

CE51 TOGETHER

Dizajn pilot-koncepta

D.T2.1.6

Version 1

07 2017





INTERREG CENTRAL EUROPE 2014-2020

TOGETHER

TOWARDS A GOAL OF EFFICIENCY THROUGH ENERGY REDUCTION

Pilot Concept Design

D.T2.1.6



LP - Province of Treviso



PP2 - EAV



PP4 - Zagreb



Izvršni sažetak

Dizajn pilot-koncepta predstavlja temeljni dodatak Građevinskom savezu (engl. Building Alliance): riječ je o akcijskom planu 8 pilot-mjera u 85 različitih pilot-zgrada.

Partneri će dizajn pilot-koncepta prilagoditi svojim pojedinačnim pilot-scenarijima te ga provesti. Dizajn pilot-koncepta mora se provesti u svakoj pilot-zgradi, stoga će partneri s vremenom elaborirati 85 dizajna pilot-konceptata povezanih s njihovih osam klastera pilot-zgrada, uz čitav niz dionika povezanih sa zgradama: vlasnike, upravitelje, predstavnike krajnjih korisnika.



Contents

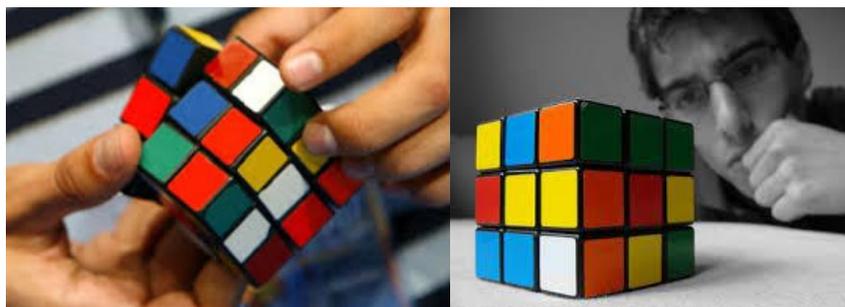
| | |
|--|-------------------------------------|
| 1. INTRODUCTION..... | 1 |
| 1.1. PROJECT TOGETHER | 1 |
| 1.2. PURPOSES OF THE PILOT CONCEPT DESIGN TEMPLATE | 2 |
| 1.3. USE OF THE PILOT CONCEPT DESIGN TEMPLATE | 2 |
| 2. THE 8 TOGETHER BUILDING CLUSTERS | 3 |
| 2.1. INTRODUCTION..... | 3 |
| 2.2. PILOT CLUSTER VARIABLES..... | 4 |
| 2.3. STATE OF THE ART IN THE INVOLVED LOCAL COMMUNITIES | 6 |
| 3. INTRODUCING THE PILOT ACTIONS AT REGIONAL LEVEL..... | 7 |
| 3.1. INTRODUCTION..... | ERROR! BOOKMARK NOT DEFINED. |
| 3.2. THE POSSIBLE APPROACHES OF THE PILOT ACTIONS..... | ERROR! BOOKMARK NOT DEFINED. |
| 3.2.1. ROLE OF THE PILOT ACTIONS..... | ERROR! BOOKMARK NOT DEFINED. |
| 3.3. DEMAND SIDE MANAGEMENT: BEHAVIOURAL AND ANALYTIC | 8 |
| 3.4. SMART METERS INSTALLATION AS A FIRST UPGRADE OF THE DAY-TO-DAY ENERGY MANAGEMENT SYSTEM IN USE..... | 9 |
| 3.5. THE MACRO COMPONENT OF THE PILOT ACTIONS..... | ERROR! BOOKMARK NOT DEFINED. |
| 4. PILOT ACTIONS FLOW | 16 |
| 4.1. INTRODUCTION..... | 16 |
| 4.2. THE ROAD-MAP FOR THE ELABORATION OF THE ACTION PLAN OF THE PILOT ACTIONS AT BUILDING LEVEL..... | 16 |
| 4.3. CROSS-CUTTING ACTIVITIES SUPPORTING THE PILOT ACTION CONCEPTUALISATION | 17 |
| 5. DEMAND SIDE MANAGEMENT TOOLS | 18 |
| 5.1. EXAMPLES OF POSSIBLE BEHAVIOURAL DSM TOOLS TO BE USED AT PILOT BUILDINGS LEVEL | 18 |
| 6. TEMPLATE FOR THE DEVELOPMENT OF THE 8 PILOT ACTIONS | 25 |
| 6.1. TEMPLATE | 25 |
| 7. EXAMPLES | 37 |
| 7.1. IDEAS FOR PLANNING YOUR PILOT ACTION..... | 37 |
| 8. CONCLUSION..... | 42 |
| REFERENCES | 43 |
| GLOSSARY | 44 |
| LIST OF FIGURES | 45 |
| LIST OF TABLES..... | 46 |
| APPENDIX..... | 47 |

1. Introduction

The Project TOGETHER offers a transnational capacity building platform, where partners with different levels of knowledge can strengthen their competences together, thus reducing their disparities and promoting actions on both the supply and demand side, in the context of planning EE in public buildings. The main goal of the project is improving energy efficiency and energy saving in public buildings by changing behaviour of building users and promoting energy efficiency measures.

This document provides common guidelines to the partners for drafting their respective pilot project implementation plans and developing the presentation of their Pilot Actions in their pilot buildings clusters with a common framework and visual identity.

This tool is contextualized within the framework of the second objective of the project TOGETHER: if the first project objective “To increase energy efficiency and secure investments thanks to improved multidisciplinary in-house staff skills and thanks to an Alliance system with more engaged and motivated buildings users” calls for the observation and learning of possible tools to be combined together for achieving energy efficiency in public buildings, the second one “To produce and test the most appropriate combinations of technical, financial and Demand Side Management tools for the improvement of the energy performance of public infrastructures” calls for the practical and concrete implementation of the possible identified measures.



1.1. Project TOGETHER

The three main objectives of the project TOGETHER consist in:

1. Increasing public buildings energy efficiency and securing investments, through the improved multidisciplinary in-house staff capacity building of Public Administrations and the establishment of a system of alliances with more engaged and motivated building users;
2. Producing and pilot testing the most appropriate combinations of technical, financial and Demand Side Management tools for the improvement of the energy performance of public infrastructures, currently in the 8 regional Pilot Actions involving a total of 85 buildings;
3. Codifying the project outcomes into a comprehensive policy package for a large-scale implementation, bringing local buildings governance practices to the centre of ambitious energy saving policies.

In its inception, TOGETHER plans the organisation of an interdisciplinary “Training of Trainers” course for building owners, managers and public decision makers that integrates the traditional technical inputs on energy management and buildings retrofitting with targeted contributions from behavioural science, economics and psychology, aiming to engage the end users in the building energy performance goals.

The “Training of Trainers” course is completed by the provision of an Integrated Smart Toolkit, including:



1. Guidelines for implementing the innovative EPIC (Energy Performance Integrated Contract) scheme, combining technological devices and behavioural-based components;
2. A set of exemplary models of Energy Management Systems in schools, institutional and other type of buildings;
3. An innovative Building Alliance concept among building owners/managers/users who cooperate within a Negotiating Panel to achieve energy savings to be reinvested through a Reinvestment Action Plan.

Additionally, and by the project's end, the Partners will jointly elaborate a Transnational Strategy and Mainstreaming Programme, including policy/strategic and operational recommendations for an appropriate follow-up and a sustainable take-up of the project outputs.

1.2. Purposes of the Pilot Concept Design template

This deliverable aims at providing a common guide to the project partners when planning their Pilot Actions in their respective pilot buildings clusters. The ambition of this deliverable/tool is to create a standardized platform that the project partners can use to plan their Pilot Actions, by using not only a common template, but a common basis of thinking and reasoning, together with their buildings stakeholders.

The Pilot Concept Design represents the fundamental attachment of the Building Alliance (D.T2.3.2): it represents the action plan of the 8 Pilot Actions in 85 different pilot buildings.

The partners will adapt and implement the Pilot Concept Design to their respective pilot scenarios.

The pilot concept design has to be implemented in each pilot building, so eventually the partners will elaborate 85 pilot concept designs related to their 8 pilot buildings clusters, together with the whole chain of their buildings players: owners, managers, end users representatives.

1.3. Use of the Pilot Concept Design template

The first test of the pilot concept design was tested in Jihlava on occasion of the Thematic Working Group meeting devoted to discussing the Pilot Actions.

On occasion of that meeting, the partners discussed about the Pilot Actions process and about the preliminary activities that lead to their delivery and decisions.

The partners have to bear in mind that according to the Application form, the Pilot Actions have to be planned on the basis of the pilot concept design, other integrated T2 tools (technical, financial and demand side management) and on the basis of the Building Alliance.

The Building Alliance identifies the common goals of energy reductions, the “profit sharing” approach, incentives etc. decided by the Negotiating Panel.



2. The 8 TOGETHER building clusters

2.1. Introduction

Project TOGETHER involves 8 pilot building clusters for a total of 85 buildings in 8 different partners regions.



Figure 1: localisation of the project partners

The partners' building clusters are composed in different ways, as explained in the deliverable D.T3.1.1 summarized by PP2 EAV.

Based on the D.T3.1.1 questionnaire elaborated in the first period, we gathered the following data:

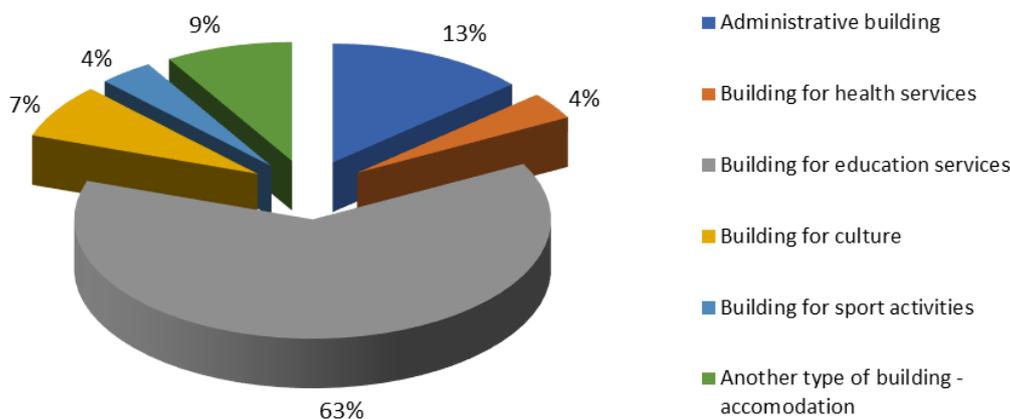


Figure 2: Demonstration of the pilot building purposes

Most of the pilot buildings are destined to educational services, where it is possible to work on the energy consumption habits of pupils and students. In the second place, there are administrative buildings, where it is possible to work on the customization of their indoor climate, also through the organisation of basic energy trainings for the buildings users, based on previous surveys of the building users' satisfaction with indoor climate. Other types of buildings included in the project are buildings for health services, buildings for culture, buildings for sport activities and buildings destined to students' accommodation: i.e. dormitories.

2.2. Pilot cluster variables

a) The partners have different pilot building scenarios:

PP1/PA1 works on its owned pilot buildings and, in parallel, in buildings belonging to the associated partners. Some partners work on their own pilot buildings, but the pilot investment does not encompass all the involved pilot buildings, as in the case of Treviso and the University of Maribor/PP3. As a matter of fact, the LP involved 8 secondary school buildings but is going to implement the investment only in 4 of them. The University of Maribor is going to test activities in 7 buildings but to invest only in 4 of them. Other partners have not involved buildings they own but are going to work with buildings belonging to the Associated Partners, as in the case of PNEC, EAV and SIEA; while Hegyvidek/PP7, Zagreb/PP4 and Paks/PP9 involved only pilot buildings they own.

b) The partners' building clusters have different compositions (as shown in the table above).

Some partners involved only educational school buildings, as in the case of Treviso, Zagreb and EAV.

Some others presented more heterogeneous pilot building clusters, involving the three main categories identified in our projects.

In some other cases, the end-users of the building clusters composed only by educational buildings have different ages.

c) 38 pilot buildings belong to different Associated partners:

- Treviso involved 12 buildings belonging to 10 Associated Partners;
- EAV involved 10 buildings belonging to 1 Associated Partners;
- PNEC involved 9 buildings belonging to 3 Associated partners;



- SIEA involved 7 buildings belonging to 4 Associated partners.

The Associated Partners have different features: they are more or less big, more or less advanced in the use of advanced contracting models and tools. It is important to note that each Pilot Action is composed of different buildings (from at least 7 to 20) and in some cases the pilot buildings belong to different institutions that are not the project beneficiaries. The fact that some Pilot building Clusters belong to different Associated Partners (i.e. in Italy, Poland and Slovakia) calls for a multi level dialogue and an intensive relationship that in some case can be really demanding.

Each pilot action will be characterized by the prevalence of one of the three typologies written above and it will have its own planning path, decided by the Negotiation Panel either directly or indirectly.

Table 1: distribution of the pilot buildings in the 3 main buildings categories

| | Total no. of pilot buildings | Educational buildings | Institutional buildings | Other types of buildings | No. of buildings involved owned | No. of pilot buildings belonging to the Associated Partners | No. of buildings interested by the investment |
|------------------|------------------------------|-----------------------|-------------------------|--------------------------|---------------------------------|---|---|
| Treviso PA1 | 20 | 18 | 2 | 0 | 8 | 12 | 16 |
| EAV PA2 | 10 | 10 | 0 | 0 | 0 | 10 | 5 |
| UM PA3 | 7 | 2 | 0 | 5 | 7 | 0 | 4 |
| Zagreb PA4 | 12 | 12 | 0 | 0 | 12 | 0 | 12 |
| PNEC PA5 | 9 | 4 | 3 | 2 | 0 | 9 | 9 |
| PAKS PA6 | 11 | 2 | 2 | 7 | 7 | 0 | 11 |
| Hegyvidek PA7 | 9 | 4 | 3 | 2 | 9 | | 9 |
| SIEA PA8 | 7 | 4 | 1 | 2 | 0 | 7 | 7 |
| Total | 85 | 56 | 11 | 18 | 43 | 38 | 73 |



The partners administered a questionnaire at local level to get a sharper overview of the state of the art related to the energy management capacities and maturity of the partners that own the building stock involved in the project and of the Associated Partners that are involved in the project in terms of pilot buildings.

2.3. State of the art in the involved local communities

The Associated Partners and the project beneficiaries that are owners of building stocks (Province of Treviso, Maribor, Zagreb and Hegyvidek) have:

- A different level of experience in retrofitting and in the use of financial and contractual instruments.
- A different level of energy management organisation.
- Different experiences in the use of automatic energy monitoring systems.
- Different in house competencies.

Moreover, the pilot buildings end-users have a different type of interaction with the buildings premises and their energy consumption practices can variably affect the energy consumption level:

- Buildings occupied by regular users for learning activities (schools, universities, dormitories, kindergartens).
- Buildings occupied by permanent staff for other activities (office buildings, municipal buildings).
- Buildings occupied by users for different, occasional activities (cultural buildings, libraries, museums, concert halls).



3. Uvođenje pilot-mjera na regionalnoj razini

3.1. Uvod

U projektu TOGETHER planirane su sljedeća tri glavna tipa mjera:

1. kombinacija postojećeg sustava osnovnog upravljanja s mjerama upravljanja potražnjom koje su razvijene
2. jačanje već testiranih shema angažiranosti korisnika s mjerama upravljanja potražnjom koje su razvijene
3. primjena integriranih alata razvijenih u sklopu RPT2, uključujući EnMS, financijske i ugovaračke alate.

Budući da je svaki projektni partner prethodno izabrao klaster zgrada (u vlasništvu pridruženih partnera ili koje pripadaju pridruženim partnerima) za ukupno 85 zgrada, pojedinačna pilot-mjera na razini zgrade može se razlikovati i može biti usmjerena na temelju sljedećih varijabli / stanja stvari u svakoj partnerskoj regiji:

- energetska učinkovitost / starost zgrade i potrošačke prakse njezinih stanovnika; prostor zgrade / prakse korištenja
- razinu zrelosti svake uključene administracije (npr. manje napredne općine koje su u početnoj fazi)
- trenutačno stanje stvari u pogledu ugovora o nabavi (tj. u slučaju da je ugovor o nabavi pri kraju, je li moguće sklopiti novi ugovor koji bi uključivao referencije na upravljanje potražnjom?)
- „interne kompetencije” koje treba istražiti imajući u vidu mogućnost kombiniranja i povezivanja različitih alata integriranih s mjerama upravljanja potražnjom.

3.2. Mogući pristupi pilot-mjera

Pilot-mjere moraju se aktivirati od rujna 2017. do prosinca 2018., no što su to pilot-mjere?

Pilot-mjere trebaju ispitati i pokazati učinak objedinjenih mjera za upravljanje energijom usmjereno poboljšanju energetske učinkovitosti zgrada te ponašanja i svijesti korisnika, što čini inovativni aspekt mjera.

Tipologija pilot-mjera koja se mogu provesti na razini pojedinačne zgrade jedne od triju vrsta:

1. kombinacije sustava upravljanja svakodnevnom energijom s pomoću mjera DSM-a koje su razvijene: **OSNOVNI PRISTUP**.
2. unaprjeđenje već postojećih mjera uključivanja korisnika novim latima DSM-a: **PRISTUP UNAPRJEĐENJA**
3. primjena integriranih alata razvijenih u sklopu RP T2, uključujući unaprijeđeni sustav upravljanja energijom, financijske, tehničke, ugovorne i DSM alate: **EVOLUCIJSKI PRISTUP**

Ove su tri glavne kategorije opisane u obrascu Prijave. Termini „osnovni”, „unaprjeđenje” i „evolucijski pristup” izabrani su u kasnijoj fazi, tijekom izrade nacrtu dizajna pilot-koncepta, kako bi se istaknula „postupna vrijednost” te sve veća težina od jednog do drugog pristupa.



Štoviše, činjenica koju treba uzeti u obzir jest da, prema pristupu projektu koji se temelji na koracima, korisnici projekta jesu regionalne/lokalne uprave i/ili predstavljaju regionalne/lokalne uprave koje imaju različitu razinu zrelosti i iskustva u vezi s energetsom učinkovitošću i mogućim mjerama koje se mogu provesti kako bi se postigla ta učinkovitost. Javne su uprave javne zgrade obično promatrale ograničeno, probleme su rješavale zasebno i samo kad se pojave, dok su ugovorima o opskrbi energije upravljale bez objedinjena gledišta.

Nedostatak znanja, složenost pravila, sve brojnije svakodnevne aktivnosti u tehničkim uredima javne uprave (u rasponu od upravljanja zgradom, građevinskih dozvola, punomoći, održavanja zgrada, ugovora o isporuci energije uz pomoć privatnih sektora itd.) sprječavaju tehničke stručnjake u javnoj upravi da se angažiraju u hvalevrijednom procesu koji će rezultirati naprednijim alatima koji su i više integrirani, a kojima je moguće upravljati energetsom učinkovitošću i stvarati je.

Uključenost i angažman korisnika zgradom zahtijeva vremena i usvajanje novog komunikacijskog registra koji bi trebali prihvatiti stručnjaci u javnoj upravi koji se svakodnevno bave održavanjem zgrada.

3.2.1. Uloga pilot-mjera

Pilot-mjere predstavljaju temeljne aktivnosti projekta, primjerice:

- potvrđuju i objedinjuju put obuke u treningu T1
- ispituju tehničke, financijske i alate upravljanja potražnjom koji su razvijeni u treningu T2 (integrirani alati)
- pružaju naznake za razradu političkih preporuka uz razradu Integrirane strategije za energetske učinkovitost u javnim zgradama koja je planirana u T4 (politička uključenost i obveza).

Da smo pilot-mjere željeli prikazati ikonom, vjerojatno bismo izabrali **Rubikovu kocku** u kojoj interni okretni mehanizam omogućuje da se svaka strana okreće neovisno o drugima, miješajući tako boje.

Sličan se pristup može primijeniti na pilot-mjere projekta kojima se želi testirati sposobnost javnih uprava da kombiniraju i povezuju različite moguće alate kako bi ostvarile ciljeve energetske učinkovitosti u svojim pilot-zgradama u koje u kasnijoj fazi primjenjuju stečeno znanje na ostale infrastrukture u svojem vlasništvu i na ostale scenarije (Tematski radni paket br. 4, Planovi za odobrenje Akcijskog plana za uvođenje testiranih mjera u ostale kontekste).

Razina i složenost kombinacija uvjetovana je razinom zrelosti javne uprave, razinom uključenog rizika i njihovom voljom da riskiraju, utirući tako put inovaciji umjesto putovanju utabanim stazama.

3.3. Upravljanje potražnjom: bihevioralno i analitičko

Neovisno o izboru, svi partneri u kontekstu svojih zgrada moraju uvesti barem mjere takozvanog bihevioralnog upravljanja potražnjom.

Koja je razlika između bihevioralnog i analitičkog upravljanja potražnjom?

Bihevioralno i analitičko upravljanje potražnjom (DSM) relativno su nove metode otkrivanja i promicanja energetske uštede koje imaju potencijal smanjiti troškove energetske potrošnje iznad rezultata koje su postigli programi tradicionalnog DSM-a. Svaka se metoda oslanja na softverske platforme i upotrebu podataka kako bi se dobile informacije o privatnoj i poslovnoj potrošnji energije.

1. Bihevioralni DSM više je usmjeren educiranju potrošača i poticanju pojedinačnog sudjelovanja kako bi se postigle uštede energije, dok



2. bihevioralni DSM pronalazi prilike za uštede praćenje opreme i analizom podataka.

Nova dostupnost podataka o upotrebi energije i stvaranje softverskih platformi s analizama podataka pružili su osnovu za bihevioralni i analitički DSM. Ovaj trend pokreću i rast pametne mreže i razvoj pametnih mjerača. Podatci, koji su rezultat toga, postali su alat za promicanje niže potrošnje energije i smanjenje troškova, što dovodi do veće zadovoljstva korisnika u pogledu komunalija i do daljnjih ulaganja u programe DSM-a. Međutim, iako programi DSM-a postaju sve važniji za komunalije, postoji određeni otpor prema prihvaćanju novih tehnologija.

Bihevioralni i analitički DSM takvi su novi koncepti da treba evaluirati upotrebe tih rješenja i rezultata koje mogu proizvesti kako bi se se razvilo povjerenje i prednost dalo njihovoj široj primjeni. To je jedan od ciljeva naših pilot-mjera koji u ovom smislu može biti primjerom.

Stroga kontrola potrošnje energije i optimizacija energetske učinkovitosti i provedenim aktivnostima mogu povećati pouzdanost podataka / povratnih informacija i, iznad svega, mogu rezultirati uštedama.

3.4. Postavljanje pametnih mjerača kao prva nadogradnja sustava upravljanja svakodnevnom energijom koji se upotrebljav

Svi projektni partneri imaju priliku projektne resurse uložiti u postavljanje sustava automatskih povratnih informacija, kao što su pametni mjerači, kako bi bilježili i prikupljali (toplinske i električne) podatke o svojoj potrošnji energije.

Pametni sustav mjerenja, definiran kao „mjera izravnih povratnih informacija” (ulomak iz izdanja „Achieving energy efficiency through behaviour change: what does it take?” („Postizanje energetske učinkovitosti promjenom ponašanja: što treba učiniti?”) EEA), dionicima U zgradu pruža konkretnu mogućnost dobivanja izravnih i neposrednih povratnih informacija o incidenciji svojih bihevioralnih i potrošačkih praksi na potrošnju energije.

Sustavi povratnih informacija, koji se temelje na pametnim mjernim uređajima stoga su strateški u programima energetske učinkovitosti utemeljenima na mjerama upravljanja potrošnjom (DSM) i uključenosti korisnika. Korisnicima su potrebni odgovarajući okviri kako bi utvrdili gdje troše previše energije, a pametni sustav mjerenja može im dati izravne povratne informacije vizualizirane na zaslonima. Opće je utvrđeno da su same mjere neizravnih povratnih informacija / ručnog mjerenja način kako uključiti korisnike i angažirati ih u usvajanju primjerenog ponašanja.

S druge strane, pametni mjerni uređaji mogu pružiti neposredne povratne informacije, pouzdane i usporedive podatke te zahtijevaju manje radnog vremena od sustava praćenja energije temeljenih na ručnoj registraciji.

Postavljanje pametnih mjerača u pilot-zgrade ključno je za pilot-mjere koje ciljaju poboljšanju svoje energetske učinkovitosti jer:

- će pružiti informacije koje će poslužiti kao osnova za planiranje svih budućih intervencija energetske učinkovitosti (uključujući tehničke, financijske, DSM,...)
- će pomoći u stvaranju promjena u ponašanju korisnika te će pratiti učinkovitost već poduzetih mjera
- će pomoći da se brzo reagira na bilo kakav kvar te da se bihevioralni/upravljački postupci prilagode na željeni način



- će pomoći u poticanju angažmana korisnika zgradom u mjerama uštede energije (kada ljudi budu mogli pratiti potrošnju energije u stvarnom vremenu, obraćat će više pozornosti svojim djelima i navikama)
- će pomoći u pružanju vizualnih informacija o promjenama u potrošnji, što može biti korisno za predstavljanje rezultata i ukazivanje svim dionicima u zgradi / korisnicima zgradom na promjene koje su i dalje potrebne.

Analize provedene u pilot-zgradama (energetske revizije) daju statičnu sliku zgrade, što nam pomaže u definiranju problema izgradnje, kvarova u mehaničkim sustavima, rasipanja energije. Rezultati tih ispitivanja definiraju točke intervencije, što može doprinijeti poboljšanju energetske učinkovitosti u uključeni javnim zgradama.

Dok te tehnologiju nemaju za cilj potaknuti promjene u ponašaju, čini se da stvaraju novi kontekst u kojemu može doći do ponašanja kojima se štedi energija. Pregovori sa zaposlenicima i njihovo prihvaćanje novih tehnologija do danas su slabo istraženi, ali ih je potrebno dodatno istražiti (ulomak iz izdanja „Intervening to change behaviour and save energy in the workplace: a systemic review of available evidence” („Intervencija radi promjene ponašanja i uštede energije na radnome mjestu: sustavna revizija dostupnih dokaza”))

S druge strane, tim se zgradama za različite aktivnosti koriste ljudi različitih navika.

Njihovi uzorci potrošnje različiti su i s vremenom se razlikuju. Te dinamičke podatke treba mjeriti u stvarnom vremenu ili treba omogućiti analizu krivulja potrošnje zgrade na satnoj, dnevnoj, tjednoj i mjesečnoj bazi.

Skup krivulja potrošnje definira krivulju potrošnje zgrade i pokazuje mjesta i vremenske intervale u kojima treba smanjiti potrošnju.

Statička analiza provedena u pilot-mjerama ispituje energetske rezultate zgrade, što pruža okvir za intervencije.

Pametni mjerač ispituju potrošnju (i opremu) ljudi, što omogućuje fino ugađanje definicije interventnih točaka u prostoru i vremenu.

PP/EAV odlučili su se za miješani pristup, i izravni i neizravni, te će evaluirati automatsko prikupljanje podataka

naspram ručnog prikupljanja podataka u kontekstu upravljanja energijom.

Dvostruka upotreba mjera izravnih (pametnim mjeračima) i neizravnih povratnih informacija (ručnom registracijom) omogućit će usporedbu isplativosti sustava izravnih i neizravnih mjerenja, pri čemu se potonji sustav bazira na ručnom radu (registracija i unos podataka).

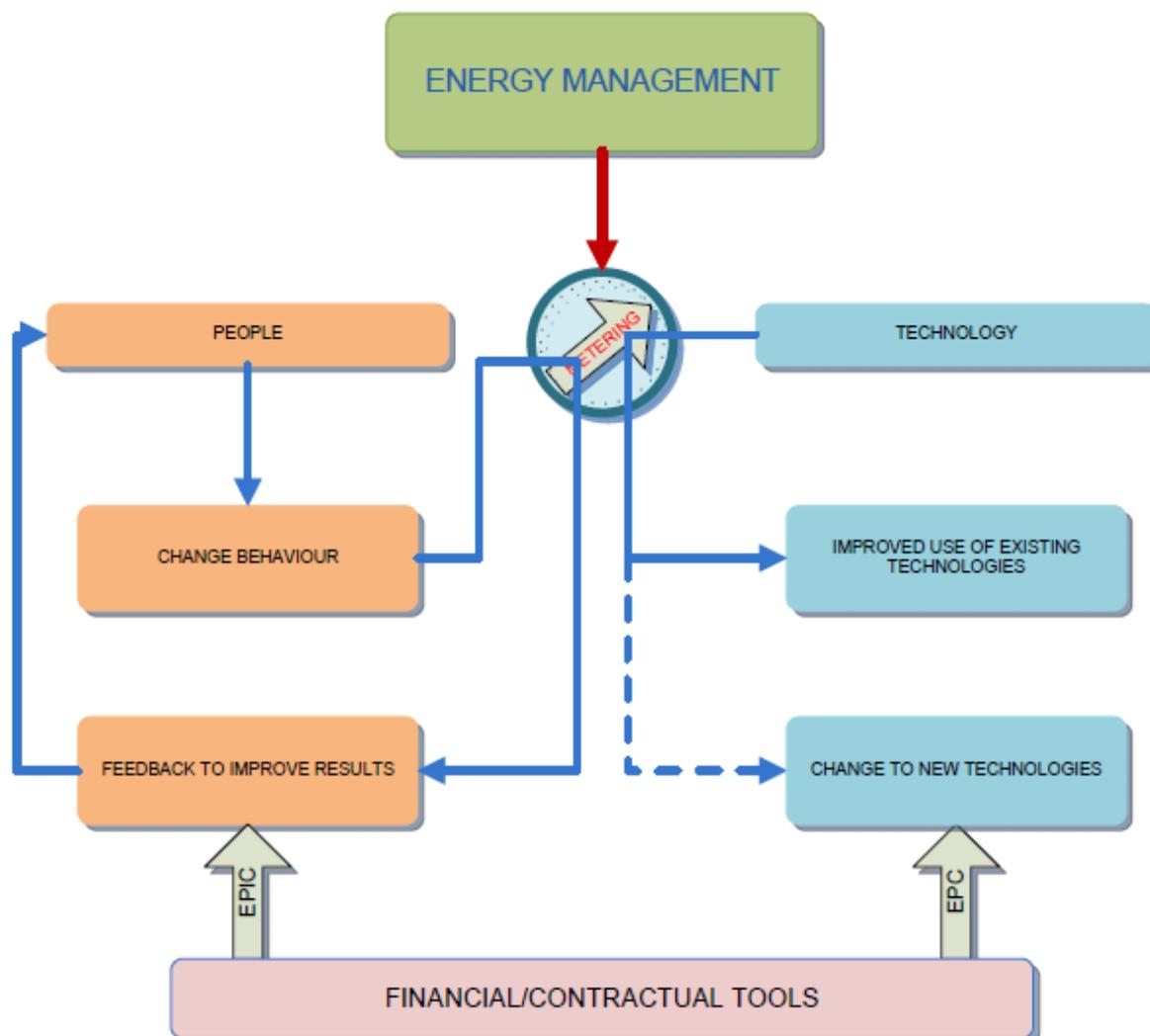
Cilj je pokazati vrijednost ulaganja (kao što je napisano u Akcijskom planu ponovnog ulaganja) u takve tehnologije i pružiti dokaze o dodanoj vrijednosti ulaganja u pametne sustave mjerenja integrirane s mjerama DSM-a kako bi se postigli konkretni rezultati energetske učinkovitosti.

Uvođenje sustava izravnih povratnih informacija i registracija potrošnje energije sami po sebi predstavljaju prvi korak na putu prema unaprjeđenju svakodnevnog sustava upravljanja energijom partnera / pridruženih partnera.

Kad je riječ o pilot-mjerama, partneri u pitanju mogu otići još dalje razvijanjem i primjenom novog/unaprijeđenog sustava upravljanja energijom (EnMS), inspirirajući se ishodima projekta Komplet alata O.T2.1. koji sadržava tri modela sustava upravljanja energijom.

Uvođenje pametnih mjerača inovacija je samo po sebi.

Sljedeći se korak sastoji od moguće partnerske formalizacije sustava upravljanja, također i uvođenjem standardnih postupka za upravljanje energijom (npr. ISO 50001).



Slika 3: Sustav upravljanja energijom

Shema prikazuje sustav upravljanja energijom koji se temelji na mjerenju i, posljedično, upravljanju potražnjom.

Lijeva strana predstavlja bihevioralni DSM: Korisnici mijenjaju ponašanje i provjeravaju učinkovitost promjene pametnim mjerenjem koje pruža povratne informacije koje omogućuju daljnje bihevioralno poboljšanje, otvarajući tako hvalevrijednu petlju.

Desni dio predstavlja analitičko upravljanje potražnjom: upotreba postojeće tehnologije unaprjeđuje se povratnim informacijama koje neprestano pruža učinkovit sustav mjerenja.



Proces također može dovesti do otkrivanja potrebe za tehnološkim unaprjeđenjima ili novim tehnologijama (točkasta linija).

Donji dio predstavlja mogućnost poticanja i mehanizama unaprjeđenja i pomoć financijskih/ugovornih alata. Desni dio predstavlja EPC (ugovor o energetske rezultata, engl. Energy performance contract, EPC) koji se može objediniti s mjerama bihevioralnog DSM-a (integrirani ugovor o energetske rezultata, engl. Energy Performance Integrated Contract, EPIC).

3.5. Makrosastavnica pilot-mjera

Projekt za provedbu pilot-mjera čine sljedeće sastavnice:

1

Planirajte razvoj i provedbu novog/unaprjeđenog sustava upravljanja energijom (EnMS) (na temelju priručnika razvijenih u T2 za različite vrste zgrada)

Energetski učinkovito ponašanje pomaže organizacijama da uštede kao i da čuvaju resurse i rješavaju pitanje klimatskih promjena.

2

Dizajnirajte:

- plan unaprjeđenja s *tehničkim intervencijama* (strukturalne i sustavne intervencije za energetske učinkovitost)
- plan unaprjeđenja s *financijskim mjerama* (financijske sheme, ugovori itd.).



Planirajte provedbu upravljanja potražnjom s mjerama usmjerenima na:

- *unaprjeđenje organizacije vremena i prostora* Odnosi se na kategoriju korisnika koji imaju ovlast za zastupanje u pogledu upotrebe prostora i vremena
- *educiranje potrošača i poticanje sudjelovanja pojedinaca kako bi se postigle uštede energije..*

Treća sastavnica „zajednički je nazivnik” koji treba uvesti u svaki pilot-klaster! U društvenu komponentu treba ulagati u svim pilot-zgradama.

3.6. Vizualni prikaz ključne važnosti upravljanja potražnjom pri planiranju energetske učinkovitosti

Tablica 2: Vizualni prikaz važnosti DSM-a pri planiranju energetske učinkovitosti

| SASTAVNICA/ZGRADA |  |  |  |
|--|---|--|---|
| <p>1</p> <p>Novi/ažurirani sustav upravljanja energijom, uključujući analitičke alate za upravljanje potražnjom</p> | | | |
| <p>2</p> <p>Dizajniranje tehničkih unaprjeđenja</p>  | | | |
| <p>3</p> <p>Dizajniranje ugovora i financijskih unaprjeđenja</p>  | | | |
|  <p>ALATI BIHEVIORALNOG UPRAVLJANJA POTRAŽNJOM U POGLEDU ULAGANJA U SOCIJALNU SASTAVNICU</p> | | | |



Većina mjera energetske učinkovitosti koje su provedene (ili će biti provedene) u Europi uključuju tehnološke intervencije, ali će se jednako tako morati osloniti na ljude koji prilagođavaju svoje ponašanje u pogledu potrošnje energije te, usporedno s time, unaprijediti kapacitet javnih uprava za ulaganje u sustav upravljanja energijom, kao što su razvijeni u nekim integriranim alatima razvijenima u sklopu projekta (referencije na priručnike D.T2.1.3 Priručnik detaljnih postupaka za sustav upravljanja energijom (EnMS) u ŠKOLAMA, D.T2.1.4 Priručnik detaljnih postupaka za sustav upravljanja energijom (EnMS) u INSTITUCIONALNIM ZGRADAMA i D.T2.1.5 Priručnik detaljnih postupaka za sustav upravljanja energijom (EnMS) u JAVNIM ZGRADAMA)

Vizualni se prikaz preklapa sa strukturom triju Transnacionalnih kompleta alata planiranih u sklopu tematskog radnog paketa T2 „Integrirani alati”, što pruža dokaze o tome kako bi se moguće rješenje energetske učinkovitosti trebalo integrirati sa sastavnicom takozvanih jeftinih mjera povezanih sa socijalnim ulaganjem, odnosno uključivanjem korisnika radi njihova angažmana u postizanju ciljeva energetske učinkovitosti.

Interakcija između mogućeg rješenja za energetske učinkovitost i njegovih integracija sa socijalnom sastavnicom razvijena je u drugim rezultatima projekta, posebice u sljedećim alatima:

- D.T2.1.3 Priručnik detaljnih postupaka za sustav upravljanja energijom (EnMS) u ŠKOLAMA
- D.T2.1.4 Priručnik detaljnih postupaka za sustav upravljanja energijom (EnMS) u INSTITUCIONALNIM ZGRADAMA
- D.T2.1.5 Priručnik detaljnih postupaka za sustav upravljanja energijom (EnMS) u JAVNIM ZGRADAMA
- D.T2.2.1 Model EPIC-a - Integriranog ugovora o energetske rezultata
- D.T2.2.2 Transnacionalni priručnik dobrog upravljanja
- D.T2.2.3 Komplet subvencija i poticaja integriranih u upravljanje potražnjom (DSM)
- D.T2.2.4 Komplet financijskih instrumenata integriranih u upravljanje potražnjom (DSM)



4. Pilot Actions Flow

4.1. Introduction

The pilot actions and their workflow are different for the different countries and partners.

There are many variables that all the project partners have to take into account, nevertheless there is a general procedure that has to be fulfilled.

4.2. The Road-Map for the elaboration of the Action Plan of the Pilot Actions at building level



Figure 4: Pilot actions flow

The starting point for planning the Pilot Action is the installation of the smart metering systems (I1-I5, I7, I8) and the interpretation of the results of the energy audit (D.T3.1.3) performed in the pilot buildings, which represents the first step of the project.

The resulting information will be integrated with the profiling of the buildings and their users (D.T3.1.2) and with the mapping of the stakeholders to be involved in the Negotiating Panel.

The Action Plan will be drafted on the basis of the information that will be available and the activities will be defined when the tools (T2) are ready.



Each Negotiating Panel will define the features of its Pilot Action so that it suits one of the three available typologies:

- Combination of the day-to-day energy management system with the DSM measures developed: **BASIC APPROACH**;
- Improvement of the already existing measures for the users' involvement with new DSM tools: **IMPROVEMENT APPROACH**;
- Application of the integrated tools developed in WP T2, including an improved Energy Management System, finance, technical, contractual tools and DSM tools: **EVOLUTION APPROACH**.

4.3. Cross-cutting activities supporting the Pilot Action conceptualisation

In parallel with the development of the preliminary activities leading to the pilot action planning and implementation, other project activities are in progress and their outputs provide the contents to conceptualise the pilot action:

- Thematic Work-package n. 1: Formal training paths in each partner region, anticipated by the Master Train-the-Trainers that provides new knowledge and assures knowledge advancement in the field of energy efficiency.
- Thematic Work-package n. 2: Development of the other integrated tools related to the technical, financial and Demand Side Management measures that provide guidelines and instructions on how to introduce possible integrated energy efficiency solutions at pilot buildings level.

The results of the Pilot Actions lead to a necessary dialogue and exchange of views with the political level that receives the Transnational Strategy for energy efficiency in public buildings and a Policy Package including the Reinvestment Plan and the Action Plan for all the buildings (Thematic Work-package n. 4).



5. Demand Side Management tools

5.1. Examples of possible Behavioural DSM tools to be used at pilot buildings level

The table below provides an indicative list of possible Demand Side Management solutions available in the market, indicating the resources/website, the possible context of use and the languages in which the material is available. Examples available in English were primarily searched for, however there are some interesting country specific examples as well. These suggestions are not intended to be copied and ready for use, they are given as an inspiration to tailor-made tools for behavioural change that fit the best to the given situation in a building that is undergoing the process of introducing full-scale energy management system. All behavioural tools rests on the awareness raising campaign that needs to be carefully designed to provide benefit recognition to the target group. Trainings with different levels of details should be organised and accompanied by appropriate materials (leaflets, posters) and if possible awards (financial or not-financial). In order to provide continuous reminders related to energy behaviour posters and signage can be used, while feedback to the building users should also be provided through publication and public promotion of best practice examples. One of the possibilities to keep building users alerted in relation to energy efficiency is a dedicated newsletter. Finally, information related to the use of social media and gaming to promote energy efficiency are provided. Distinction between different types of public buildings was not made for each and every tool, as all of them, if designed properly, can be used in each type of a public building. However, for some examples indication on the type of building was made, dominantly in relation to educational buildings as they have pupils as one specific and very important target group to be addressed in all Energy Management Systems and Demand Side Management activities.

Furthers DSM measures are listed in the deliverables D.T2.2.3 “Set of subsidies and incentives integrated with Demand Side Management” and D.T2.3.3 “DSM tools for the engagement of the buildings users”

Table 3: Examples of possible Behavioural DSM tools to be used at pilot buildings level

| | |
|---|---|
| <p>Training and awareness raising campaigns</p> | <p>Training and awareness raising are integral parts of any energy management systems. They should be tailor-made to fit the needs of a target group. Awareness raising campaigns and trainings need to be accompanied with appropriate promotional and training materials. For employees and building users (e.g. pupils in educational buildings) simple, informative and interactive trainings should be provided.</p> <p>Example of training materials for public sector employees is provided here (guidance for green office): http://www.enu.fzoeu.hr/assets/files/shared/list/zuRadnaKnjiga.pdf (In Croatian)</p> <p>How to develop awareness campaign can be found here:</p> <p>https://www.carbontrust.com/resources/guides/energy-efficiency/creating-an-awareness-campaign-download/ (in English)</p> <p>Training may be more relevant in mod traditional offices with decentralised energy functions where, for example, employees can operate air conditioning interfaces, but often without any knowledge in how to best use them, such as closing windows whilst the air conditioning is active. Training may also become more relevant alongside the introduction of new smart energy technologies or system, which return some influence</p> |
|---|---|



| | |
|-----------------------------------|---|
| | <p>over local conditions to buildings occupants in order to improve satisfaction levels, which are often low under the centralisation strategy.</p> |
| Financial and economic incentives | <p>Financial incentives can be good stimulus for change of behaviour and can be a part of awareness raising campaigns, as the result of the changed behaviour will be immediately awarded. The awards do not need to be necessary in money terms, they can also bring some other form of benefit, as tickets for theatre or football game, etc. However, even better examples that immediate awards are seen in the ability to make decision about distribution of saved money. This is especially good stimulus for long-lasting behaviour change, i.e. for adopting energy efficiency as a way of living in schools. Excellent example is 50/50 project:</p> <p><u>http://www.euronet50-50max.eu/en/about-uronet-50-50-max/what-is-the-uronet-50-50-max-about</u> (in English)</p> |
| Leaflets | <p>Leaflets are usually used to provide more information on specific topic. E.g. leaflets are used to disseminate information on available sources of financing, on specific energy efficiency activities that are going to be implemented or that have been implemented (in these cases, results of activities are presented) or to provide guidance on how to implement certain activities.</p> <p>Interesting example of leaflet aimed at using green criteria in public procurement is available here:</p> <p><u>http://fzoeu.hr/docs/brosura_zelena_javna_nabava_v1.pdf</u> (in Croatian)</p> <p>Leaflets usually contain energy saving tips and links to implementing agencies that can provide more information, e.g.:</p> <p><u>https://www.derbyshire.gov.uk/images/Energy%20Efficiency%20leaflet_tcm44-205647.pdf</u> (in English)</p> <p>Example of project-based leaflet is provided here:</p> <p><u>http://www.euronet50-50max.eu/images/documents/Leaflet_50_50_max_EN.pdf</u></p> |
| Posters/signage | <p>There are numerous examples of posters/signage that raise awareness of employees within a public building. This awareness raising messages are universal and can be applied in any public building, reminding employees to turn off the lights or switch off their computers when not in use.</p> <p>Available resources (ideas that need to be adapted for specific country/city/institution): <u>https://www.pinterest.com/pin/242350023676097837/</u> (in English)</p> <p><u>https://www.carbontrust.com/resources/guides/energy-efficiency/posters-and-stickers-for-employee-awareness/</u> (in English)</p> <p><u>http://www.enu.fzoeu.hr/info-edu/informiranje-i-edukacija-gradana/informativno-edukativni-materijali</u> (in Croatian)</p> |



| | |
|-----------------------------------|--|
| | <p>Excerpt from “intervening to change behaviour and save energy in the workplace: a systematic review of available evidence”</p> <p>A meta- analysis of studies to promote pro-environmental behaviours in the workplace finds that those most impactful interventions are those that involve cognitive dissonance (where differences between actions and pre-existing values or attitudes are highlighted), goal setting, social modelling (providing role models), and prompts (other types of treatment reviewed included "making it easy" for employees, justifying the need for actions, providing instructions, giving feedback, offering rewards and seeking employee commitment" - excerpt from "intervening to change behaviour and save energy in the workplace: A systematic review of available evidence"</p> <p>Providing energy-saving prompts by email directly to employees or placing signs by light switches asking employees to turn them off, could be argued to be both educating users as to energy saving actions that be taken, and to be providing contextual cues to remind people of behaviours that they should already be undertaking.</p> |
| <p>Direct feedback system</p> | <p>Changing the physical context- such as the use of signs, stickers or posters, use of electronic devices and on line dash boards to provide real time energy use feedback (which may implicitly promote awareness and therefore considered use of energy)</p> <p>Emails prompts</p> <p>Checklist</p> <p>The use of feedback devices may offer more potential than the use of signs or visual imagery.</p> |
| <p>Success stories/newsletter</p> | <p>Success stories related to energy efficiency in public sector are numerous and are published by the cities, project consortiums within different projects, solution providers and other agencies implementing specific projects in the public sector at local level, primarily local or regional energy agencies. Newsletters are also usually formed as a part of some specific project/programme that lasts for a specific period of time or by specialised institution that implements activities, usually local or regional energy agencies. At their web sites, implementing agencies offer possibility to subscribe to a newsletter, so that you can be regularly informed about activities. The following examples can use as an inspiration to establish a database of best practices and to develop a newsletter at the level of a building as well as a part of overall energy management system.</p> <p>Available resources (examples of newsletters and published success stories):</p> <p>European association of local authorities in transition - Energy Cities is regularly publishing newsletter: http://www.energy-cities.eu/-Newsletter-</p> <p>Example of a newsletter published by local/regional energy agency: http://regea.hr/newsletter-objave/?arc_year=2017&arc_month=04</p> <p>Example of a newsletter published by local/regional energy agency: http://www.energap.si/uploads/News%20review%20Dec08-en_def%202.pdf</p> <p>Example of success stories published by local energy agency:</p> |



| | |
|---|---|
| | <p>http://regea.hr/newsletter-objave/kako-je-dvorac-bra%C4%8Dak-postao-energetski-u%C4%8Dinkovit.html (In Croatian)</p> <p>Example of case studies/success stories published by financing institutions:</p> <p>http://www.webseff.com/images/CaseStudies/CS02%20-%20Brod%20plin%20-%20Croatia.pdf (in English)</p> <p>http://fzoeu.hr/docs/_v14.pdf (in Croatian)</p> <p>http://www.ieadsm.org/wp/files/eceee-Rotmann-1-181-151.pdf</p> |
| Energy saving tips | <p>Energy saving tips are very widespread tool for raising awareness on energy efficiency in public buildings. They can be distributed and made visible in different forms (posters, stickers, leaflets, web sites, e-mail). Some inspirational examples are provided hereafter:</p> <p>Energy Saving Tips for Schools: http://www.energyineducation.ie/Energy_In_Education/Information_for_Schools/Resources_and_links/Top_ten_energy_tips_factsheet.pdf (in English)</p> <p>General energy saving tips: http://www.enu.fzoeu.hr/assets/files/post/146/list/200savjeta-full.pdf (in Croatian)</p> |
| Social networking - sharing experiences | <p>Social media are becoming the most important way of sharing information. Social services are online tools used for people to engage, share, interact and participate with each other. It's really a big deal - More people now use social networking than use email! Inspirational material on how to use social media to promote energy efficiency can be found here:</p> <p>https://www.energystar.gov/sites/default/files/asset/document/Using%20Social%20Media%20to%20Promote%20EE.pdf (in English)</p> |
| Serious game | <p>A serious game is a game with purpose other than solely entertainment. It has all the elements of a real game, will look and feel like a real game, but has some defined purpose, outcome or message the creators wish to get across to you. Serious games can be used to promote reduced energy consumption and emissions reduction in public buildings, by increasing the building users understanding and engagement in energy efficiency. In the games, real data on energy use may or may not be used. One of the advantages of the use of real data is that players get real life feedback on consequences of their actions. These games are suitable e.g. in office buildings where sensor network is created to monitor energy use. Feedback on energy use that results from certain type of behaviour is provided through serious game and can be combined with the awards to the best performing once. An example of such a game is provided here:</p> <p>http://energychickens.weebly.com/ (in English)</p> <p>There are many educational games that are used for raising awareness among pupils about energy and climate related issues. A useful list of such games can be found here:</p> <p>http://www.euronet50-50max.eu/en/educational-games/games-developed-within-</p> |



| | <u>other-educational-projects</u> (in English) |
|---|--|
| Competition - battle of the building | <p>Noun</p> <p>the act of competing; rivalry</p> <p>a contest in which a winner is selected from among two or more entrants</p> <p>a series of games, sports events, etc.</p> <p>Engage employees</p> <p>Employees in L’Oréal USA’s New York City headquarters helped the company cut electricity use by 9% by adopting energy-saving behaviours during their “I’ve Got the Power” campaign.</p> <p>Competitions for the energy efficiency are present in the USA, as shown by the Energy Star https://www.energystar.gov/buildings/about-us/how-can-we-help-you/communicate/energy-star-communications-toolkit/motivate-competition-0</p> <p>For three months from September 1 - November 30, 2016, more than 200 organizations across the country entered 800+ buildings to compete in the 2016 National Building Competition: BOOTCAMP. Competitors worked to cut energy and water waste, one energy or water-saving action at a time, and tracked their building’s monthly energy and water consumption using ENERGY STAR Portfolio Manager®, EPA’s online measurement and tracking tool.</p> <p>Each competition lasts for one year, with applications usually accepted in late spring. Competitors get access to a one-stop shop of promotional materials, like web buttons and banners, <i>template blast emails</i>, event ideas, and more.</p> <p>http://www.energizeschools.org/competition.html</p> <p>A 8-week challenge for K-12 schools served by Pacific Gas and Electric to compete to save electricity! The Competition is from February 27th - April 21st,. Compete with your: •Environmental Clubs & Green Teams</p> <p>Leadership Clubs</p> <p>Science & Engineering Classes</p> <p>Any students and faculty interested in making a difference at their school!</p> <p>Want to participate in our Fall 2017 Energy Conservation Competition? Fill out the 2017 Competition Request Form below, and we will contact you with details about our Fall Competition</p> <p>How can Energize Schools help</p> <p>Guidance on identifying, planning, and implementing conservation strategies from an Energy Advisor assigned to your school</p> <p>Lesson planning or in-class instruction support</p> |



| | |
|--|---|
| | <p>Resources package with a sample lesson plan, participation guide, and conservation action plan</p> <p>Informational webinar: watch here</p> <p>Prizes will be awarded to the top two schools that achieve the highest percentage reduction in their electricity use:•First Place \$1,000Second Place \$500One additional prize of \$500 will be awarded to the school with the best conservation campaign materials. Teams who submit their conservation materials by the end of the competition on May 1st will be eligible. Check out successful campaign resources below.</p> <p>http://ec.europa.eu/energy/intelligent/projects/en/projects/en2</p> <p>Bet to win!” - the climate competition between municipalities and their citizens</p> <p>Stimulating a sense of competition can be an excellent way to raise awareness, as one EU-funded project has demonstrated by bringing the Kyoto Protocol into people’s homes. Inspired by a Belgian campaign, Energy Neighbourhood has gathered together cities and municipalities across the EU to challenge their citizens to save energy</p> <p>The rule was that people had to compete collectively - teams of friends, colleagues and neighbours gathered into Energy Neighbourhoods. The challenge then taken up by cities in 16 countries was to defy participants to save at least 9% energy over four winter months in 2010/2011 and in 2012/2013.</p> <p>Some 830 Energy Neighbourhoods representing 8 626 households and 22 420 household members took part. On average, they achieved energy savings of 8.94% in the first year and 12.94% in the second year.</p> <p>“It was all about small things, like switching off lights,” says project coordinator Anke Merziger who works for B.&.S.U mbH in Berlin, a company that deals with environmental consulting and services. It may have been small things but the EU competitors saved 5.66 million kWh and 2 425 tons of CO₂, while at the same time bridging the gap between theory and practice.</p> <p>Keeping up good habits</p> <p>Winners were chosen first at national level, with the top EU prize (a trip to Brussels for a small gala) going to a town near Athens that reduced its energy consumption by 64%. Participants claim they have kept up the good habits, even though the organisers say they haven’t been able to get the figures to prove it. While the project was running, each participating country had its own website, and some have since extended the EU project to national level. France and Belgium have been particularly dynamic in urging households to save energy but Hungary, Slovenia, Sweden and Austria are doing good work too.</p> |
| <p>Direct information provision and peer education</p> | <p>Generic energy advice given through postcards sent directly to individual, with the impacts of combining energy advice alongside either emailed feedback on energy use at the building level, or peer education involving employees acting as points of contact and information for colleagues.</p> <p>A study finds that participants considered email a better means of communicating</p> |



| | |
|---------------|---|
| | <p>information than either posters or leaflets, with specific rather than general advice to be most meaningful. The study draws attention to the frequency and duration over which feedback information is provided., suggesting emails sent weekly would be effective in providing information but would not annoy employees.</p> <p>Peer education provided the opportunity for students to raise questions and concerns and for these to be addressed, thus removing barriers to energy saving behaviour: some students had expressed a belief that they were not allowed to turn off the lights when leaving the classroom as it was a public space,, a fear which was allayed through the peer education. It appears that targeted information and knowledge passed on by peers is likely to be more effective than general information provided through printed material such as stickers and posters.</p> <p>Excerpt from “intervening to change behaviour and save energy in the workplace: a systematic review of available evidence”</p> |
| Social reward | <p>Incentivisation is described as creating the expectation reward, for example through the use of prize draws to induce attempts to stop smoking in the health domain. Incentivisation could involve the provision of rewards in the form of cash , bonus, food and other prizes. However rewards may be of social nature, i.e. not based on financial or other gains, but rather a sense o achievement, for example the provision of positive descriptive comments in employee reviews. Social rewards tend to be given in relation to meeting pre-established targets or goals around performance of energy saving actions, although goal-setting (with no expectation of reward) is itself also a form of incentivisations. Reward may be given to employees on an individual basis or based on groups of employees working together.</p> <p>Publically given rewards outperformed ones given privately, and that social rewards outperformed monetary ones; in fact public social rewards generated energy savings of 6.4% whilst private monetary rewards led to an increase in energy use. Some studies encourage competition between employees, although with no tangible rewards beyond social recognition.</p> <p>“IChoose” engaged groups of employees in competition with each other. Although organised through their work, this intervention crossed the domestic/non domestic divide as employees were encourage to register savings activities in their own homes, and in doing so gained points for themselves and their team at work.</p> |



6. Template for the development of the 8 Pilot Actions

6.1. Template

- Please fill in a separate template for each building involved in your pilot cluster
- Please try not to use more than 10 pages for each pilot building
- You must develop an ACTION PLAN for each pilot building!
- Please read carefully the Application Form before working
- Please bear in mind that, according to the Application Form, all the pilot actions have to start in September 2017 and be completed by the end of December 2018.

Classification of the pilot project:

- Please, mark the thematic areas your project shall deal with and indicate which type of buildings and users the project involves (if adequate you may tick several fields).
- Consider that in all the pilot buildings it is essential to plan DSM activities with the users! If you need inspiration, please go to the “Inspiration Island” chapter n.7 and to the behavioural DSM resources available in the market, chapter n.5
- The Action Plan must be included as an attachment of the Building Alliance

Before elaborating the pilot template, it is recommended to investigate the “level of maturity” of the pilots owners, collecting the following information. The aim of this questionnaire is to drive with specific questions the pilots owners to think about the possibility to introduce in their pilot buildings financial and technical measures for integrating the DSM measures that are requested by the project.

BUILDINGS OWNERS

- Pilot building name
- Partner/Associated Partner
- No. of inhabitants (where applicable)

OWNED PUBLIC BUILDINGS

- Total N. of public buildings owned
- Total square meters

ENERGY POLICY

- Members of the Covenant of Mayors
 - YES
 - NO
- Do you have an energy action plan?
 - YES
 - NO
- Please provide brief information related to the action plan (year of approval and main content)
- Other voluntary measures
- Please specify the voluntary measures.

ENERGY CONSUMPTION



- Year of the latest available baseline of the pilot buildings

ENERGY SUPPLY CONTRACT

- Types of energy used in your pilot buildings
- Typology of the contract (e.g. separate contract for gas/electricity supply etc.
 - Integrated supply contract for gas and electricity
 - Integrated supply contract for gas, electricity and maintenance
 - Separated contracts
 - Other
- When does the contract end?

ENERGY PERFORMANCE CONTRACT

- Are you interested in this energy efficiency instrument such as EPC contract?
 - YES
 - NO
- Is your administration ready to rest to such contracts?
 - YES
 - NO
- Would you like to develop and formally adopt an EPC within the framework of the TOGETHER project (as a possible pilot action)?
 - YES
 - NO

REFURBISHMENT OF PILOT BUILDINGS INVOLVED IN THE TOGETHER PROJECT

- On the basis of the energy audit results, are you willing to update/modify your investment plan, by the end of the project? (With an official approval)?
 - YES
 - NO
- If yes, please explain briefly
- On the basis of the energy audit results, are you willing to invest your own resources/external funds in the refurbishment of the pilot building (as a possible pilot action of the project), by the end of the project?
 - YES
 - NO
- If yes, please explain briefly
- Have you the opportunity to apply to regional/national calls for proposal for financing the refurbishment of the pilot building/facility (as a possible pilot action of the project), by the end of the project?
 - YES
 - NO
- If yes, please explain briefly





PILOT CONCEPT DESIGN - ACTION PLAN

PART A

| | | | | | |
|--|--|--|--------------------------|-----------------------------|---------------------------|
| I.D. of the building Pictures <i>(size compatible with the template)</i> | | | Basic approach | Improvement approach | Evolution approach |
| Name of the building | | <input type="checkbox"/> Educational building  | <input type="checkbox"/> | <input type="checkbox"/> | |
| Owner | | <input type="checkbox"/> Institutional building  | | | <input type="checkbox"/> |



| | | | | | |
|---|---|--|---|--|--|
| Location | | <input type="checkbox"/> Other type of building  | | | |
| Engagement in previous projects related to the involvement of end-users for energy efficiency. | <input type="checkbox"/> yes <input type="checkbox"/> no | If you have ticked yes, describe briefly | | | |
| <p>Agreements and basic conditions of cooperation</p> <p><i>The first step is to meet the local requirements for cooperation with owners and managers of the pilot buildings. This first step can vary according to the different types of partners (agencies, cities, etc..)</i></p> <p><i>In case the partners are not the owners of the buildings where the smart meters are installed, it is compulsory to sign an agreement regulating the relationship between the project partners and the associated partners. In fact the project partners maintains the ownership of the installed equipment even after the end of the project (for at least five years after the final ERDF reimbursement).</i></p> | | | <p><i>Provide a brief description of the terms of reference of the agreement signed (if applicable)</i></p> <p><i>e.g. number of the deliberation/number of registration of the agreement and brief summary of the contents with reference to the ownership and maintenance</i></p> | | |
| <p>Establishment of a Negotiating panel</p> <p><i>It is crucial to map who are the members of the panel and who is responsible for co-defining the energy reduction objectives, the activities to be implemented and the profit sharing approach.</i></p> | | | <p><i>Provide a brief description of the members of the negotiating panel</i></p> | | |



| | |
|---|--|
| <p>Type of Smart Meters installed - Investment</p> <p><i>Public procurement for purchasing and installing the smart meters</i></p> <p><i>Different methods and different approaches are possible, considering the size of the investment and the EU/national rules on public procurement.</i></p> <p><i>Installation of smart meters, implementation of software for data collection and interpretation, training of the involved subjects...</i></p> <p><i>The PPs describe the list of devices that are installed in the building. Which kind of meter monitors which type of energy; further description and explanation of the installation.</i></p> <p><i>The main goal is that of controlling the use and the costs of energy for a specific activity.</i></p> <p><i>Shifting form a system that is not controlled to a controlled one, it is possible to achieve energy saving.</i></p> | <p><i>Provide a brief description of the main features of the automatic energy consumption system installed and one or more pictures of the installation work</i></p> |
| <p>Energy Management System in use and first upgrade of the system connected to the introduction of the smart meters</p> <p><i>Please, indicate your current system of energy management. The automatic collection of data is just the first step. How will the data be used? Who is responsible for checking the data collected?</i></p> | <p><i>Provide a brief description of the energy management system already in use and of the changes resulting from the smart meters installation</i></p> |
| <p>Data collection</p> <p><i>How are the data collected? Where are the data saved (owner of the server)? Which kind of (energy management) software is used for viewing and processing the data (diagrams, statistics, etc..)?</i></p> <p><i>Some screenshots of the software could be included as an example.</i></p> | <p><i>Provide a brief description of the data collection system that you have developed in conjunction with the installation of the smart meters. Please include pictures and schemes explaining the data workflow</i></p> |



| | |
|--|--|
| <p><i>Are you planning a (temporary) parallel data collection in order to verify the correctness of the data collected through the smart meters?</i></p> | |
| <p>Profiling of the buildings results</p> <p><i>All the pilots must be analysed from different points of view. The first analysis is the technical profile of the building, detailing the construction and technical equipment of the building. The technical profile is complemented by the users' profile. This information refers to deliverables D.T3.1.1 and D.T3.1.2. The profiles of the pilot buildings are useful as a "first view" of the pilot building....</i></p> <p><i>As part of the pilot concept, the partners should deliver the technical profiles and users' profiles of the pilot buildings.</i></p> | <p><i>Provide a brief description of the results of the profiling of the buildings, including the main features related to the users' profile and technical profile of the buildings</i></p> |
| <p>Energy audit results</p> <p><i>An energy audit must be provided for each pilot building of the project TOGETHER. There are different approaches for processing the audits. The energy audits are necessary to better understand "how the building works" and to define the potential opportunities in the field of energy efficiency for the pilot building, such as possibilities of investments, retrofitting, heating, cooling, ventilation or "simple" energy management of the building.</i></p> <p><i>As part of the pilot concept, the partners should deliver the Energy audit report.</i></p> | <p><i>Provide a brief description of the main results provided by the energy audits</i></p> |
| <p>Type of smart meters installed</p> <p><i>Public procurement for purchasing and installing the smart meters...</i></p> <p><i>Different methods and different approaches are possible, considering the size of the investment and the EU/national rules about public procurement.</i></p> | <p><i>Provide a brief s description of the main features of the automatic energy consumption system installed and one or more pictures of the installation work</i></p> |



| | |
|---|--|
| <p><i>Installation of smart meters, implementation of software for data collection and interpretation, training of the involved subjects...</i></p> <p><i>The PPs describe the list of devices that are installed in the building. Which kind of meter monitors which type of energy; further description and explanation of the installation.</i></p> <p><i>The main goal is that of controlling the use and the costs of energy for a specific activity.</i></p> <p><i>Shifting from a system that is not controlled to a controlled one, it is possible to achieve energy saving.</i></p> | |
| <p>Negotiation of a Building Alliance</p> <p><i>The Building Alliance is meant as a contract defining an improvement path that plans for technical interventions (structural and system interventions for energy efficiency), financial actions (financial schemes, contracts etc.) and actions aimed at improving the organization of time and space.</i></p> <p><i>The Building Alliance¹ should be developed, also through the definition of its goals of consumption reduction, by September 2017.</i></p> <p><i>The elaboration of the Building Alliance entails the selection of the tools affecting users' behaviour (basic and/or improvement approach)</i></p> | <p><i>Provide a brief description of the main contents of the building Alliance by using the template provided by the Lead Partner D.T2.3.2</i></p> <p><i>Make reference to the consumption data</i></p> |

1 The subjects involved in the Building Alliance define together the potential incentives and benefit sharing to be included in the REINVESTMENT ACTION PLAN (WP T4) in terms of a “win-win approach” and circular economy (D.T2.2.5 Transnational protocol for the definition of the system for calculating the savings generated by the Pilot Actions, functional to the Reinvestment Plan)



| | |
|---|--|
| <i>and the selection of integrated tools (advanced approach).</i> | |
|---|--|



DEFINITION OF THE ENERGY SAVING STRATEGIES- ACTION PLAN

PART B

| | |
|--|-------------------------|
| Title of your Pilot Action | <i>Please, fill in!</i> |
| <p>Plan for the development and implementation of the Energy Management System (EnMS), including the Analytic Demand Side Management, for a strict control of energy consumption</p> <p><i>In this case, the interested owners have to develop, adopt and test the system by December 2018</i></p> | <i>Please, fill in!</i> |
| <p>Improvement plan with technical measures (Structural and system interventions for energy efficiency)</p> <p><i>In this case, the interested owners have to plan:</i></p> <p><i>1) the approval/modification of their investment plan by the December 2018;</i></p> <p><i>2) the use of their own resources, by the end of the project, to improve the technological performance of their pilot buildings</i></p> <p><i>3) the resort to external resources in order to pay the necessary investment. By the end of the project, the interested partner can elaborate and submit projects to get regional/national funds. However, it is important to link the request of funds with the results provided by the energy audits!</i></p> | <i>Please, fill in!</i> |
| Improvement plan with financial measures | <i>Please, fill in!</i> |



In this case, the interested owners have to adopt the financial measures within the framework of the TOGETHER project, with an official approval of the financial measures identified. For example, in case an administration is interested in developing an EPC contract, it is necessary that the contents are elaborated and approved by the end of December 2018. The effective launch of the EPC can be done at a later stage, but there is the clear need to get the technical/political pledge before the end of the project.

Plan for the implementation of the Demand Side Management

The plan entails the selection of tools affecting users' behaviour, i.e. tools for behavioural change, as well as low costs measures.

All the partners should match the list of (meanwhile identified and selected as key) DSM tools with the buildings where the Pilot Actions will be implemented.

Remember that the TOGETHER Application Form does not specify a minimum number of behavioural/analytic DSM tools to be provided/used within the pilot.

Inspiration can be taken from the D.T2.2.2, concerning low costs measures, and some communication tools developed under the Work-package Communication (e.g. tutorials, origami, videos etc.) can be used

| | |
|--|--|
| | |
|--|--|

| Name of the selected tool | Select and describe |
|---|---------------------|
| <i>Training and awareness raising campaigns</i> | |
| <i>Financial and economic incentives</i> | |
| <i>Leaflets</i> | |
| <i>Posters/signage</i> | |
| <i>Direct feedback system</i> | |
| <i>Success stories/newsletter</i> | |



| | | |
|--|--|--|
| | <i>Energy saving tips</i> | |
| | <i>Social networking - sharing experiences</i> | |
| | <i>Serious game</i> | |
| | <i>Competition - battle of the building</i> | |
| | <i>Social award</i> | |
| | <i>Direct information provision and peer education</i> | |
| | <i>Etc... make references to the other DSM tools mapped in the D.T2.2.3 and D.T2.3.3</i> | |
| Brief description of the pilot project. Please, clearly summarise the action planned for the interested pilot building in a few sentences (please note, one per each pilot building), providing results when the activities are implemented | <i>Please, fill in!</i> | |
| Please, indicate the main objectives the pilot action aims to achieve in each building of your pilot cluster. | <i>Please, fill in!</i> | |
| Possible problems and risks. Please, describe the difficulties that may occur during the implementation of the project action! | <i>Please, fill in!</i> | |
| Please, describe the planned activities (1.1., 1.2, 1.3) and their timing | <i>Please, fill in!</i> | |



| | |
|---|--|
| <p>e.g.</p> <p>1.1 informal training for caretakers: Sept- December 2017</p> <p>1.2. organisation of a workshop for the sport associations Sept-December 2017</p> <p>1.3. elaboration of the EnMs Sept- December 2017</p> | |
| <p>Please, explain which is the specific target group of your Pilot Actions and its size (e.g. students, caretakers, members of the sport associations...)</p> | <p><i>Please, fill in!</i></p> |
| <p>Please, indicate which best practices or strategies inspired the development of your pilot action.</p> | <p><i>Please, fill in!</i></p> |
| <p>Please, indicate the profit sharing approach used (50/50, incentives, prizes etc.).</p> | <p><i>Please, fill in!</i></p> |
| <p>Verification of whether the proposed measures actually work.</p> <p>Implementation, monitoring and support (until December 2018).</p> <p>Reporting of the savings achieved.</p> | <p><i>Please, fill in!</i></p> |
| <p>Setting up of a Supporting Structure.</p> <p>According to the application form, A.T3.4 plans for the setting up of a Supporting Structure, at partners' level, supporting the implementation of the pilot action.</p> | <p><i>Provide a brief description of the structure that has been set up and that supports the implementation of the pilot action. In case of external support, please include references to the external company providing support for the implementation of the pilot activities.</i></p> |



7. Examples

7.1. Ideas for planning your pilot Action



| Behavioural Demand Side Management | Financial Measures | Technical measures | New/updated Energy Management System including low cost measures, such as space and time organisation and analytic DSM measures |
|---|---|--|---|
| <p><i>Resources:</i></p> <ul style="list-style-type: none"> • project library • training material developed by Zagreb • T2 - toolkit containing the Demand Side Management tools | <p><i>Resources:</i></p> <ul style="list-style-type: none"> • project library • training materials developed by Treviso • T2 - Toolkit containing Financial and contracting tools | <p><i>Resources:</i></p> <ul style="list-style-type: none"> • project library • training material developed by Maribor | <p><i>Resources:</i></p> <ul style="list-style-type: none"> • project library • training material • T2 - tools containing the Energy Management System |
| <p><i>Resources of the Communication Work-package</i></p> <ul style="list-style-type: none"> • <i>Video of the project</i> <ul style="list-style-type: none"> • <i>Origami</i> • <i>Posters</i> • <i>Animated tutorial on correct energy conscious behaviour</i> <ul style="list-style-type: none"> • <i>Animated tutorial on how to read smart meters</i> | | | |
| <p><i>Informal training through class/school competitions - gamification</i></p> | <p><i>The building owner is used to managing separate supply and maintenance contracts. He sets the new goal of elaborating the terms of reference of a new type of contract i.e. ENERGY PERFORMANCE CONTRACT/EPC and/or EPIC with the valorisation of the investment in social components/activities</i></p> | <p><i>The local authority, owner of the pilot building, considers the opportunity to adopt the decision to invest money to improve the equipment in the pilot building, on the basis of the results emerged from the energy audit.</i></p> | <p><i>One partner wants to upgrade its energy management system adopting a specific standard/procedures acknowledged at international level. Then its pilot action includes the improvements of the energy management system according to a specific standard</i></p> |



| | | | |
|---|---|---|---|
| <p><i>Elaboration of a set of communication tools aimed at instilling proper energy conscious behaviour in different types of users (e.g. elaboration of edutainment material, storytelling, APPs...)</i></p> | <p><i>The Owner takes advantage of the training, tools and assistance provided by the Province of Treviso to elaborate the terms of reference for a new contract</i></p> | <p><i>The investment is included in the Building Alliance, thus, the savings registered are included in the Alliance and reinvested</i></p> | <p><i>The local authority and building managers want to revise the time-space organisation and commit themselves to changing the existing model of organisation with a new one. Managers and owners elaborate together an excel file/informative document with a view to collecting the needs of the buildings most used, and try to re-organise them in an energy efficient way, by using tools such as the analytic DSM tools</i></p> |
| <p><i>Informal training with students organised by teachers and/or peers: e.g. informal training organised by students for students</i></p> | <p><i>A building owner is already used to implementing EPC contracts and more advanced contractual schemes. He decides to dialogue with his contractor and verify whether the % of savings to be invested in technological activities can be partially invested to finance incentive schemes for those teachers that cooperate with managers and owners in reducing energy consumption.</i></p> | <p><i>One partner/associated partner is interested- for an example - to start to put the basis of an energy performance contract. It could work in the framework of the evolution approach: DSM measures + the elaboration of the terms of reference of an EPC contract that should be approved (not necessary launched) by the closure of the project.</i></p> | <p><i>Setting up of common energy action plan for the group of public buildings owned by the public authority, where common aim will be defined. The aim must be SMART (specific, measurable, achievable, relevant, time-based).</i></p> |



| | | | |
|---|---|---|--|
| <p><i>Organisation of events and internal debates related to energy conscious practices</i></p> | <p><i>Two-step procedure involving the DSM measures which are successfully implemented in the building. It leads to energy and money savings. From this savings can be financed an investment in building renovation leading to another energy savings.</i></p> | <p><i>A partner/associated partner is interested in introducing DSM measures ex novo (as never tested before) in connection with buildings managers; moreover, It is interested in investing with own funds or external funds for improving one or more elements put in evidence by the energy audit report that is a sort of “wishing list”.</i></p> <p><i>On the basis of that wishing list, the interest partner/associated elaborates and approve by the closure of the project an intervention plan or approve the modification of the current investment plan (if existing).</i></p> <p><i>The interest partner can even think to attract funds applying for special national funds based on the energy audits.</i></p> <p><i>So in case, the submission of the request of funds for technological intervention or the approval/update of the investment plan, have to be elaborated and approved before the project closure and possible by December 2018.</i></p> | |
| <p><i>Collection of materials concerning the proper energy management behaviour and relevant training material (e.g. training material targeting caretakers) to be left as a legacy to the new students/new users</i></p> | <p><i>To show the building owners possibilities of EU/national funding of the investments. It is good to contact local subsidy consultant.</i></p> | | |



| | | | |
|--|---|--|--|
| <p><i>Elaboration, introduction, use of applications/IT tools to record the energy consumption routine and habits of the building users and estimation of the waste of energy . These activities are carried out by pupils/other type of users by using a “log file”</i></p> | <p><i>Definition and monitoring of concrete financial performance indicators, which can show impact of investment/non-investment energy efficient measures.</i></p> | | |
| <p><i>Energy sentinel groups: setting up of an energy team responsible for monitoring the energy consumption and promoting energy conscious activities</i></p> | | | |
| <p><i>Engagement of the pupils in technical activities, such as micro-climate analysis (inspired by the Fanger studies, energy audit procedures etc.)</i></p> | | | |
| <p><i>Training for caretakers and cleaning companies on the proper behaviour to have when working and cleaning.</i></p> | | | |
| <p><i>Implementation of the Euro-net 50/50 MAX methodology in 9 steps (European Project introduced to the partners during the Master in Krakow)</i></p> | | | |



8. Conclusion

The documents has been delivered to support the partners and their associated partners to define the pilot activities to implement in each of their pilot buildings. The benefits obtained with the provision of a standard template is for:

- Harmonising the descriptions of the ad hoc activities.
- Guiding the partners/associated partners to select the most appropriate tools and better describe their conceptualised interventions!
- Inspiring the partners and future administrations, managers and owners to introduce DSM tools into their pilot building scenarios.

The sum up of the separate templates will provide the description of the activities to be carried out in each single pilot buildings that can be different even if they belong to the same “pilot clusters”.



References

1. Application Form Approved by the Central Europe Programme
2. Summary report D.T3.1.1 delivered by EAV/PP2 in the first period
3. <https://www.navigantresearch.com/research/behavioral-and-analytical-demand-side-management>
4. <https://www.energystar.gov/buildings/about-us/how-can-we-help-you/communicate/energy-star-communications-toolkit/motivate-competition>
5. <http://www.sciencedirect.com/science/article/pii/S2214629616300627>
6. <http://www.zdnet.com/article/storytelling-our-energy-future/>
7. <http://www.ieadsm.org/wp/files/ecee-Rotmann-1-181-151.pdf>



Glossary

Demand Side Management (DSM) - The modification of consumer demand for energy through various methods such as financial incentives and education.

DSM tools - Communication techniques and contents targeting building users (including Apps, Storytelling, edutainment, gamification and social networking) according to their age and attitudes.

Edutainment - Content designed both to educate and to entertain.

Gamification - Application of game-design elements and game principles in non-game contexts.

Social networking - The creation and maintenance of personal and business relationships especially online.

Storytelling - The social and cultural activity of sharing stories, often with improvisation, theatrics, or embellishment.

EnMS/ Energy monitoring system - allows to view usage of different types of energy in the building

Energy management - activities and/or measures aimed at the effective operation of the building.

Protocol - rules for communication between two or more nodes (systems, controllers).

Manual data collection - regular manual data logging by person who is in charge of energy management of the building. All consumption data must be collected at least once a week.

Automatic data collection - is ensured by wire/wireless communication of measuring devices with appropriate software.

Capacities - Capacities are to be understood as the combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals (UNISDR, 2009: Terminology). They comprise the enabling policy, legal and institutional environment including human resources development and the respective managerial systems. Capacities may include infrastructure and physical means, institutions, societal coping abilities, as well as human knowledge, skills and collective attributes such as social relationships, leadership and management.

Energy efficiency - Energy efficiency improvements refer to a reduction in the energy used for a given service (heating, lighting, etc.) or level of activity. The reduction in the energy consumption is usually associated with technological changes, but not always since it can also result from better organisation and management or improved economic conditions in the sector ("non-technical factors") (World Energy Council, 2008: Energy Efficiency Policies around the World: Review and Evaluation).

Stakeholder - person, group or organization that has interest or concern in an organization.

Stakeholders can affect or be affected by the organization's actions, objectives and policies. Some examples of key stakeholders are creditors, directors, employees, government (and its agencies), owners (shareholders), suppliers, unions, and the community from which the business draws its resources. Not all stakeholders are equal. A company's customers are entitled to fair trading practices but they are not entitled to the same consideration as the company's employees.



List of Figures

| | |
|---|----|
| FIGURE 1: LOCALISATION OF THE PROJECT PARTNERS | 3 |
| FIGURE 2: DEMONSTRATION OF THE PILOT BUILDING PURPOSES..... | 4 |
| FIGURE 3: ENERGY MANAGEMENT SYSTEM | 11 |
| FIGURE 4: PILOT ACTIONS FLOW | 16 |



List of Tables

| | |
|---|----|
| TABLE 1: DISTRIBUTION OF THE PILOT BUILDINGS IN THE 3 MAIN BUILDINGS CATEGORIES | 5 |
| TABLE 2: VISUAL REPRESENTATION OF THE CRUCIAL IMPORTANCE OF THE DSM WHEN PLANNING ENERGY EFFICIENCY | 14 |
| TABLE 3: EXAMPLES OF POSSIBLE BEHAVIOURAL DSM TOOLS TO BE USED AT PILOT BUILDINGS LEVEL..... | 18 |



Appendix