so-called Building Alliance

During all pilot activities Demand Side Management (DSM) and gamification materials has been used and communicated connected to energy saving and energy efficiency. These materials have been made with the support of the Municipality by the working groups. One of the main communication tool was “Humphry the little troll” as a brand (created by the drawing school), who was visible in a colouring book for children, on stickers for different places in kindergartens like light switches etc. and as an online Facebook game called “Energy vampires”. Also the drawing school made other posters and stickers connected to energy saving for all pilot buildings, and has been implemented in each building.

Each Negotiating Panel has approved a Pilot Concept (meant as a Building Action Plan) preparing the approval of the so-called Building Alliance, for a total of 9 Alliances to be signed by the end of the project.

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Summary report from Slovakia

More evidence here: https://www.interreg-central.eu/Content.Node/TOGETHER/PP8-SIEA.pdf

Under the supervision of the Slovak Innovation and Energy Agency, pilot actions were conducted in 6 public buildings, each with specific needs and different implementation possibilities:

- 2 elementary schools – Výčapy-Opatovce, Rišňovce
- 2 Kindergartens – Veľké Kostoľany, Rišňovce
- 3 Institutional buildings – Rišňovcce, Výčapy-Opatovce, Veľké Kostoľany

At the beginning of each pilot action we focused on an introduction of TOGETHER and its aims and benefits. We used tools and language appropriate for group of attendants the pilot action was dedicated to. We could divide the audience into 2 main groups according to the age: the first group was consisting primarily of students and kids, about 4-15 years old, while the second group were adults working in public buildings (administrative and office clerks, local managers, engineers, teachers).

We have paid a large amount of attention to understand the special needs of the specific groups and find the right approach for them to profit as much as possible from provided materials, activities, workshops and discussions.

According to the received feedback, the interest increased even after pilot activities were over because we have been successful in having people making commitments to undertake specific actions.

Adult audience was of a great challenge. Influencing someone who does not have a direct financial impact on the costs is quite difficult. We are happy to have had the opportunity to conduct workshops and activities to the audience that was interested and even though their capacities were limited, they engaged themselves deeply into the discussions.

Last but not least, pilot actions covered not only educational, but also energy management activities. Sometime after the installation of smart metering system, SIEA started with analysis of gathered data. The findings have been frequently discussed with mayors and building managers in order to improve energy efficiency. We are at the beginning of this process, but it is already possible to see some results.

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Summary report from Poland

More evidence here: https://www.interreg-central.eu/Content.Node/TOGETHER/PP5.pdf

The Polish pilot engaged 9 public buildings from 3 municipalities (3 administration buildings, 4 educational buildings and 2 service buildings) in energy saving activities integrating analytical and behavioural approaches to reduce energy consumption & related costs.

Analytical measures included carrying out energy audit and installation of smart metering systems with dedicated software enabling better energy management, setting up alarms, etc. Behavioural measures, on the other hand, included encouraging change of building exploitation and maintenance routines, as well as change of user behaviour based on better awareness of the building, energy and energy saving methods.

In order to create a sense of rivalry and strive for the highest possible savings a competition for the "energy-saving master" was organised with the building teams being rated both for the level of savings achieved and for completing relevant tasks on the path leading to them (with some extra points to be obtained for special creativity and finding "untypical" ways for energy saving).

6 tasks were prepared and given to the building team and PNEC's staff helped with the execution of some of them on the spot.

The tasks were:

(1) internal energy review/audit of the building;

(2) social audit of the building;

(3) exploring and using heat saving potential;
(4) exploring and using electricity saving potential assoc. with lighting;
(5) exploring and using electricity saving potential assoc. with electric appliances.
Each task was accompanied by a report template to be filled in by the building teams.
The teams were encouraged not only to explore building's energy saving potential but also to implement some of the measures identified (mostly low-cost and no-cost). Their job was to also engage building users in energy saving efforts as much as possible. In between the tasks the building teams received short thematic newsletters with further food for thoughts and energy-saving tips.

Installed smart metering systems were very important element of the pilot action, as they did not only allow real-time monitoring of electricity & heat consumption and seeking possible optimizations, but also to give immediate feedback on the results of implemented measures.
This experience is also being used for delivering "Reinvestment action plan" (for the allocation of financial savings achieved in further Energy Efficiency measures) and an "Action plan for energy efficiency in public buildings" (aimed at introducing project tools into a wider range of buildings).

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Summary report from Paks, HU

More evidence here: https://www.interreg-central.eu/Content.Node/TOGETHER/PP9.pdf

PAKS
az együttműködés városa

The pilot had two main aims:

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 solve these issues and reduce energy consumption in general by eco-conscious behaviour.

The two aims framed two different actions. To define the energy characteristics of involved buildings, their energy flows had to be measured and compared across time and with other similar buildings. For this the smart metering system was installed with an Energy Management Software already available before the TOGETHER project started. This investment was completed in all 11 pilot buildings of Paks in September 2017. Data was collected in different ways depending on the energy source (gas, electricity, heating). The Energy Management Software analysed the consumption and created reports upon request. The consumption values and the consumption curves could be checked online and they were also projected by dashboards on tablets installed at the 11 pilot buildings of the municipality. The software created reports for the periods defined by the users and also analysed consumption data in order to provide the possibility to decide what capacity is necessary at the measured buildings.

Data was transmitted by wireless transmitters. Optical data reading was also possible. Dashboards were located in each measured building, usually at the entrance in order to reach the maximum possible number of persons in the building. The dashboards showed the current consumption measured by the meters of the buildings (different from building to building: electricity was measured in all buildings, while gas or heat was measured at some buildings only). Curves of different time periods could be also visualized. The dashboards are 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 in this way for the benefit of 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, the Municipality of Paks organized bilateral discussions with building managers, printed 2800 stickers for switches and taps, realised 60 posters in 3 versions for awareness raising, made available 5000 pieces of A5 leaflets with energy saving tips for building users, and several A3 posters that described the functioning of smart metering and energy management systems. Besides that, corporate newsletters were issued and the project's findings have been integrated in the education curricula of the Energy Secondary School.

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The many faces of the TOGETHER prism

True stories from the partner regions

For more true stories on the Central Europe programme you can always contact:

https://www.interreg-central.eu/Content.Node/cooperationiscentral.html


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TRUE STORIES FROM TREVISO

End users should put themselves in the owners' shoes

My name is Marina, I'm an engineer and a technical officer of the Province of Treviso. Until some years ago my main activity consisted in supervising building sites for the construction of new schools or the enlargement of already existing ones.

For some years I've been dealing with the management of the energy system of the buildings belonging to the Province of Treviso and, consequently, also with the European project TOGETHER, Towards a Goal of Efficiency Through Energy Reduction, financed within the CENTRAL EUROPE programme, which aims at improving the Public Administrations' ability to increase their buildings energy efficiency

It's a project approved in 2016, with a duration of 36 months and a budget of 2.330.175,75 Euros co-financed by the European Regional Development Fund. The project has been eagerly pursued by my manager, Antonio (Director of the Buildings estate and public tenders Department) who, together with Federica (TOGETHER financial manager for the European Relations Unit), successfully co-wrote the project proposal. TOGETHER was approved by the European Commission on 16 December 2014, in the first call of the CENTRAL EUROPE programme 2014-2020, within the framework of the cohesion policy of the European Union! It's a programme of so called European Territorial Cooperation. Among the thematic priorities that can be financed by the programme, the second priority focuses on "cooperating on low-carbon strategies in CENTRAL EUROPE", and it is within this one that the project TOGETHER successfully applied way back in 2015.

How can the project TOGETHER and our pilot actions be described in short? Let's start from the formula of the International Energy Agency…

The International Energy Agency claims that the result of action aimed at reducing energy consumption is represented by the following formula:

Result = potential x acceptance

And if mathematics is not an opinion, every number multiplied by zero gives zero.

It must be said that change for the sake of improvement starts, first and foremost, with acceptance and awareness of the current status.

As a result, resistance to a situation or state that is not accepted can create tension and hinder the possibility of change, continuing to perpetuate an unwanted state of things.

How can we promote acceptance?

Acceptance is learned through knowledge and awareness: in our specific case, accepting that behaviours can be more or less energy-intensive, and highlighting that they have an influencing effect serving as a multiplier of the final result concerning a building, be it public or private.

In a private building, the advantage is that the energy bill is almost always borne by the end user, the consumer, whether he or she is wise and parsimonious, or a "serial" consumer.

In a public building instead, those who pay the energy bill are almost always far away from consumers and fulfill their financial responsibilities often without asking too many questions and exploring the possibility of leveraging technology to lower bills (sometimes technology pays off through financial schemes), as well as organizational/managerial (e.g. reducing building vacancies, concentrating the activities in a floor, etc.) and behavioural improvements, the latter aiming to change user behaviour.

In public buildings, there is often an overlap of roles and responsibilities as a result of which sometimes buildings and parts of them become "no man's land".

All types of possible activities can therefore essentially be traced back to a concept of behaviour understood as a “way of the individual to behave vis-à-vis his/her surrounding environment”. First of all, it is perhaps necessary for the owner of a building to begin by modifying his/her behaviour within work strategies and devise a model aimed at consumption containment: the owner should become a sort of “good family man”, thrifty and attentive to costs. The owner must also update, understand, and invest time in training and updating skills to trigger change.
Similarly, the manager of a building should identify the margins for improvement and optimization of the use of space by making organization decisions without the fear of questioning old and cemented organizational approaches that are implemented as a matter of habit, rather than for actual necessity. The manager must question, understand, and invest time and resources to carefully study the buildings in which there are possible concrete areas of intervention.
Lastly, the end user should “put himself in the owner's shoes”, sometimes reawakening a mild civic consciousness to start thinking about bad habits that are repeated almost automatically and, by extension, reset innate energy conscious attitudes.

But how can we leverage awareness to trigger a process of change in an energy management system that has both technological and human components?

This is what our pilot activities are for! They intend to trigger this process of change or, better yet, to 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 therefore visualization and immediate and objective evaluation. In the case of the TOGETHER Project, Investments made in devices for the real-time detection and monitoring of electrical and heat consumption.

In Treviso, we performed two types of technological tasks:

- Fitting of 12 municipal buildings with new monitoring system, unprecedented in any municipally-owned building;
- Integrated sensors already installed in 2012 in 4 school buildings owned by the Province with an upgrade to the system that accounting separately for consumption in the gym, a place generally used by multiple users (including non-students) and, therefore a “no man's land”.

Collected data transits through the Province's server and leverages an already decoded IT system, monitored by provincial staff that performs Energy Management activities and which has now become a support structure for the 10 municipalities in which the complexity of the entire operation is now being tested for the first time.

The know-how transfer operation found in the project the necessary funds and an opportunity to put an end to an energy management system based on the passive payment of energy bills and on the automatic fulfilment of demands for energy by schools.

To these ends, the pilot activity of the Province of Treviso involves 20 buildings, 18 of which for school use and 2 institutional buildings that house the administrative offices of two municipalities.

Of these 20 buildings, 8 of them belong to the real estate assets of the province of Treviso and since 2012 are being monitored and involved in activities that elicit users’ awareness, even if with a different degree of resourcefulness and response. The buildings owned by the municipality and municipal bodies (which will become the owners of the devices and that, from the end of the project,

will contribute to the payment of system maintenance) are involved in a project of technological and behavioural experimentation.

If technological experimentation consists of the installation of devices, as well as in relevant training and increased ability to analyze consumption scenarios, behavioural experimentation comprises a series of activities common to all the buildings and for specific activities defied by the single work group.

Common activities are identifiable in the process of:

- Constitution of a mixed work group, composed of as many subjects representing the building and sub categories of users;
- SWOT survey of issues concerning buildings realized by the working group;
- Verification and analysis by the working group of the results of energy audits;
- Acquisition of skills and knowledge to leverage the potential of sensors;
- Identification of critical points and definition of an intervention plan;
- Identification of a consumption reduction target in a partnership which defines the allocation of savings;
- In high schools, the administration of a social audit that is functional to understanding knowledge of school population in matter of energy issues and their degree of awareness of the impact of one's choices on consumption;
- Focused work with some target groups;
- Assistance in decoding consumer data.

The specific activities of each institute reflect the contents of the intervention plan defined by each working group on the basis of a framework of suggested interventions, to include "nudges" through the process of training, animation and support triggered by working group of Project TOGETHER.

Social investments chosen and conceived by the members of the various management committees 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, that just like gentle pushes do, activate processes of reflection and behaviour change. Naturally, the technical-scientific complexity of the implemented activities is defined according to the reference target group which, moreover, does not function as passive spectator, but as co-producer of initiatives and material, in the context of a living-lab logic.

Adherence to the project has created favorable conditions for cooperation, triggering collaborative processes that find their expression in the School-to-Work formula.
In fact, School-to-Work partnership agreements have been entered into with 43 high schools. Essentially, each agreement allows accounting for hours of training of students through work produced in Project TOGETHER. To testify to the importance of cooperation that unites schools and the Public Administration through Project TOGETHER, 4 students of Liceo Giorgione questioned the potential for energy savings through behaviour improvement, creating an ad hoc algorithm that has elicited the interests of sector experts on the occasion of the presentation of Project TOGETHER at the 2017 ENOLL - European Network of Living Labs - event, in Krakow.

At present, the training (i.e. 12 training days) and energy audit marriage yielded the decision by some municipalities to invest and add further resources to improve pilot buildings from an energetic point of view, leveraging recommendations produced by the energy study and the integrated training path. A municipality has mustered the courage to review its public lighting system (not strictly linked

to Project TOGETHER, but, in general, to the Priority 2 objective of the program), a decision that was partly achieved by the interest aroused by the project towards more daring contractual formulas. The leverage effect generated by the project in terms of investments in technological improvement reaches in the province of Treviso alone the amount of 100,000 Euros, including investments that some municipalities have taken to adapt their heating systems to make the installation of sensors possible. An external spectator might ask: **“Was a project like this really necessary in order to activate these solutions and behavioural changes in large scale? ”Yes, for sure", is the answer.** Not only because it provided financial resources to support a network of professionals dedicated to steer a change process and a technological network of sensors that allow acquiring a wealth of data that otherwise would have never existed.

First of all, because it represents in a strict sense, a pretext of dialogue which, under the aegis of the EU, scrutinizes and, as a result, questions the actions of the municipalities involved, which are still anchored to obsolete energy-consuming management models. **For the Province of Treviso, Project TOGETHER represented an opportunity for the renewal of social intervention schemes already tested whose limits were clear**. From a competition which aimed to award intentions, the Province transitioned to a competition among schools based on the value of energy actually saved, in the context of a minimum target to be reached.

It has introduced the concept of “sharing” burdens as well as honors, adding the element of savings allocation between school and Province. We were able to establish with high schools a building partnership which, if proven effective, will be extended to all provincial buildings. Thanks to Project TOGETHER, it was possible to accelerate and enhance the concept of “competition” that, up to now,

was managed in a "politically correct" way: provisional rankings of the energy performance of the 8 school buildings are regularly published on the project website, introducing a precedent in the experience of Project Greenschools (http://www.greenschools.eu/home.aspx).

Soon, the TOGETHER Junior Competition #1 will be launched, aimed at the elementary and middle schools involved in the project! The goal of the competition is that of stimulating the success of the activities planned by the schools, in the perspective of a challenge that must be intended as a virtuous confrontation playfully engaging children, teachers and all the school staff "to work together in order to work better". The competition aims at evaluating and rewarding the pilot buildings that have achieved the most important results in terms of:

1. Level of involvement of the different actors that use and/or manage the building,
2. Reduction of electric and thermal consumption, according to what has been recorded by the installed smart meters

We'll see the results of the competition that will be launched in May 2018 and will end next January 2019. There are some prizes for schools at stake and, above all, the possibility to participate in the final Conference of the project that will be held in Bratislava in Spring 2019.

Last but not least. by 2018, a EU call for tender will be issued to award an energy performance contract which will finally transition from a model of enhancement of technological interventions to a mixed model of enhancement of technological and social activities (to be implemented by the awarded), perhaps establishing a precedent at the European level.

The dancer Mikhail Baryshnikov said, "I do not try to dance better than anyone else. I only try to dance better than myself". We could say that this statement sums up the operation carried out by the Province of Treviso and its international partners: we are not trying to manage the energy of

public buildings better than anyone else. We are only trying to manage energy better than it is usually done, to introduce a concept of measurement that is partially unknown in the existing energy management systems.

Marina Coghetto, Technical officer of the Province of Treviso
Treviso, April 2018

The 4-Member Amazing Team for Project TOGETHER

We are Leonardo, Marco, Alessia and Edoardo.

We are seniors at Liceo Scientifico of the Giorgione High School of Castelfranco Veneto in the province of Treviso, and in a few months we will take our final high school graduation state exam.

Our school is one of the 100 institutions whose energy consumption is being managed by the Province of Treviso, in a seemingly pioneering fashion in Italy and, perhaps, at the European level. Indeed, the Province has fitted school buildings with devices called "smart meters", which collect electricity and heat consumption data in real time, displaying them on a web system called "**energy sentinel**".

Essentially, at any time of the day it is possible **to check the status of real consumption of a specific building**; potentially, it would be possible to detect the consumption of individual classrooms or even single parts of a building, if additional sensors are added to the general system.

We learned almost a year ago about the automated consumption measurement system and the institutional purview of the provincial authority in the management of school buildings, when our professors discussed with us the opportunity to cooperate with the provincial body and, specifically, the Building Construction Sector in the context of **School-to-Work programs in the framework of the project TOGETHER**. In Italy, School-to-Work programs were introduced in 2015 and are now compulsory for all students attending the last three years of high school. Before the program kicked off, we barely knew that the Provincial Body was in charge of managing, heating, supplying electricity

and maintaining our school as well as all other provincial school buildings, including all associated gyms.

In short, we were not aware that in addition to its institutional "duty" to manage energy supply, the Province of Treviso introduced experimentally a few years ago, and in a more structured way since 2012, innovative systems for the management of energy demands, which was recognized as good practice also at European level.

In particular, the Province participates in the **European Network of Living Labs (ENOLL)**, at which, in 2014, it submitted the **Green Schools** initiative. It is basically a path undertaken in 1999 which entailed a new approach in the management of the educational heritage of secondary schools, with the aim of honing deep knowledge of the local assets and involve users in the management and accountability in the use of common assets and space sharing. Green Schools aims in essence to transform schools into real incubators for the development of a new outlook oriented towards sustainability and energy savings.

In this period, just less than a year ago, we met Antonio and Marina at the Sant' Artemio office. Antonio is the Manager of the Buildings Estate and Public Tenders Department, and Marina is the Sector's Engineer and Technical Officer, who, since 2016, has also been committed to the European project **TOGETHER: Towards a Goal of Efficiency Through Energy Reduction, funded under the Interreg CENTRAL EUROPE 2014-2020** program, which aims to improve the ability of Public Administrations to work towards achieving energy efficiency in buildings. The project was approved in 2016, has a duration of 36 months and a budget of 2,330,175.75 Euros, co-financed by the European Regional Development Fund.

At the sound of the word TOGETHER, we realized that, perhaps, unlike other School-to-Work experiences, we would do more than just make copies all day. We immediately realized that our

work would contribute to a puzzle of complex activities that in their entirety aim to provide the Administrations of 8 Central European countries with solutions to increase their ability to manage, if not reduce, energy demand.

Antonio and Marina manage the Project TOGETHER in cooperation with the European Relations office (mainly with Federica), with which they assist, support and guide not only the local network of 10 municipal authorities and 18 schools, for a total of 20 public buildings, but also the network of international partners that all together are experimenting with initiatives in **85 public buildings**. Our school is one of them!

Unfortunately, we were unable to participate in the **kick-off meeting of the project organized in Treviso in June 2016**, the date of its official start, and, therefore, to meet the staff of partners assigned to the project. However, the project representatives meet approximately every 6 months to take stock of the situation and plan activities, tackling together any problems and looking for solutions.

Of course, physical meetings are a moment to circle back on activities carried out across the miles, marked by a busy and daily exchange of emails, phone and Skype calls.

We learned about the regions involved - our famous partners - not only through the stories and anecdotes of Federica, the Financial Manager of the project for the European Relation Unit, but also through updates posted by partners on the FB page dedicated to the project, which, of course, we tagged with our own “likes”. The page is particularly active and within the typical social network approach, it presents the project’s technical contents and can be accessed by everybody from the project Internet site. In short, it is a **transnational work group** that, within all work sites involved, operates together synergistically for the implementation of energy efficiency measures for public buildings.

Managing and being part of these projects certainly requires a set of interdisciplinary skills: technical or specific abilities in the project subject, as well as linguistic, organizational, financial, administrative, management and communication proficiency. It is necessary to have a perceptive capacity for mediation, identification and cooperation among the parties. In our opinion, it also takes an **additional ingredient, a secret ingredient ... passion for what you do!**

After meeting this passionate team, we have ourselves become passionate about the subject matter, a contagious effect that we did not foresee at the beginning! So much so that somebody among us four (Leonardo!) has serious doubts about what major to declare after graduation. The experience in the Project TOGETHER has questioned his previously unquestionable choice to enroll in the School of Medicine...

Back to our experience... Antonio and Marina have proposed to process with our School-to-Work project some calculation tools to identify in a scientific and mathematical way the share of electric consumption resulting from the **incorrect behaviour of users of our institute.** After several briefings, including some conducted over Skype, we identified the workflow and started to assemble spreadsheets that allowed us stating with some accuracy that the potential for energy savings in our school is at 26%, which can be achieved through behavioural changes. By quick accounting, we are talking about 100 Euro a week that in a year turn into about 4,000.00 Euro wasted for unnecessary energy. And these data apply only to our school! Imagine what would happen if the model is applied to all other schools. And even if the amount was smaller… **Why waste economic resources that could be used in another way… To say nothing of the environmental impact in terms of CO2 produced.**

We were incredibly surprised by data we collected, aware through our simulations and estimates that it is possible to free up economic resources with **behavioural changes that often require just a**

click: turn off a computer and PC monitor, use natural light when possible, organize and rationalize the use of space, clarify who does what and do not let hallways, for instance, become no-man's land. It often happens that the correct energy-saving practice is not implemented, and transformed into habit and consumption practice, in the uncertainty of who should do what or when it may not be possible to implement a certain behaviour, such as turning off hallway lights.

Our work has been made available locally to the other 7 high schools involved in the project, not only through the transfer of documentation and files, but also through a presentation of all work carried out, last September 25, 2017, in the auditorium of the Da Vinci High School in Treviso.

We explained to attendees, including high school administrators and professors (from desks to chairs!) our work processes, different phases and results obtained, as well as the strategies we suggested to improve behavioural performance.

Furthermore, our work has also **crossed national borders**, as it was translated and transmitted to the Points of Contact of the network of international partners, so that they can take inspiration from our work, adapting it to their needs. Our work was **presented on occasion of the Hungarian partner's (Hegyvidek)** study visit organised in Treviso, last January, with the participation of its thematic expert: a professor of Technology from the University of Budapest.

Truth be told, this is one of the values distinguishing local cooperation projects, namely, **putting together knowledge, filtering it and eventually adopting winning solutions elsewhere.**

And there is more… We were invited to participate as speakers at the thematic workshop "Leveraging Behavioural change for Energy Efficiency in Public Building" organized as part of the annual event of the European Living Lab Network, held last August in Krakow. This workshop was inspired by the TOGETHER project and therefore organised by the Province of Treviso in close cooperation with other **ENOLL members**.

Participation in the ENOLL event not as simple participants but as speakers, alongside innovators, idea incubators, university professors, sociologists, economy experts and behavioural scientists is certainly the strongest experience within the framework of the School-to-Work project under the **TOGETHER brand.**

At that time, we actually met Patrycja Plonka, project manager for the Polish partner PNEC. In the context of our own workshop, Patrycja presented some of the experiences that inspired the Project TOGETHER, in particular, the Project Euronet 50/50 MAX. We returned from Krakow with loads of positive energy to meet the challenges inherent in the work of our senior year!

We have almost forgot to mention that we meet last summer 2 **School advisors from California** interested in getting an insight into the project TOGETHER.

Our work at school is continuing not only on books, but also in our role as environmental motivators and, sometimes, the proverbial "pain in the neck", because, unfortunately, that is how those who point out behaviours different from those that generally result from habits, if not laziness, are dubbed.

In our small way, we try to **stimulate changes,** explaining to our teammates the work we did and data we collected, knowing that all building users, like teachers, caretakers, and administrative staff must work together to achieve **concrete and lasting results.**

And last but not least… **Our parents are especially happy with the project** in which we have been involved. It is no longer up to them to remind us to turn lights off; it is now us who unplug the phone charger as soon as charging is complete!

We are trying to convince them to retrofit our homes with consumption monitoring systems, similar to those that, thanks to Project TOGETHER, have been installed in a total of **83 public buildings**

belonging to the project partners, of course, with significantly lower costs that pay off through savings obtained.

With a simple APP, you can check energy consumption in your home and identify the unnecessary consumption of devices which can contribute to reducing energy costs!

One final thing... Antonio, of course, has already installed a similar device in his home to keep under control his domestic consumption!

Alessia, Leonardo, Edoardo and Marco

Castelfranco Veneto, April 2018

Why joining TOGETHER was an amazing choice

I became aware of Project TOGETHER in 2015, precisely on 28.10.2015, when it was presented to the Municipalities of Treviso by the Europe Office of the Province, the proposing body and coordinator. At that time, the project had successfully completed its first selective phases and hopes were high for a positive forecast. The staff of the Europe Office described Project TOGETHER and its **potential** with realism and enthusiasm. After returning to my office, I tried to present this opportunity to all parties - political and managerial - of my municipality (those who would have decided whether to participate or not in this project), hoping that Casale sul Sile would decide in favor of participation. Project TOGETHER convinced me and arose my passion from the very start. However, the main obstacle for me was to translate this great opportunity to decision makers. The difficult task was to triumph over the legitimate hostility, which I partly felt, about the feasibility of reconciling my standard work schedule with time to be reserved to TOGETHER. How much time should I commit to it? Who, which ones and how many professional figures should reasonably be involved in its realization? There was no doubt that the Project required to find additional human resources (a work team) and financial resources. Would I, a part-time employee with a good inclination for training and intellectual curiosity, have been able to cope with the amount of commitments that participation in the Project would entail, including, last but not least, a 12-day training course, without to the detriment of my regular duties? I do not deny that often things in my office can get complex. The commitment required by the Project perhaps exceeded my predictions.

However, I believe that joining the Project was an **excellent choice** and a unique opportunity for training. Unfortunately, modest-size Italian municipalities, like Casale sul Sile, rarely manage to train their staff due to lack of financial resources.

Knowledge gained from the Project on the issues of energy efficiency has allowed me think out of the box, and promoting my enrichment in terms of human relationships. I met the world of school, management and teachers who, with dedication and immense preparation, began working with their pupils. The merit of the Project's success mostly goes to them, Elena and Belinda, who are exemplary teachers. Therefore, to the concise and precise question: would you recommend to a bureaucrat of another municipality to participate in the Project? **Yes, for sure**. It is a long journey, difficult at times, but also exciting and enriching in many ways, including from a cultural and human point of view.

Daniela Gottardo - Municipality of Casale Sul Sile

Treviso, May 2018

Everyone is involved in TOGETHER!

The first complex steps taken by my colleague at the Environment Office, allowed me to join Project TOGETHER after the activities had already begun and been shared. My training and, at the same time, problems related to energy savings, which are more current now than ever, have found **fertile ground** in this Project.

It is now necessary to focus on and understand issues related to **energy management**, finding **alternatives** to structural interventions which present financial challenges and must hinge on behaviour, **education** and good **property management**. The parallel between technicians responsible for building and plant maintenance and adult users, but especially young school children, has brought out all the **potential** of this Project. **Everyone has made a contribution**: schools, through teachers, have encouraged children with games, work and good education to **achieve goals**, highlighted through useful monitors installed at schools, technicians with targeted structural interventions have contributed to adjustment and consumption improvement and more comfortable places.

All this was the result of a 360-degree training we addressed “TOGETHER”.

Elisabetta Bortolini - Municipality of Casale Sul Sile

Treviso, May 2018

Smiley faces for energy saving

Pupils of 4^A and 4^C of the elementary school "A. Canova" were involved in the project TOGETHER, a European project promoted by the Province of Treviso and shared also with the Municipality of S. Lucia di Piave, which aimed to promote good behaviours to reduce energy consumption of public buildings. In particular, the project involving our school started with the installation of a smart meter connected to a monitor in the hall of the new wing, where a smile indicates whether consumption is too high or adequate. Councillor Ciullo presented the project to the children and instructed the two classes to spread awareness throughout the school on how small gestures can prevent energy waste.

Teachers the pupils studied the different ways of producing energy and investigated the environmental consequences of using more or less renewable energy sources, proving to be very sensitive to the problem of pollution and greenhouse gas emission, also thanks to the intervention of an external expert who supported the Provincial Administration of Treviso in the activities of environmental animation.

Therefore, the need to involve all the users of the school was expressed by the children, who created leaflets and a handbook to raise awareness on the topic, which were handed out to all the classes; also, to encourage a behaviour aimed at energy saving a competition called “Turn on your mind and respects the environment” was organized. Here are the rules set out together with the children.

Collaborators had great difficulty in awarding red marks, because all the students were very good and carefully to apply the suggested measures, they were the ones to check and remind distracted teachers to turn off lights or PCs!! The classes that finally won the competition were 1^C, 2^C and 5^A, which were awarded with a solar-powered calculator for each pupil.

The classes 4^A and 4^C, that worked on the project for a long time and became involved, were rewarded with a trip to the renewable energy park of Padua, partly supported by a contribution of the province of Treviso.

It will be our commitment to continue to promote virtuous behaviour to respect the environment and for a conscious use of energy!

Da Ros Michela - Teacher at the Elementary School "A.Canova"

Santa Lucia di Piave, October 2018

TRUE STORIES FROM ZAGREB

Project “Energy and I” - Ecology activities for energy efficiency!

Since 2016, Zapruđe Kindergarten has been involved in the international TOGETHER (TOwards a Goal of Efficiency THrough Energy Reduction) project, in which the City of Zagreb has been participating as one of the partners in the Interreg Central Europe programme. The goal of the TOGETHER project is not only to make the kindergartens’ facilities energy efficient, but also to **raise awareness** about the need to change the **behaviour of children and adults to achieve energy efficiency** and to try and influence the wider community.

Our group consisted of children between the ages of 6 and 7. This is the age when children often expect too much of themselves, they set themselves up with difficult tasks, so the role of the educator is important to help them achieve their realistic objectives. They are very interested in group work and the feeling of success in different situations is of utmost importance to them. For this reason, we conducted a variety of research, testing related games and activities to help them solve problems by themselves, to successfully discover relationships, create and test their assumptions, and to gain new knowledge using different game materials and resources.

To encourage awareness of the need for energy efficiency and an environmentally friendly way of living, it is best to start from the earliest age. Preschool children find the energy and energy efficiency concept very abstract and it is a great challenge for educators to bring the notion closer to the children. The project "Energy and I" was designed with this aim. It is divided into 3 stages to help children expand their knowledge of energy and, through familiar topics, gradually understand the abstract concept of energy efficiency.

The main topic of the last academic year was "My Body", hence we devoted the first stage of the project to the **body's energy**. In addition to the importance of physical activity, we found out what our body needs to live, the important role of healthy food as a source of energy, how our body turns food into energy and internal processes of air and water circulation. A lot of time was spent on walks and physical activities to better understand how much energy we need to get to a further destination and we gradually shifted to the next stages or, at times, even mixed individual stages of the project.

The second stage of the project consisted of activities with which children, having become aware of their own energy, **transferred energy to objects**. Objects were used that children handle every day, but in a different way. We moved balls by blowing into them, we put domino tiles into rows to get a chain reaction, we used spinning tops, air hockey, mini bowling alley, and so on. Spending time outside and physical activities were also a usual practice.

Having researched different ways of energy transfer to objects, we began the third stage which was devoted to energy efficiency and the awareness of the need for an **eco-friendly** way of living. We started with waste sorting activities, and in parallel established the Eco-Patrol. **Eco-Patrol** has had an important role in understanding the need for energy efficiency. The support of the City Office for the Economy, Energy and Environmental Protection helped us in procuring the measuring instruments to help children measure the temperature, brightness and power consumption by themselves. In

addition, we bought a smart TV which provides us with a real-time "poster" to **monitor energy consumption** and makes every change visible. In the “Baby elephants” educational group we have been dealing with various green topics and energy research for a long time, so we have established the Eco-Patrol.

The Eco-Patrol is made up of five children who take turns doing patrols and they take with them two guests from other educational groups. Eco-Patrols are done 2-3 times a week, and the observations are recorded on a large board, giving each group a smiley or an angry face in the following categories: water saving, electricity saving, paper and plastic separation, decorative plants care, and yard cleanliness.

We started our mission by designing a logo, ID cards and Eco-Patrol uniforms. Given that we have had many ecological topics so far, we realized there is a great need to preserve nature, sort waste and save energy. We have decided to send memorandums to other educational groups and explain how they can **help preserve our planet Earth.**

The tasks of our Eco-Patrol are not just kindergarten visits for energy saving reviews, but also research on various environmental issues such as **waste sorting, renewable energy sources, energy transfer and environmental concerns** through group work and collaboration with other educational groups.

Most of the activities were of research nature, but in addition to learning and awareness, we tried to encourage the development of other areas in children as well. We often integrated topics into activities that at first glance have little to do with the topic itself and thus managed to hold their interest for a longer time. Working together with parents, the Eco Patrol also made and took care of a small herb garden.

Throughout the year, the interest in the subject fluctuated, but it always came back when we would offer new or extended the old stimuli. The exception was the third stage, which was constantly in

focus of the Eco-Patrol. We encouraged the interests of children and developed activities through the stimulating environment that we have created together with children, parents and the expert team. The expert team supported us with various didactic content and literature.

We worked together with parents through parental meetings, daily communication when they brought and took their children home, individual conversations and procurement of various materials (PNM, plastic and paper boxes and bags, garden seedlings, planting substrates, etc.). Along with the **Eco corner**, we also created the **Energy corner** where we disseminated the work related to energy efficiency. Also, one of the more interesting activities we did was when we walked in the centre of our city block and, by singing and with ecological posters, tried to make the neighbourhood aware of our efforts and the importance of eco-friendly way of life. This was how we marked the Zagreb Energy Week, which we do every year.

The living room space was refurbished to suit the needs. Most of the activities were connected to the living room and other rooms such as the kitchen, laundry room, and boiler room, and we were verifying the insights by walking outside the kindergarten and with physical activity. When weather conditions permitted, we investigated and organized the kindergarten yard where we created our little garden with aromatic herbs. That was also interesting for children from other educational groups.

The topic "Energy and I" proved to be a great success because it has provided a lot of opportunities for children to express themselves **creatively** in interaction with the offered stimuli. However, with this topic, it was difficult to stimulate the children's interest because of the abstractness of the concepts of energy and energy efficiency. The integration of the topic "Energy and I" at the beginning of the academic year was more difficult because of the "extensiveness" of the topic not easily understood by children of that age. For this reason, through a series of small projects related to body

energy, healthy nutrition, waste separation and ecology-related experiments, we decided to try to raise awareness of the importance of caring for the environment conservation, eco-friendly living and energy efficiency.

At times, the interest was greater than the available material or aids. We would like to emphasize this as a deficiency. The project was successful despite its shortcomings and the specific situation at the beginning of the academic year because it took place through a longer period and every child had the chance participate.

After months of work and a lot of small projects needed to get the children interested in the topic, we were able to work on interesting topics that eventually brought us to the desired goal. In doing so, the children gained new knowledge and experiences which they passed onto the wider community, which was the main goal.

Matija Pavlić, educator, Zapruđe Kindergarten
Zagreb, October 2018

Ecological Awareness at School

Ever since we joined the project, our main preoccupation was how to join together the ecological awareness and new experiences with the children's creativity and innovation. We have regularly discussed with the children about their energy saving habits in their homes and at school. The children quickly recognized the importance of caring for the environment.

We wondered what we could do to contribute not only to environment protection and energy saving, but also how to motivate others to care about these issues.

We started our story about the need to save energy by making reminders with eco-shaped messages such as water droplets, put above each faucet in the school.

Some of our messages are:

"Turn the water off, don't let it run!!"

"If you let the water flow until the morning, it may be gone tomorrow!"

The students wrote eco-messages on bulb-shaped reminders that were then put near computers and above the switches. Some of our messages are: "Saving electricity saves the Earth." "Save energy, it is our friend."

The Earth day was marked with a short video made by students. The video shows the students' idea on asking external help for environment protection. A call for help, maybe?!

Then we had the idea to make an educational picture book. The ideas were endless: there were names of characters to be chosen, events to be detailed, ecological messages to be formed… The outcome was an educational picture book "The story of Computer, Droplet and Mr. Shiny". The story follows the boy, Tomo, and girl, Iva, who are trying to change the bad habits of their parents who persistently forget to save energy in their home.

As part of the project, we also visited the energy center Bračak, where we got a first-hand experience on what the children had been learning about during the year. We also met with other energy teams and saw their work during the Zagreb energy week!

We have had a busy, enlightening and fun year as part of the project! We are looking forward to another one!

Monika Vasko, Katarina Bertović, Slaven Staklenac.
Većeslav Holjevac Primary School
Zagreb, October 2018

Project TOGETHER in the Dandelion group

Scientific findings show that pre-school age is one of the most beneficial age groups to gain new insights due to the biological and psychological advantages that make it easier and quicker to adopt the immediate source of information. This contributes to the development of feelings of security, self-confidence, psycho-ecological approaches to situations in the environment and the possibility of understanding definitions is that context. Through the project TOGETHER our goal is to develop ecological sensitivity and awareness of the children and their active relationship in the immediate environment with the promotion of children's rights, respect for diversity, and multiculturalism as core human values. A child is an active factor and a promoter of sustainable development as a concept of everyday living. The group's vision is to spread and promote eco-sustainability, to inform others of what makes sustainable development and the concept of sustainability in pre-school age. The continued development was made possible thanks to the support received from the open partnership with the parents of the children of the beneficiary programs as well as the whole community through the "TOGETHER" project. We want to contribute to the collaborative relationship in the education and development of the child to be aware of the addiction of adults about the environment and the environment about man. The environment is ever changing. This change is primarily caused by anthropogenic actions. It is therefore necessary to spread awareness of responsible forms of environmentally conscious behaviour and the use of renewable forms of energy. Our steps may seem small, but they are significant. We were actively involved in

the international project Together, through a series of activities and concrete workshops (Behavioural DSM: Changing Behaviour to Energy Consumption, Public Sector Consumption Analysis, Thermo-camera Measurement, "We All Manage Energy" - Presentation of Project Achievement, Energy Saving as a real choice – a forum and a round table, a presentation, an exhibition of artworks on energy issues, etc.) aimed at improving the energy efficiency of public buildings and is based on changes in user behaviour and user building education while monitoring energy savings.

Saving the Earth for the future generations requires our small, but important activities which we have been implementing in the “Dandelion” group:

- Separation and recycling the waste paper
- Energy Wednesday – the energy team visits the boiler room; Cleany and Wasty – encouraging positive beliefs on the environment; Eco quiz for all; Eco patrol; Eco problem cards; A droplet – educational games; Energy efficiency in the kindergarten; Energy saving day – arctic story – renewable energy sources; Energy around us, and other activities)
- Story about energy friends – an educational show accompanied by music; this story is a product of activities of the group as well as a method of dissemination of the knowledge and skills gained. The show has been realized by children with the help of their parents)
- Saving and promoting the need to save water, electricity and heating
- Promoting a healthy lifestyle, learning about endangered plant and animal species

Through this project, we sought to sensitize the children to nature, its preservation and the multicultural understanding of the world and society. Partnerships and co-operation enable the inclusion of children and adults as equal partners and the child as an individual is educated and directed on the path of realizing active participation in his/her society. This is the basis for further

learning and achieving long-term results in the area of sustainable development and the preservation of the environment in which we live and grow, as well as thinking of future generations.

Renata Grdić, Jasna Lisac, Tamara Tutić
Kindergarten ISKRICA,
Zagreb, October 2018

The TOGETHER project in kindergarten Cvrčak

The kindergarten Cvrčak has been included in the project Together in the year 2017/2018. For this purpose, the kindergarten has formed an energy team including the principal, pedagogue, caretaker, kindergarten accounting staff etc. After a discussion among the kindergarten's expert staff, it has been decided to include the children's group Zvjezdice (Stars) in the program on energy efficient development and rational use of energy. The children included range in age from 5-7. The project has been launched in September 2017, when a part of the group returned from the Nature program, held in the City of Youth. This program included the children learning about nature and forest preservation and obtained a degree as „Nature defender“. Upon their return, the children decided to share their newly acquired knowledge and experience to younger children. The children expanded their experiences of plant and animal life through activities such as: dwarves as nature conservation guards in the forest, exploration (mowing, treating, measuring, stacking, ...) of various natural materials (wood, bark, leaves, cones, twigs, moss). In the group's room there is a small workshop created where children actively participate. Even younger children (five to six years old) gladly joined the activities: we created a forest cabin with forest animals. As part of the project, the children also worked with other kindergarten groups and made toys out of various materials to be used when playing. The group then discussed other

types of energy and renewable and non-renewable energy sources. The introduction of tools for measuring energy use was a very interesting event. We measured the amount of light and heat used and wondered how we can use the energy in an economical manner. The children were quick to react and asked to turn off the light as the natural lighting was sufficient. They also were very prompt to disconnect the CD players when not in use. The best part of the activities implemented was that the children did their best to raise the awareness of other children and their teachers concerning the rational energy use in an effort to encourage a more responsible attitude to energy usage. They were also quicker and more eager to do their part in waste management and recycling. The project shall continue in the following year, with a more active parent involvement.

Kindergarten Cvrčak
Zagreb, October 2018

Project TOGETHER in our school

Oton Iveković Primary School is in the Kustošija quarter, Stjepana Pasanca street 3. This schoolyear, the school numbers 463 students in 22 classes. The school was constructed in 1969 and hasn't had any upgrades or major reparations made since. During our 50 years here, we have cared for this building as for our own homes: the maintenance and investments into it have been regular (in accordance with our abilities). The school has a new roof and entrance shade, as well as new aluminium windows, but sadly no shading. All rooms have halogen lighting. In the year 2017/2018 we have joined the TOGETHER project, which includes six primary schools and six kindergartens. We have started implementing project activities from the first day: we have

organized a school energy team which includes representatives of students from all classes, teachers, expert associates, the principal and the caretaker.

Our motivation for participating in this project is:

- A desire to learn more about energy
- Proper energy management and achievement of a maximum effect
- Decrease of energy consumption
- Decrease of energy costs
- Concern about the environment through emitting less CO2 into the atmosphere thus impacting the climate

• Preservation of the planet Earth for future generations

The energy team pays attention to saving energy during their stay at the school. The higher-grade students and the caretaker have undertaken technical measurements with the aid of the received measuring equipment.

We used the following energy measurement instruments:

- The energy team activities:
- Production of the Together
- info poster
- A lecture to the teaching staff
- Educating the school staff
- Production of the energy
- saving stickers
- Production of the Together info
- poster
- Dashboard implementation in the school lobby

Classroom workshops were held by older members of the energy team.

Laura, an 8th grade student, gave a lecture to the 4th grade students so that we could successfully implement the project. Their interest was most peaked by the Planet defenders quiz.

Oton Iveković Primary School

Zagreb, October 201


SPÓROLJ AZ
ENERGIÁVAL!

TRUE STORIES FROM THE VYSOČINA REGION

My Dream was... to Have a Dashboard!

Hello, I am a custodian and energy manager at Gymnázium in Žďár nad Sázavou. Gymnázium is a high school for students from the ages of 11 to 19. Sometimes it is very difficult to cooperate with them, to teach them how to save energy, why to switch off lights, why to open or not open the windows to get fresh air without wasting energy for heating. My dream, for many years was to have a **dashboard** or something, that could show in a very **simple** way the **consumption of energy**. Few years ago, we were part of one project, that gave us meters to measure the energy. Result? Zero... Only disappointment and distrust in international projects.

In September 2017, we got in touch with the Energy agency of Vysočina. They told us that they were part of a Central Europe project called TOGETHER. The same speech as last time, the same promises. I was so skeptical, didn't believe them. **How wrong I was!** EAV has young team of real **experts** that came to our school, they made new **energy audits**, we talked about possibilities, how to save energy and what is the most important for me, we talked about meters. Not normal, but **smart meters**. My dream became a reality. The first phase was to install the meters. We have these meters for electricity and heating.

The second step was to install tablets. We have one tablet in the assembly hall. I could easily see the **real time** consumption of energy. And not only me, **students** could see it too! And this was the goal! I would like to wish good luck to EAV and mainly good luck for me! I hope that cooperation with our students in field of energy savings would be much better for me!

Thank you very much for your approach!

Jhilava - Gymnázium

Žďár nad Sázavou, July 2018

TRUE STORIES FROM MARIBOR

Saving Energy Brings People TOGETHER

It was a sunny afternoon, in mid-May, very warm for this time of year. I was sitting at the camping table, trying to study for an exam and as well getting a bit of a tan.

All of a sudden, I heard loud voices inside the house. My mum was desperately looking for my sister and I. In fear, she called my father asking for his help to find their two daughters. I heard cries coming from one of the rooms upstairs. My younger sister was terrified because of the voices yelling her name looking for her. My mother found her and tried to explain to her that some ecological catastrophe happened and we should stay inside the house. I only managed to hear only separate word as “nuclear plant”, “catastrophe”, “radiation cloud”, “above Maribor”. I was not able to connect the words to understand the meaning, but due to the reaction of my parents, it did not look promising. My mother managed to find me as well and pulled me inside the house, muttering something about the sun being poisonous. My sister was screaming and Father was trying to find a TV news channel, however, we were even more frightened as the electricity went out. Father said some words that were not appropriate to be heard in public, and Mother’s face was pale. It seems I was the only calm one there. Outside, the Sun started to switch its power off. The time for supper was slowly approaching, so my sister’s cries kept getting louder by every minute. I strained my brain in order to find a solution to calm down my sister. My parents were occupied with finding out what happened and how to proceed. I started to run up the stairs to the first floor and then down to the basement until there was still some sunlight. In the rooms upstairs, I managed to find some woolen

blankets. In the basement, I tried my best to scavenge for anything useful and found some wooden sticks. I continued my race up and down the stairs to collect some food from the refrigerator and from the garden. Then I remember that I had almost forgotten to look for the most essential thing needed in the darkness. My brains were working like a steam machine resulting in sweating all over my face. My race all over the house became even more frantic. After half an hour, I still did not manage to complete my mission. I decided to capitulate, and take care of my sister's crying since it could not be heard any more. I bent down to her and whispered in her ear. Her cries stopped immediately and a smile from cheek to cheek emerged. She moved her head showing a gesture of agreeing about tonight's mission. The mission "calm-down the sister" was completed. Now, I was able to focus on my parents. "Hey", I said, "let us have a barbeque this evening, since it is a weekend and we should enjoy it". "My sister and I will prepare the sausages and you can start the fire." My mother whisper that it is not **safe** to be outside, but I calmly replied that we did not have to sit outside necessarily. "We can sit at the table and have barbeques using a fondue pot". My father just smiled and instantly went to the basement to collect the needed energy power for the fondue. Throughout the dinner, there was a quiet atmosphere, each of us lost in our own thoughts. After dinner, my sister and I left our parents and went to my room, because it was bigger. I left my sister in room, giving her **instructions**. I continue with my unfinished business. After half an hour of panic running up and down, my mother stopped me asking, "Are you looking this?" I grasped it, gave my mother a big kiss on her hollow-cheek and ran away. I made a quick pit-stop in my sister's room. Then, equipped with all necessary things, I joined my sister in a **big and colourful shelter** in the middle of my room. We laid down comfortably, holding each other by the hand and I read her favourite book to her. The next morning, we still were out of electricity, but, surprisingly, we everyone seemed to be calm.

The Sun was shining brightly that morning as we left the house. The neighbours started to gather and to talk to each other. This was a nice picture, all past disagreements between neighbours had disappeared. Then suddenly, my mother cried out to all the neighbours “Please, join us in our garden!” Some of them looked surprised, but in the end, we had a whole garden full of people. Judging by the expressions on their faces, everyone seemed to be relaxed enjoying the moment. However, this was just a facade to prevent the children from panicking. The parents started to gather themselves into groups, each group with its own mission. The men mostly took charge of searching for energy; objects that could be used for building and repairing; for news; and above all, to understand how to proceed in this situation. The mothers organised themselves in a way to take care of the small children, to prevent panic, and to be responsible for food and drinks, especially to find a way to prepare it. This was a special challenge, since the **electricity** was used as power for cooking and baking in all our kitchens. Us children seemed to be the happiest among all seeing as we had so many companions to play with. The day passed as we enjoy the food, which was prepared using an ancient way of food heat-treatment. In the evening, we gathered around a fire. The men were having a serious debate, while mothers were sharing her experiences regarding raising the children. The teenagers enjoyed listening to scary stories from the older children, while younger children were enraptured with fairy tales.

On the following days, the situation slowly began to improve. The electricity started to come back, in the beginning just for short periods throughout day. The same situation followed with **drinking water** from the water supply, since our neighbourhood relied on electricity to pump the water. During that time, we developed special **rituals** to use the electricity as **efficiently** as possible, when it was

available. We gained **knowledge** - based on experience learning - on how to **preserve the electricity**. The same, but perhaps more important, was the **"water-saving-mission"**. We saved tap water in plastic bottles for drinking, and we used rain water for cleaning, cooking and watering.
Returning to an almost normal situation when the electricity was restored, was a relief for all of was. On the other hand, however, we did miss having to help, support each other and work **"TOGETHER"** as a **community**.

Ever since then, in the evenings, the house of my parents glows with solar lamps. Each house has a container for collecting rainwater. The bond created with the neighbours remained over time, and just recently, all the neighbours in our street, collectively placed the solar collectors on their roofs. My experience with this unpleasant situation caused me to change my behaviour towards energy conservation. I have been recognized by my society as a **devout energy saver**, as in my family, as at my workplace, and in my new neighbourhood. Neither my sister nor I live at our parents' house anymore, but we keep the monthly **tradition** "to save the energy" by preparing the food using a **traditional** way, that doesn't require consuming electricity. Both of us still recall the memory of reading bedtime stories using the lantern and thus have carried over this tradition onto our sons. During the summer, we often go camping where we **demonstrate** in practice our children how we can **survive** without electricity.

I always try to transfer my **dedication** toward energy saving to my son in a friendly way using an experiences, seeing as my change in behaviour was a rather action-forced situation no prior knowledge.

Changing behaviour is not that simple and it cannot happen immediately, but taking the “energy saving concept” as a daily routine can help bring awareness to community level.

Zdenka Peršin, University of Maribor
Maribor, May 2018

Students and Professors can Learn How to Save Energy TOGETHER

It was a cold morning when I woke up. I saw that the car windows were frozen. “Brr”, I thought, “I must scratch the windows again to be able to drive safely”. I put on some warm clothes, took the scraper and removed the ice layer from the car windows. I arrived to work early, so I still had time to prepare my lessons. It was the first week of March, the beginning of the summer semester. On my schedule I had the first hour of **“Environmental Saving”** course for the second year students. I was looking forward to it since this was my favourite subject, and because the students had already gained some knowledge and experiences, which is always a plus teachers.

The first hour passed as I introduced them to the subject. They did not show much enthusiasm towards the themes, which made me a little bit sad.

They listened intently when I presented them their tasks needed successfully pass this course. They were less keen on knowing how to pass the written exam than on how to prepare their own seminar work. The latter was planned to be discussed in more details the next time. As the morning classes came to an end, I went onto the laboratory practical lessons, still a bit disappointed that the students had not shown much interest.

I dedicated the week to upgrading my favorite subject in order to make it more interesting for students. I read books, articles and searched on internet to find some themes, which would be more

attention-grabbing for students. I felt like a student myself, fully surrounded by books, notes and my computer. It was interesting to refresh my knowledge on the facts and I found it encouraging that, indeed, the knowledge gained during the study, could be useful to the students someday. If only students recognized this during their studies, perhaps a greater part of them would win Nobel Prizes.
"Good morning my dear students", I started cheerfully the next lesson of Environmental Saving. "I wonder if someone of you know what day we celebrate today?" I asked them and waited for their responses. They seemed very sleepy and lazy, since it was early in the morning. There was silence, so I asked them again. I received two answers informing me that two famous people celebrate their birthdays today. "Well," I said, "happy birthday to them both, but did you not notice that this was not my point of view?" They seemed to be waking up as the noise in the classroom grew. The students used their heads **together**, talked for a few minutes, then one of the girls in the class encouragingly asked "What does your question refer to?" I answered, "It should be obvious – to the subject you are studying right now!" "Hmm", she replied.
A little bit louder, voices spread all around the classroom and then the whole room was suddenly resounded with a male scream **"It is the international day for celebrating energy saving"**. I applauded and asked them what they had done during the week in order to save the energy. There was more silence. I encouraged them saying "Every morning **I turn off the heating,** while I am not at home". I continue with "My parents move the curtains away and **pull the window blinds up** to get sunshine in the room". I stimulated them further with several examples, but unfortunately, no one joined me. I challenged them more with "So, you only did the opposite – you just breathed?"
Suddenly they became awake and alive. I could see their brains working very hard in order to find a solution. They were trying to discover some examples "to beat" my statement, but without success. Then I told them that in winter we mostly use wood, oil and natural gas to heat our rooms. I continued

saying, “Humans use oxygen and make carbon dioxide. In the World, there are many people breathing. Many people burning fossil fuels and producing carbon dioxide. Plants do just the opposite of that, but, unfortunately, us humans, make more carbon dioxide than the plants could use to transform into oxygen. This affects the **balance** of atmospheric carbon dioxide, resulting in climate changes”. I summed up with “We cannot stop breathing but we can stop using so much energy and in order to do this, we must **change our way of thinking** which would reflect in different way of living than the one we are used to.”

They started to move their heads in agreement. A quit debate among themselves followed, but I interrupted them by delivering the questionnaires. The **questionnaires** were prepared in order to awake their present **behaviour** toward energy use. The survey was composed of three parts, one devoted to **general use of energy**, the second to find out their use of energy at **home**, and the last part about their attitude toward energy usage at **school**. The impatient students started filling out the survey immediately. The class fell silent. Time-to-time, there were some lonely sounds pointing out curiosity or disappointment I gave them time until the end of the lesson. When they brought me the sheets, they asked if I would be able to **evaluate** and present the results the next time. I was surprised and happy at the same time. ”Sure”, I replied.

I could hardly wait until the afternoon, when I managed to find some time to evaluate the questionnaires. I read the answers and prepared the presentation of the results. One would say that the obtained results were rather disappointing; however, I was convinced they were at least **honest**. The results portrayed the hard work for me in the future. I did not lose hope because I am there to teach them and they are there to learn. The next week, I presented the questionnaire results. Those regarding the general usage of energy indicated that they still, almost every day, u**se petroleum and**

electricity, as a source of energy. There were no answers indicating the use of alternative ways for producing energy.

The results of the second part indicated that, at home, they mostly use oil for heating, electricity for heating water and gas for cooking. The same answers were obtained by questions referring the usage of energy at school. Also in these cases, there was no evidence of alternative energy sources usage. The third part of my presentation was very poor with answers, since the students gave no statements how they save energy. This part made me, as well as them, very sad, but they surprised me with their spontaneous answers about what they did since our previous lesson. They told me they **switched off the lights, TV and radio when they left the room**. They told the parents to **turn off water heater** during the night in order to save energy and money. They saved power by monitors, as they set the brightness on halt of the capacity. The rest of the lesson consisted of brainstorming, where we produced ideas about efficient ways of saving energy. We were so deeply involved in the discussion that we only stopped once the next group of students came into room and we were forced to finish.

During the next lesson, the students surprised me by informing me that on that day, we celebrate the **"International day of waters".** They continued, full of emotions, explaining that they had saved energy every day, since our last meeting. They even aroused enthusiasm in their friends by advising them to use stairs instead of lift to reach the upper floors, and to use **public transport** or **walk** instead of taking the car. They even brought home exemplary ideas on how to be more energy efficient. They convinced their parents to **lower the heater thermostat by 1 degree** or even completely switch off the heating, while they are not at home. The students were proud that their families agreed on introducing the time-limited showering, since they were shocked by the fact that **each family use min 150 L up to 300 L of water per day**. One student was especially proud because

her mother listened to her advice and used the same water that was used for washing the salad, to water the flowers. When the students were speaking, their eyes sparkled and they grinned.

In the lessons that followed until the end of the summer semester, consisted of **knowledge sharing**. My presentations focused on an overview of national laws regarding preserving the environment, introducing the themes concerning the sustainable development, and technological and economical point of view dealing with energy. The students were especially interested when they gave their own presentations. Mostly, they choose the themes of renewable energy. Moreover, it was a great coincidence that all the students passed the examination on **"World environmental day".**

As we met us in the school corridors again in the next academic year, they still remembered the date when they passed the exam and thanked me for planning it. Nowadays, whenever we met, they proudly tell me what they have been doing to save energy and how have they influenced their friends and families' behaviour. With honour, they tell me of the progress they witness in their friends' behaviours, as they switch to more **energy efficient light bulbs** and **use the washing machine only when there is a full load**. Based on their recommendations, the students in the dormitory started to **cook together** – they put several dishes at once in one oven. In addition, students began to use a **toaster** for preparing toast instead of the oven. Furthermore, they take food out from the freezer in the morning in order for it to be ready to cook in the afternoons, without having to use a microwave to defrost!

After years had passed, one day, they surprised me by telling me "We started to behave like you". Looking at my puzzled face, they smilingly explained that they had been collecting waste oil from their housekeeping for several months and that they found a company that was able to use their oil as biofuel. I congratulated them for the **innovative solution**. I was filled with pride since I succeeded in teaching them to think daily about the rational use of energy. In practice, I manage to prove that,

regardless of age, one can be encouraged by others to change his/her behaviour and adopt new and better habits. In addition, not only they, but also I, receive a small bit of knowledge, proving that teachers and students can learn saving energy **TOGETHER.**

Zdenka Peršin, University of Maribor
Maribor, June 2018

TRUE STORIES FROM HEGYVIDÉK

Daddy, are You Humphrey?

My story is about the success of the booklet about the little troll Humphrey. My daughter, Sara, brought it home from her kindergarten where it was distributed one day.

She found Humphrey very funny, because he likes hanging on the chandelier and does a lot of other naughty things. Of course, we explained to her the Humphrey story and the **importance of saving water and electricity.**

When a couple of days later I was brushing my teeth, Sara was looking at me and suddenly said: "Daddy you are Humphrey! You did not close the tap." Since then, in our family, if somebody forgets to turn off the lights, close the tap or close the window we just say "**You're Humphrey!**" and we all know what to do.

However, my wife is less happy about the Humphrey booklet: Sara has requested a drought dog for her birthday, so she is working on it day and night in her empty hours.

Csoknyai Tamás, Associate Professor
Budapest University of Technology and Economics
Budapest, July 2018

Why is it Beneficial to Participate in the Project?

When I was asked to write my story about the TOGETHER project, I thought of all those people who at the beginning kept asking me why. 'Why is it beneficial to participate in the project, we have already invested so much in insulation and retrofitting?', they would say. Their assumption was that **energy efficiency is mostly a technical question** that has to be solved by engineers. And they are right in some ways, physical construction determines energy performance. But even a building with sufficient insulation and state-cutting edge heating and cooling system can produce high energy bills if we do not **consider the people** who use and manage the facility.

In Hegyvidék, we are lucky because we have the funds to constantly upgrade and renovate our buildings. With this level of preparation, it is our duty to teach people how to use their workplace properly. And people are willing to respond if you give them a chance. In one energy commando meeting (our task forces who implement the measures) when we explained possible gamification methods, the representatives from three kindergartens already started to brainstorm they should **cooperate** and embody these methods into their pedagogic **strategy**.

Combining technology and human behaviour resulted in **great innovations** in the past. The TOGETHER project has the same potential. We hope that more and more leaders are going to recognize this, and we can transfer our **good practices** in the future.

Lajos Kovács, Vice-mayor of Hegyvidék Municipality

Budapest, July 2018

TRUE STORIES FROM SLOVAKIA

Learning by Doing is the Best Practice

Learning by doing is definitely the best practice. We had so much **fun** learning about energy efficiency with **Energacik**, friendly troll that was our companion. We have made some **experiments** with water, wind and shadow and experienced, on our own, how it can affect our environment.

We all know now that when brushing our teeth, the **water tap should be closed,** and when the sun is shining directly into our windows, closing curtains is better than turning on the air conditioning, and we learnt that a paper fan can have multiple colors, which we all found to be very entertaining.

We are looking forward to applying our experiences to our daily lives, to share the knowledge with our family members and friends, and learn lots more things on how to save energy next time"

Lubica Bors, Project Manager
Bratislava, July 2018

Energy Efficiency for all ages

Being the Head of a Primary school in Vycapy Opatovce gives me opportunities not just to teach students how the world works but also to influence their perception of the world - to give them examples of what is good for us, and I mean for all of us. I like to give them perspectives of the world as a place to love, to protect, and to share. I want to teach them that one is never alone and that **working together**, **learning** together gives us more than doing things alone. When I was introduced to the TOGETHER Project, I immediately knew it is the best activity to attend together. I find very important to talk, to show by examples how things work because I am convinced that learning by doing and discussing brings better results than just talking in one direction without receiving and listening to any **feedback**. The activities held during project allowed the students learn in real-time examples of how basic principles of energy work. It was very captivating to participate and observe their **curiosity** and **passion** for learning. I am happy that the project members took into consideration the fact that there are **different age groups** at school and have chosen appropriate activities for specific ages. You can learn about water leaks and its effects in general but when one finds the right way to make the topic attractive for a 6 year old, as well as for a 14 year old, it is really very pleasant to observe. During **interactive activities**, what more can you expect? Our students learned about energy efficiency, not just by listening, but also, by exploring and doing. All of them enjoyed taking part in the **water experiments** and **electricity** examples too. In the younger audiences, the experiment with **brushing teeth** was very well perceived.

Having the puppet of **Energacik** was of a great benefit since he took part in experiment and students continued to work with the handbook also after the workshop was over.

We have worked with the topic of energy efficiency following days and weeks too by having committed ourselves to practice the **daily minimum of energy efficiency plan**. Our teams committed themselves to follow the daily plan and checked its fulfilment. We have dedicated ourselves to check every day if the lights were off when leaving the room, if the water was closed properly, if windows were closed, and many more. It was important that **students could choose which activity they commit themselves to**. We are going to extend the list during the autumn/winter period since there are many more principles to be applied in the daily routine. I am convinced that by applying these activities into daily life they become a **routine** not just at school but students will teach them to their relatives at home. This way, they will be energy efficient at home too. This changed behaviour will lead to savings not just at school but also in their households, which is our **aim** - making students conscious not just at school but to practice the skills gained also in other environments and spreading the good example to others. We have made an **exhibition** of large posters students created in order to share with the rest of the school for a long time.

I am thankful for having the chance to attend workshops held by **SIEA** and see students of my school gain practical skills of energy effectiveness and I am proud of seeing the results of these skills in everyday life, because they have become a part of daily life as well.

I am very curious about to see the smart meter results because they will provide us with a quantitative measure of our changed approach to energy efficiency and our behavioural change.

I would suggest **spreading** this information as much as possible among schools and students because by teaching them how to protect and save, we teach them an important lesson they can profit from all their life. Thank you for providing us with the opportunity to be a part of the TOGETHER Project.

Mgr. Mária Civáňová
Head of Elementary School
Výčapy Opatovce

How Energy efficiency can be a part of our daily life

Information, sharing experience, feedback, different opinions, new knowledge.... this is all a part of what you give and also get during discussions**. It is a great opportunity and time spent to have a space for discussion. Whether with your friends, family or colleagues**. Discussions are a part of pilot activities SIEA representatives were sharing with us while our Municipal House participated in the TOGETHER project workshops. We are happy to say that discussions belonged to those most interesting and sometimes even entertaining activities. We had a great time not just by receiving new information, but also by having the space to share our opinions, experiences, tips and tricks all connected with the topic of Energy efficiency. Expertise presentations turned into discussion about our **everyday life and how the principles of energy saving can be a part of them**. We exchanged information about our everyday life, our routines, habits… common things one does every day. And then looked at them from a different perspective.

From the perspective that is conscious regarding the energy saving, cost decrease, environment protection. We argued, discussed and came to a conclusion. By adopting simple actions into our daily routine, we found out that we all can personally bring by small changes a big contribution. What happens if you ask a question? Well, you probably get an answer. But, are you ready for the answer you might get for the question you give? And this is the big thing. Being able to accept some other persons' opinion and maybe even learn from it a great lesson. This is big.

We all have different habits, opinions, we work in different environments, have different lifestyle but it is awesome to have the chance to exchange them and adapt those we are agreeing with into our everyday life. Small things turn into big ones, you just need to give them the opportunity. Starting with an effective and conscious usage of the TURN OFF/ON switch might be the one to begin with. And this is what we committed ourselves to do. To be conscious and energy effective in our everyday life not just at work but also wherever we go.

Municipal House in Vycapy Opatovce
Vycapy Opatovce, November 2018


KERES-DEMAND
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TRUE STORIES FROM POLAND

TOGETHER saves money for Besko Town Hall (PL)

Since the installation of central UPS (uninterruptible power supply) the **Town Hall of Besko, Poland**, has been experiencing problems with reactive power, i.e. a circulating power in the electrical system. Such energy is not included in the energy consumption but is treated as an undesirable phenomenon and scrupulously measured by modern energy meters. In a bimonthly billing cycle the charges for reactive power only reached 500-800 PLN (approx. 120-190 EUR) depending on the season. Two companies undertook effort to compensate this power but with limited success as nobody could precisely indicate the times the phenomenon occurs and its intensity.

In early 2018, thanks to the TOGETHER project, smart metering system was installed in the town hall, including an electricity meter enabling permanent monitoring of both electricity consumption and other parameters, including reactive power. Within few days only the meter registered enough data to enable building personnel to correctly estimate the capacity of the necessary reactive power compensation unit. Since July 2018 the charge for reactive power is either not present on the electricity bill or comes to few PLN (1-2 EUR) for a two-month period.

Patrycja Płonka for Besko Municipality
Besko, December 2018

TRUE STORIES FROM PAKS

TOGETHER is not just a job in PAKS (HU)

Before the Steering Committee and study tour event at Paks (29-31 October 2018), I had already put the attention stickers on the office walls: the green "Turn off the light" sticker for the switches and the blue "Turn off the water" sticker to the taps. My colleagues generally pay attention to these principals, not only at home, but also at the workplace, but there were a few habits that had to be brought to the attention. For example, in the winter, when it gets dark earlier, they leave the lights on in the office after working hours, saying that there is no use to turn them off as the cleaners are coming soon. However, it may take half an hour or an hour before the cleaning staff arrives and the electricity is used unnecessarily. Or, sometimes it happens that computers stay switched on after work, thus they run in standby mode all night. This consumption is more remarkable then we would think.

At first they didn't take my notifications serious, and they were surprised that I'm telling it to them, but after a while – and several chats on the corridors – they realized that every minute counts for saving energy, so they had been paying attention since then. So the situation changed: first they smiled at our ideas and warnings, but by now me and my colleagues working in TOGETHER have became one of the representatives of the environmentally conscious lifestyle in the office, which feels good. We feel that this project is not just a job, but it can really help transform people's thinking, even in small steps.

Neiner András *for PAKS Municipality*
Paks, December 2018


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