



CE51 TOGETHER

D.T1.3.2 Master train the trainers -
behavioural DSM material

Version 1
03 2017

TAKING
COOPERATION
FORWARD



Kraków, 22.02.2017



Introduction to the DSM concept and the TOGETHER integrated approach



Antonio Zonta - Provincia di Treviso

WHERE DOES THE TERM “DEMAND SIDE MANAGEMENT” COME FROM?

- According to Wikipedia, “The term DSM was coined following the time of the [1973 energy crisis](#) and [1979 energy crisis](#).^[5] Governments of many countries mandated performance of various programs for demand management.
- Wikipedia adds that “**Energy demand management**, also known as **demand side management (DSM)**, is the modification of consumer demand for [energy](#) through various methods such as financial incentives and behavioral change through education. Usually, the goal of demand side management is to encourage the consumer to use less energy during [peak](#) hours, or to move the time of energy use to off-peak times such as nighttime and weekends



WHERE DOES THE TERM “DEMAND SIDE MANAGEMENT” COME FROM?

According to other sources, it seems that the term Demand Side Management was introduced by Clark W. Gellings, an American researcher, in an article on *IEEE Spectrum* in 1981

In the following years Gellings continued to popularize the term in a wide series of articles and volumes, setting a strong connection between DSM and the process of **Energy Planning**.

In a recent publication, Gelling refers about Demand Side Management as embracing 5 critical components of energy planning :

- 1.DSM **will** influence customer use
- 2.DSM **must** achieve selected objectives
- 3.DSM **will be** evaluated against non-DSM alternatives
- 4.DSM identifies how customers **will** respond
- 5.DSM value **is** influenced by load shape



Two new categories of DSM have recently been introduced and may be found in the market of energy efficiency measures: behavioural and analytical demand-side management.

Behavioural DSM refers to management of the individual energy behaviour of direct consumers,

Analytical DSM focuses on the actions people take to alter energy use as a result of data analysis and equipment monitoring.

Both categories require a solid support of metering devices



IEA DSM Technology Collaboration Program

‘Promoting Energy Efficiency and Demand-Side Management for global sustainable development and for business opportunities’

The Demand-Side Management Technology Collaboration Program (DSM TCP) is one of more than 40 co-operative energy technology programs within the framework of the International Energy Agency (IEA). <http://www.ieadsm.org/>

Since 1993, the IEA DSM Technology Collaboration Program has worked to develop and promote tools and information on demand-side management and energy efficiency. As a result of this collaborative work between countries in Australasia, Europe and North America, the DSM TCP has created a ‘tool box’ of resources and information for governments, utilities and energy companies to help them incorporate DSM measures into their energy policies, projects and activities.

Thus, for anyone who wants to develop or use demand-side management activities or related policies, the IEA DSM TCP should be the natural first resource to consult to make use of experiences learned and to further develop DSM and Energy Efficiency tools.



Energy Efficiency is not difficult - it is only complicated

- The technological aspect of energy efficiency is fairly straightforward and often already covered by existing knowledge and technology
- but getting it bought, installed, used and maintained correctly is a whole other matter.

Experience shows that even if the potential to reduce the use of economic and physical resources is **obvious and high**, this will not **happen by itself**.



- The **actors involved are several** and the interplay between them is complex.
- Some actors even **lose money** when energy efficiency is applied.
- It is not only an issue of combining the best technologies, but even more so an issue of the **behaviour of parties and individuals** involved.
- The performance of the energy system has a great impact on environment and even if the impact of individual actions is small **the sum may be of huge** importance.

The opportunities to improve energy efficiency must be harnessed in a systematic way. This will require management skill:

→ **Demand Side Management (DSM) skill.**

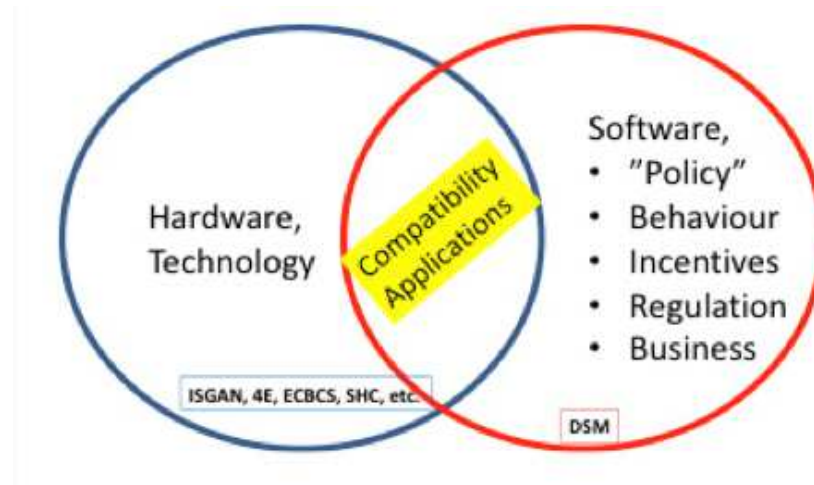


Result = Potential * Acceptance

The potential per se is not the issue. The problem is to get sufficient **acceptance** of energy efficiency measures by the **users** of energy. Any huge number multiplied with zero will stay zero!

Acceptance, understanding and uptake have been too low to release the potential in full.

DSM means working on both the issues in order to get a full result by a large-scale deployment of energy efficiency.



THE PROJECT'S ACRONYM

Our project is officially registered as TOGETHER, and explicitated as «Towards a Goal of Efficiency THrough Energy Reduction»

By the way, to better understand its meaning, we must read it as a whole, like this:

(let's move) **together towards a goal of efficiency through energy reduction**

The project's title therefore contains a strong reference to the need of joint actions as the most effective way to achieve efficiency in energy use, involving:

- **Technology and people**
- **Different people involved in different ways in the process of energy use in public buildings**



THANK YOU FOR YOUR ATTENTION!



Antonio Zonta
Province of Treviso - Buildings, Estates and
Public Procurement Department
TOGETHER



www.interreg-central.eu/TOGETHER



info@together.com



facebook.com/Together



linkedin.com/in/together



twitter.com/together



TAKING
COOPERATION
FORWARD



Krakow, Poland, Master Train-the-Trainer workshop



Development of the Together Training material - DSM



City of Zagreb, City Office for Energy, Environment and Sustainable development

Demand Side
Management

Behavioral DSM

Module 1:
Behavioural &
psychological
science related to
consumers habits
& practices

Module 2: Methods
and tools for
communicating
and cooperating
with building users

Module 3:
Development of
successful
educational &
information
campaigns
addressed at
building users



Module 4: Methods
& tools for
changing habits
and behaviors of
building users

Module 5:
Different incentive
schemes for
energy saving

Module 6:
Monitoring of
building users'
behaviors

Module 7: No-cost
and low-cost
energy saving
measures

Module 8:
Integration of
behavioral
measures with
other EE solutions



- modification of consumer demand for energy by using various methods such as financial incentives and behavioral change through education
- Two categories:
 - Behavioural DSM refers to management of the individual energy behavior of direct consumers
 - Analytical DSM focuses on the actions people take to alter energy use as a result of data analysis and equipment monitoring.

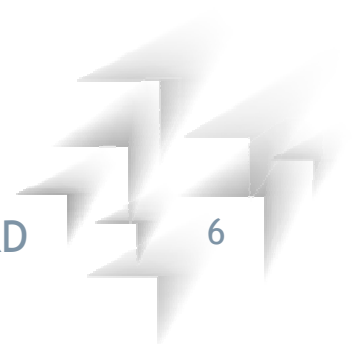


- focuses on educating consumers and encouraging individual participation to achieve energy savings
- Aim – influence the users to change their behavior by raising awareness
- 8 modules focused on education and communication



CONTENT OF MODULES

- Word references
- Ppt presentation
- Exercise
- Case study
- Further suggestions



Behavioural & psychological science related to consumers habits & practices

- A deeper look into the psychological explanation for consumers' behavior
- Objective: realize the best way to approach consumers and raise their awareness



Methods and tools for communicating and cooperating with building users

- Info points, galleries in frequent areas of institutions, flyers, posters, banners, Internet...
- Workshops, lectures, presentations, round tables,...
- Interactive events, open door days, exhibitions, media...
- Objective: familiarize the users with the issue, provide explanations and allow for insight into possible results achieved through behavior change



Development of successful educational & information campaigns addressed at building users

- Campaign:
 - Market research – how much do users really know about the issue at hand?
 - Identification of the „weak points” to work on
 - Identification of the ideal message carrier, depending on the target group to be reached
 - Raising the campaign
 - evaluation



Methods & tools for changing habits and behaviors of building users

- It is essential to define the most successful strategies for achieving the goal of permanently influencing the behavior of building users
- Each strategy must have a specific purpose
- Roles, rules and tools approach
- Possible tools:
 - „soft” measures and suggestions (dialogue)
 - Official rules concerning changes in energy management of a building
 - Measuring instruments – thermal camera, hygrometer, luxmeter, thermometer, device for measuring electricity consumption
 - Remote reading equipment



Different incentive schemes for energy saving

- Incentives and rewards allow for bringing about behavioral changes
- Possible incentives:
 - Financial – „the more energy you save, the less you will pay”
 - split incentive - 50/50
 - Ecological – realization that our actions have a direct impact on our surroundings (especially well-suited for families with children)
 - Rewards – supplying the users with ex. pamphlets accompanied by specific aids for energy management (shower restrictors)
 - Competitions – a fun way of gaining knowledge



Monitoring of building users' behaviors

- Off-site
 - Analytical monitoring of a building
 - Remote reading
 - Comparison of the Before-and-After state
- On-site
 - Eco-spies
 - Surprise visits
 - Comparison of the Before-and-After state



No-cost and low-cost energy saving measures

- Operations and maintenance
 - Efficient energy management-
Monitoring and analysis of energy consumption, regular checks and maintenance of equipment, monthly maintenance of heating and cooling equipment, conduct a nighttime audit, ...
- Lighting
 - Turn off lights when not in use, maximize daylighting, remove unnecessary lamps...



No-cost and low-cost energy saving measures

- Office equipment
 - activate sleep settings on equipment, avoid the stand-by option...
- Heating and cooling
 - Adjust thermostats, use shades and blinds to control sunlight in summer and winter to prevent or encourage heat gain, set back the thermostat in the evenings and other times when the building isn't occupied...



No-cost and low-cost energy saving measures

- Communication and education
 - Educate employees and building occupants on how their behaviors affect energy use, develop an energy team, reward energy-efficient behaviors and habits...
 - Educative competitions – quizzes
 - Set up visually attractive infopoint about energy state of building,
 - Artistic corner for pupils' creative expression...



Integration of behavioral measures with other EE solutions

- Measures of building refurbishment and behavioral measures are two side of the same coin
- Full extent of potential is realised only when both are combined





City of Zagreb, City Office for Energy,
Environment and Sustainable Development
Project TOGETHER



www.interreg-central.eu/TOGETHER



info@together.com



+385 1 6585029



facebook.com/together



linkedin.com/in/together



twitter.com/together



MOTIVATING FOR CHANGE

TAKING
COOPERATION
FORWARD



Manuel Nina



Director of innovation

SNAP! Solutions Portugal



Manuel Nina

MSc Mechanical Engineering Certified Project Manager

- 2009 - European Parliament – Energy Policy Expert
- 2010 - Portuguese Parliament – Energy Policy Expert
- 2011 – Energy Consultant/Auditor
- 2011-today – European Energy Project Coordinator
 - SAVE ENERGY
 - SMART CAMPUS
- 2015-today – H2020 SME Instrument expert
 - *3.950.000€ for SMEs and counting!*



2008

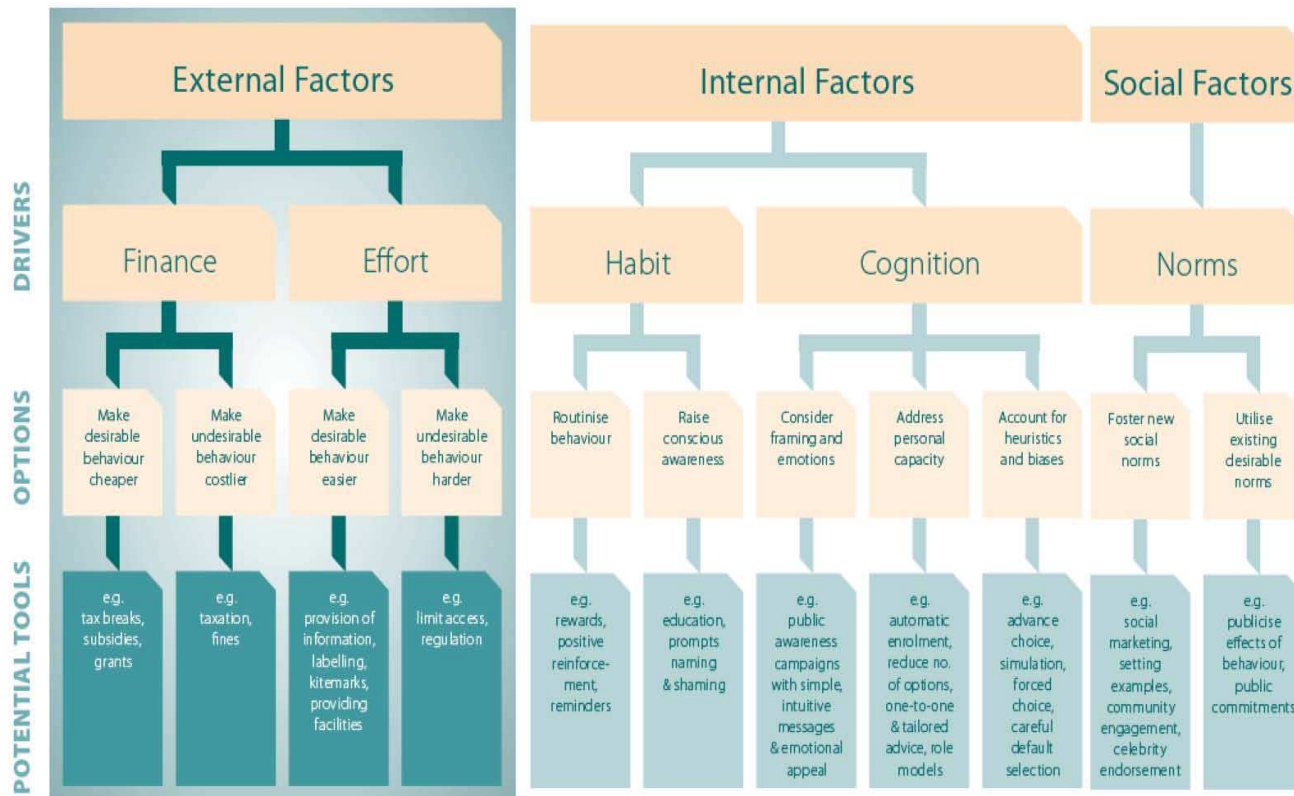
CREATURES OF HABIT?

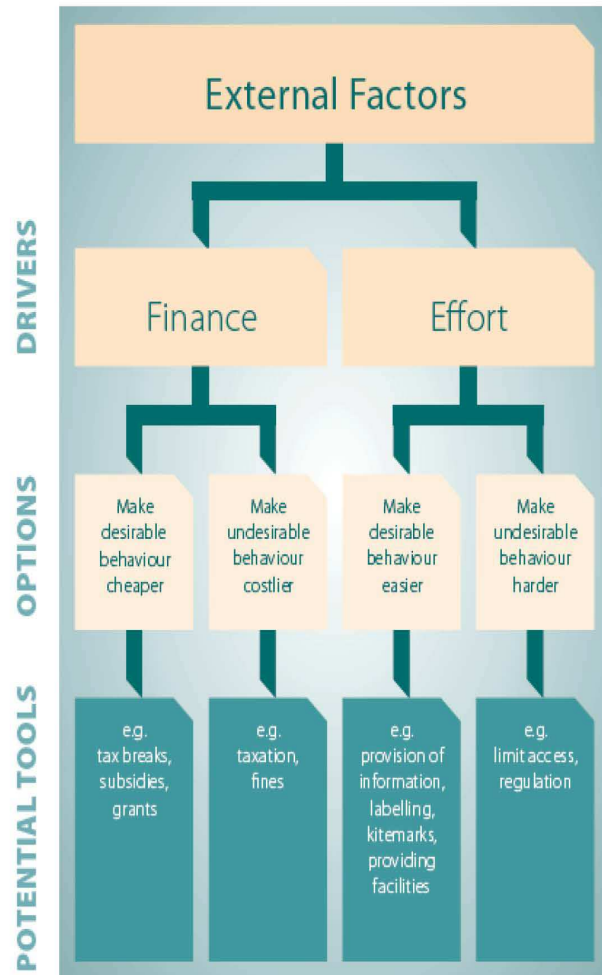
The Art of Behavioural Change

Jessica Prendergrast, Beth Foley,
Verena Menne and Alex Karalis Isaac



Framework for Behaviour change

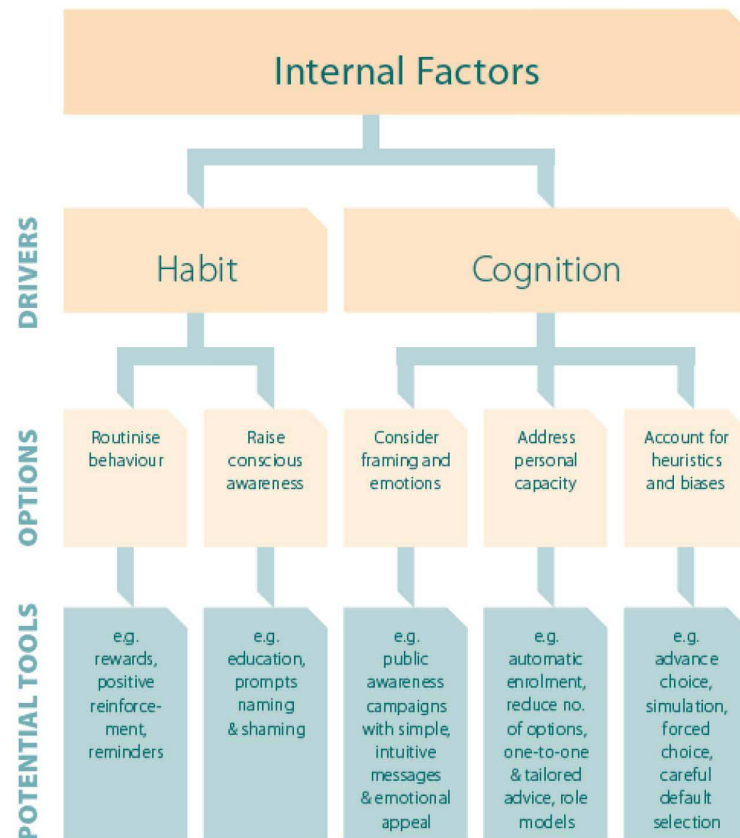




Policy based

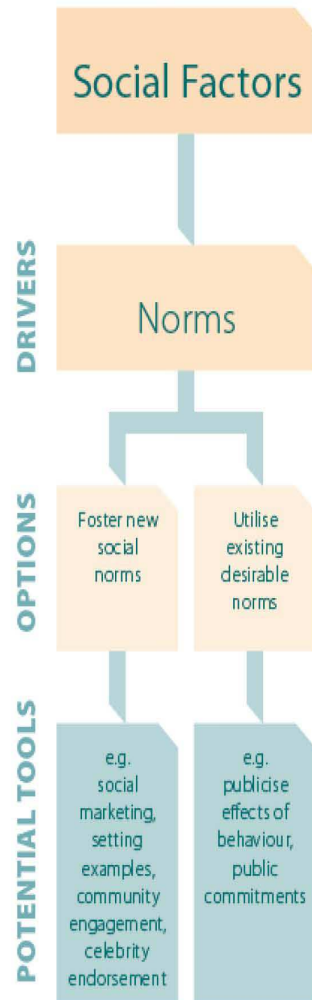
- Internal policy – Top-Down approach
 - Define targets and rewards/consequences
- Internal procedures
 - Management of the Power of Agency (lighting, HVAC, Equipments)





- Rewards, Positive reinforcement
- Education, prompts, ranking
- Emotional appeal – motivations
- Individual training – Agency
- Biases – resistance, simulation





- New social norms
 - New examples, social marketing, purpose (charity)
 - Role-model

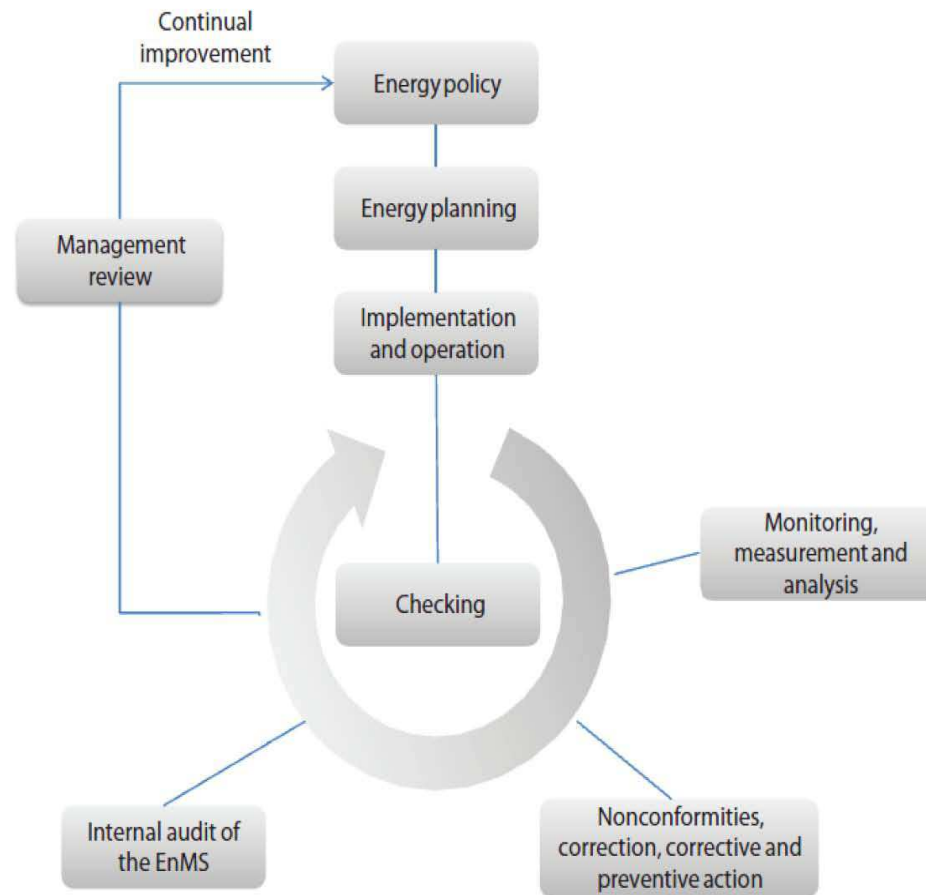
- Promote existing norms
 - Publicize best practices
 - Public commitments
 - Top-down examples



How to implement change?

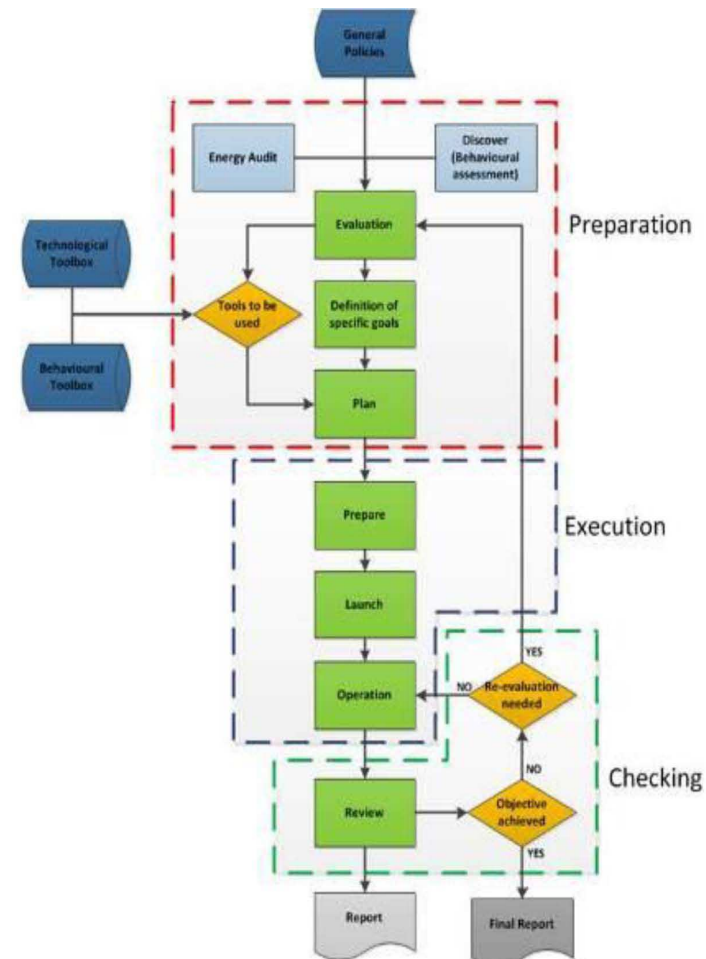


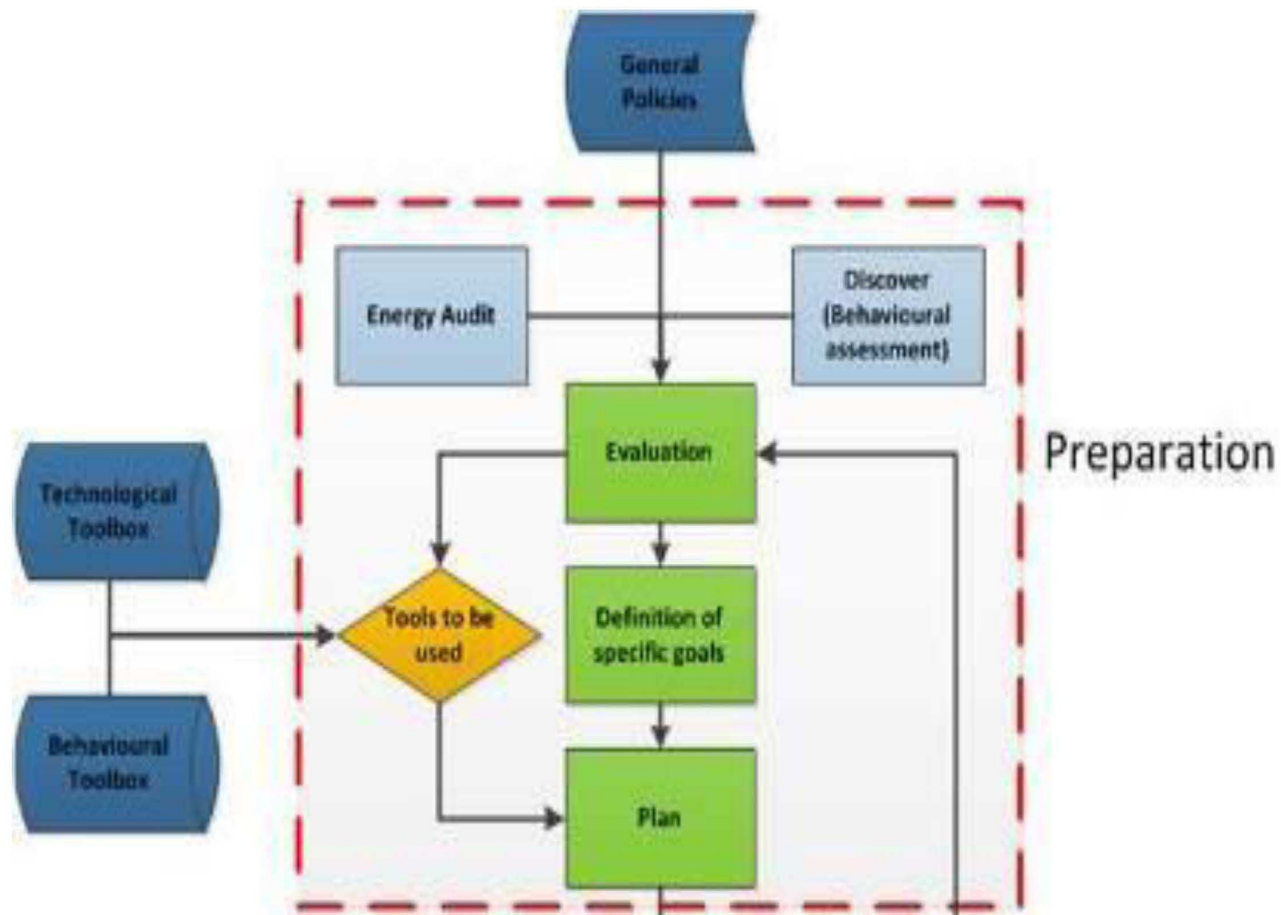
ISO 50 001



User Behaviour Transformation Methodology

- Preparation
- Execution
- Checking





Preparation Phase

- *Evaluate* the pre-requisite such as General policies, City objectives, EU goals other existing policies. Also evaluate the users and their needs for achieving the goals.
- Make an energy Audit of the building (often done by local authorities)/observation
- *Define* the goals based on the input from the evaluation. What is possible to achieve and what cost is acceptable for achieving this.
- Select the needed tools from the Behaviour Toolbox (includes technology?).
- *Plan* your activities. One of the most important tasks is to plan for the user involvement. Plan the meeting schedule, how to provide information etc. to the users. Also consider, who is the user? Of course people in the building, but perhaps also local management, house owner, and visitors?



Changing behaviours

Our actions are generally dependent on the questions that are asked and answered by our sub-conscious mind:

- **Is there a problem?**
- **Do I care?**
- **Do I know what to do about it?**
- **Will the solution work?**
- **What will others think about what I do?**

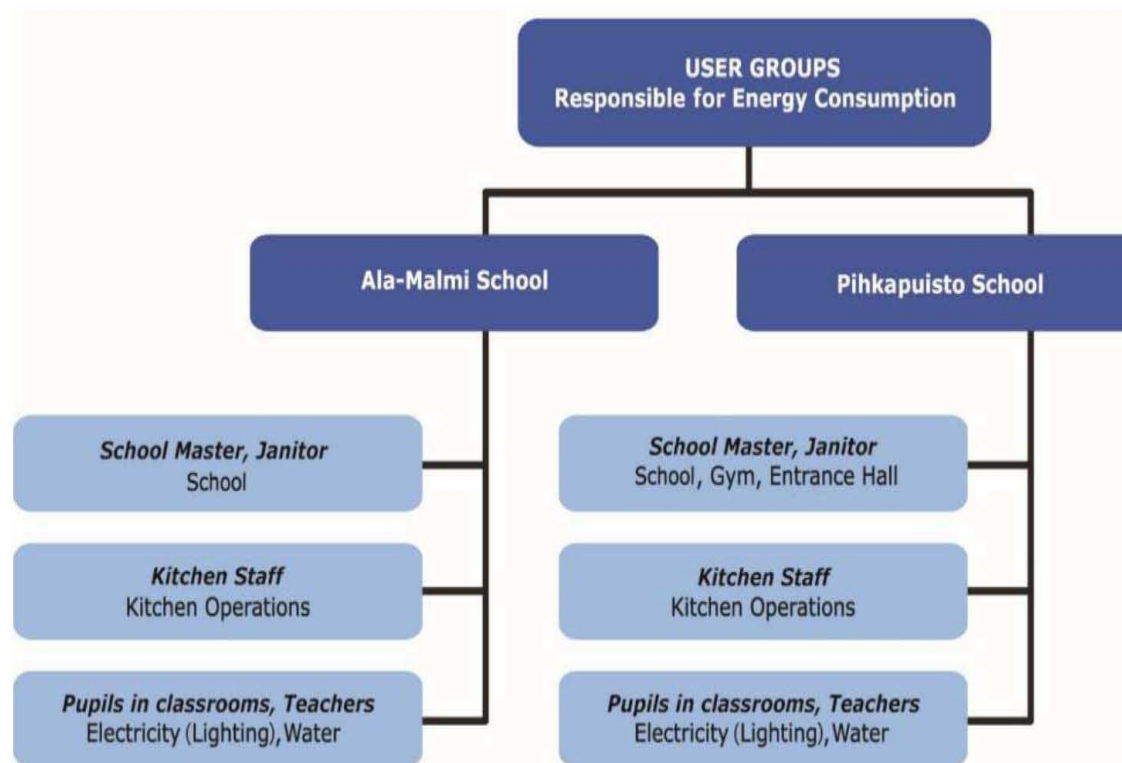
When attempting to change the behaviour of other people we need to use educational techniques to answer questions **1, 3 and 4** along with motivational techniques to answer questions **2 and 5**. Even when we are fully educated and motivated, we still often need a reminding prompt to do the right thing.



Behaviour Change Tool	Educate			Motivate		Prompt
	Is there a problem?	Do i know what to do?	Will the solution work?	Do i care?	What will others think?	
Informal Meeting	●	●	●	●	●	●
Formal Meeting	●	●	●	●	●	●
Energy Audit	●	●	●	●	●	●
Actions Checklist	●	●	●	●	●	●
Energy Helpdesk	●	●	●	●	●	●
Corporate Policy	●	●	●	●	●	●
Metered Billing	●	●	●	●	●	●
Personal Objectives	●	●	●	●	●	●
Set Examples	●	●	●	●	●	●
Suggestions Box	●	●	●	●	●	●
web/ tv/ radio	●	●	●	●	●	●
Serious Game (with real data)	●	●	●	●	●	●
Serious Game (no real data)	●	●	●	●	●	●
Social Network - share experience	●	●	●	●	●	●
Social Network with data	●	●	●	●	●	●
Leaflet (information)	●	●	●	●	●	●
Poster/ Signage	●	●	●	●	●	●
Newsletter (stories)	●	●	●	●	●	●
Report (with real data)	●	●	●	●	●	●
Real Time Energy / Cost	●	●	●	●	●	●
Performance vs Baseline	●	●	●	●	●	●
Historic Information (graphical)	●	●	●	●	●	●
Energy Saving Tips	●	●	●	●	●	●
Competition / Incentives	●	●	●	●	●	●



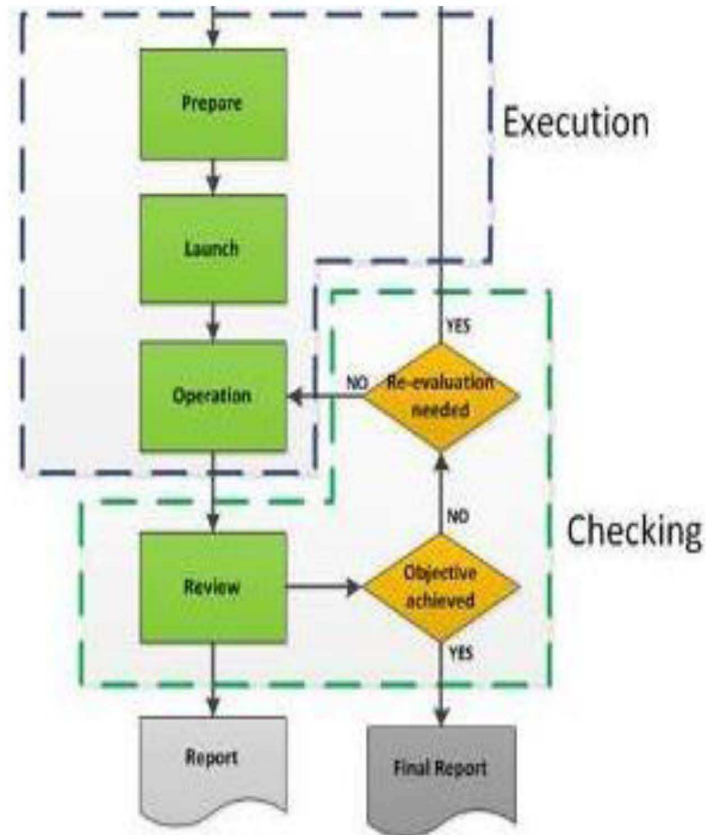
User Groups and Agency Power



Empowering users

- Who is pushing forward?
- Who gives more suggestions?
- Eco-motivators
- Team leaders
- Extra training (internal project)

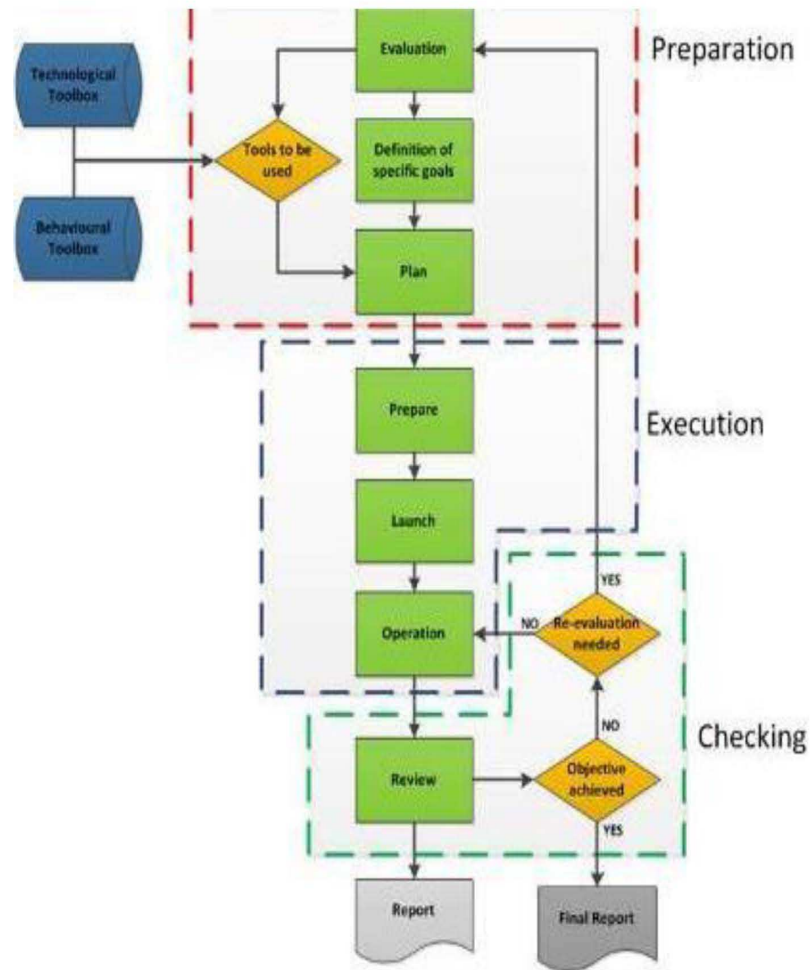




Execution Phase

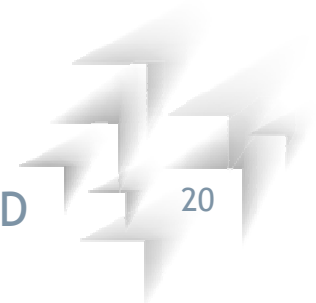
- *Prepare* by installing technology, establishing reference baseline, correction factors etc. The reference baseline can normally be established in two ways. Either by having historical energy consumption data (or plan for your own reference period where you establish these historical data) or by having a reference building to compare with (often more complicated to ensure that the two buildings are the same and that operation of the reference building is not influenced by what is happening in the test building).
- *Launch* the program officially, involving all the users so that everyone is aware and committed.
- *Operate* the execution by monitoring technology, users and building to see that everything is running normally and according to plan. Do we need to re-evaluate the goals? If so jump back to the preparation phase.





Checking

- *Review* the progress and analyse the intermediate results. What adjustments are needed? Have the goals been reached?
- Send short intermediate reports about the current status compared to the goals after every Review.
- A final report should be issued stating the results compared to the defined goals when you have finished the process.



Best Practice	Notes
Know the organisational culture	The best approach to behaviour change will depend on the culture of the organisation. Note that this can significantly change dependent on other factors such as looming job cuts or rapid growth If there have been other recent change programmes implemented, people may be getting tired of constant change. Conversely people may be hungry for more change
Recognise that everyone is different	It is easy to believe that everyone will react in the same way and that the vociferous people represent the views of everyone. Seek out ways to engage with every individual
Target the key energy saving opportunities	Roughly calculate the scale of potential savings before committing project time and equipment to a specific opportunity
Use a range of user behaviour transformation tools	The most appropriate range of tools should be selected at the project commencement and then reviewed and improved over time (see Toolbox)
Keep it changing	Just like any advertising campaign that seeks to change behaviour, it is important to keep it changing to maintain interest and engagement
Maximise person to person contact	Person to person contact is probably the most important aspect of any behaviour change programme. Without some form of personal contact, change is unlikely to be sustained. Social media is fast becoming an important factor in normal day to day contact between people
Select an appropriate change manager	The ability of a change manager to gain respect, educate and motivate in the target environment is essential. If the programme includes “green champions” then select them carefully. Just because someone is keen, doesn’t mean that they will necessarily be able to successfully influence others
Continually review management commitment and leadership	If senior personnel are do not openly demonstrate their commitment to the change, then others are unlikely to change
Identify individuals who are likely to have a significant influence on their peers	All organisations have particularly influential individuals. These people may have a position of authority or they may be particularly popular or have a strong personality. These key individuals are likely to have a significant influence on the general behaviour within an organisation. Having these people on your side, or if necessary, reducing their influence will have a major impact
Integrate with other energy saving initiatives	People need to see that other energy saving initiatives are taking place and appropriate investments are being made, otherwise they will quickly become cynical about changing their behaviour



Incentives

- Monetary
 - Direct - % of savings – shared revenues (ESCO business model)
 - Indirect - % of savings – common pot (training fund, team building, etc.)
- Non-monetary
 - Reputation – “team 2nd floor won this week’s challenge!”
 - Charity contributions
 - Prizes
 - Cinema tickets every week

Suggestions from end-users – football team equipment,



Example – The PVision Building in Helsinki

- 3 floors competition
- Teambuilding fund (sailing day)
 - First floor tried hard and improved 15%
 - Second floor tried hard too, **got worst** 10%
 - Third Floor not committed, improved 20%
 - Connected high consumption equipment to 2nd floor electric system



Document Pack

- Creatures of Habit
- SAVE ENERGY Manual
- SMART CAMPUS Manual
- SMART CAMPUS Living Lab Methodology
- Presentations





Internal Views





Rooms and Uses

- 3,500 staff
- Conferences
- Weddings/public functions
- Committee Rooms
- Sculpture Hall
- Seven staircases
- Great Hall – 4000m² of marble flooring
- 4 state rooms





Energy Use 2007-8 & 2008-9

	2007/2008 kWh	2007/2008 Cost	2008/2009 kWh	2008/2009 Cost
Mar	156,902	£12,417	143,311	£8,239
Apr	132,494	£7,309	142,068	£11,726
May	150,247	£8,832	125,192	£10,497
Jun	131,156	£7,647	121,284	£12,194
Jul	133,312	£7,740	120,010	£12,105
Aug	124,545	£7,306	112,655	£13,345
Sep	136,905	£7,989	131,167	£16,791
Oct	160,887	£9,147	153,898	£18,815
Nov	167,609	£9,498	152,004	£18,573
Dec	154,877	£8,795	163,600	£19,869
Jan	146,827	£8,451	145,159	£18,480
Feb	140,940	£8,166	146,950	£18,708
Total	1,736,698	£103,295	1,657,295	£179,342





Electricity use 27th Jan 2009





Electricity Use February 2009





Potential Areas of Work

- Re-lamping – impact of new lamps
- PC energy use
- Production kitchen – measure impact
- Elevators

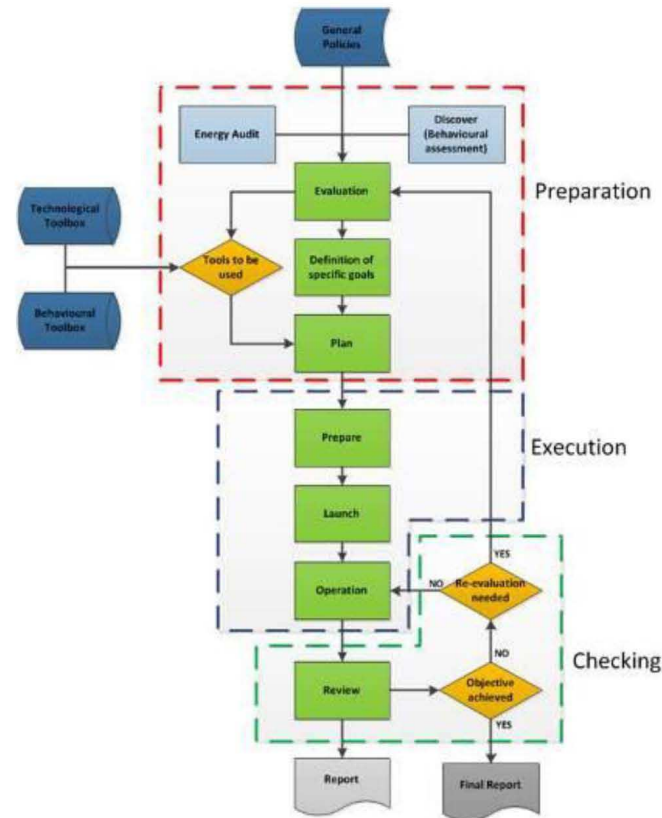
- Behaviour change – influencing custom and practice





User Behaviour Transformation Methodology

- Preparation
- Execution
- Checking





Preparation Phase

- *Evaluate* the pre-requisite such as General policies, City objectives, EU goals other existing policies. Also evaluate the users and their needs for achieving the goals.
- Make an energy Audit of the building (often done by local authorities)/observation
- *Define* the goals based on the input from the evaluation. What is possible to achieve and what cost is acceptable for achieving this.
- Select the needed tools from the Behaviour Toolbox (includes technology?).
- *Plan* your activities. One of the most important tasks is to plan for the user involvement. Plan the meeting schedule, how to provide information etc. to the users. Also consider, who is the user? Of course people in the building, but perhaps also local management, house owner, and visitors?





Changing behaviours

Our actions are generally dependent on the questions that are asked and answered by our sub-conscious mind:

- **Is there a problem?**
- **Do I care?**
- **Do I know what to do about it?**
- **Will the solution work?**
- **What will others think about what I do?**

When attempting to change the behaviour of other people we need to use educational techniques to answer questions **1, 3 and 4** along with motivational techniques to answer questions **2 and 5**. Even when we are fully educated and motivated, we still often need a reminding prompt to do the right thing.

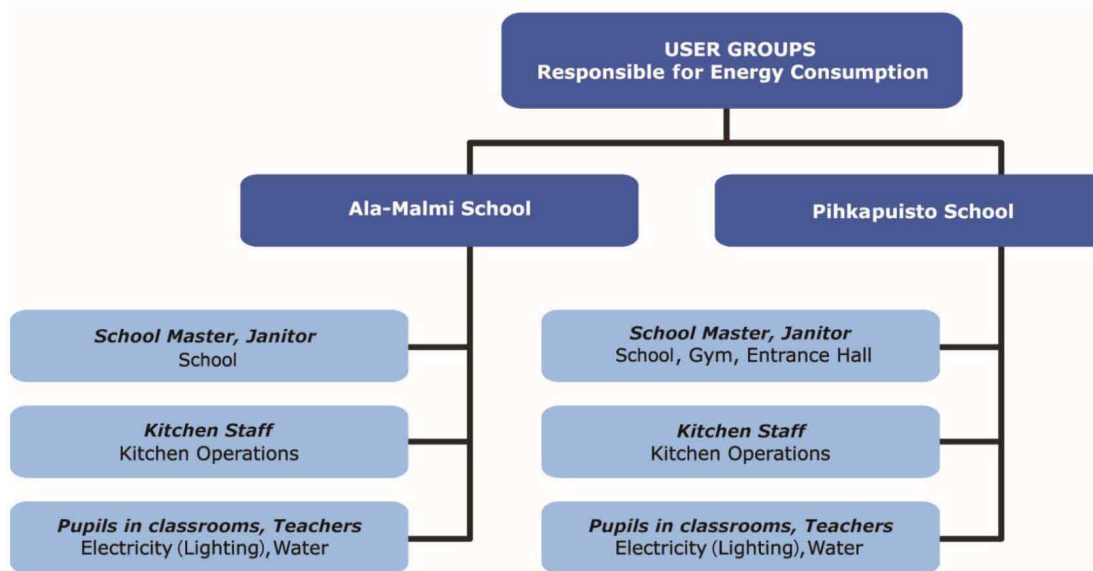




Behaviour Change Tool	Educate			Motivate		Prompt
	Is there a problem?	Do i know what to do?	Will the solution work?	Do i care?	What will others think?	
Informal Meeting	●	●	●	●	●	●
Formal Meeting	●	●	●	●	●	●
Energy Audit	●	●	●	●	●	●
Actions Checklist	●	●	●	●	●	●
Energy Helpdesk	●	●	●	●	●	●
Corporate Policy	●	●	●	●	●	●
Metered Billing	●	●	●	●	●	●
Personal Objectives	●	●	●	●	●	●
Set Examples	●	●	●	●	●	●
Suggestions Box	●	●	●	●	●	●
web/ tv/ radio	●	●	●	●	●	●
Serious Game (with real data)	●	●	●	●	●	●
Serious Game (no real data)	●	●	●	●	●	●
Social Network - share experience	●	●	●	●	●	●
Social Network with data	●	●	●	●	●	●
Leaflet (information)	●	●	●	●	●	●
Poster/ Signage	●	●	●	●	●	●
Newsletter (stories)	●	●	●	●	●	●
Report (with real data)	●	●	●	●	●	●
Real Time Energy / Cost	●	●	●	●	●	●
Performance vs Baseline	●	●	●	●	●	●
Historic Information (graphical)	●	●	●	●	●	●
Energy Saving Tips	●	●	●	●	●	●
Competition / Incentives	●	●	●	●	●	●



User Groups and Agency Power





Empowering users



- Who is pushing forward?
- Who gives more suggestions?

- Eco-motivators
- Team leaders

- Extra training (internal project)





Execution Phase

- *Prepare* by installing technology, establishing reference baseline, correction factors etc. The reference baseline can normally be established in two ways. Either by having historical energy consumption data (or plan for your own reference period where you establish these historical data) or by having a reference building to compare with (often more complicated to ensure that the two buildings are the same and that operation of the reference building is not influenced by what is happening in the test building).
- *Launch* the program officially, involving all the users so that everyone is aware and committed.
- *Operate* the execution by monitoring technology, users and building to see that everything is running normally and according to plan. Do we need to re-evaluate the goals? If so jump back to the preparation phase.





Checking

- *Review* the progress and analyse the intermediate results. What adjustments are needed? Have the goals been reached?
- Send short intermediate reports about the current status compared to the goals after every Review.
- A final report should be issued stating the results compared to the defined goals when you have finished the process.



**USER BEHAVIOUR
TRANSFORMATION
TOOLS & PROCESSES**

**TAKING
COOPERATION
FORWARD**



Manuel Nina



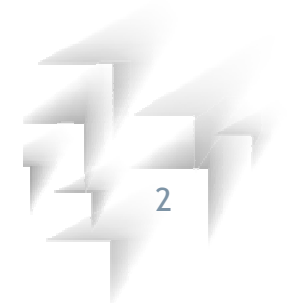
Director of innovation

SNAP! Solutions Portugal

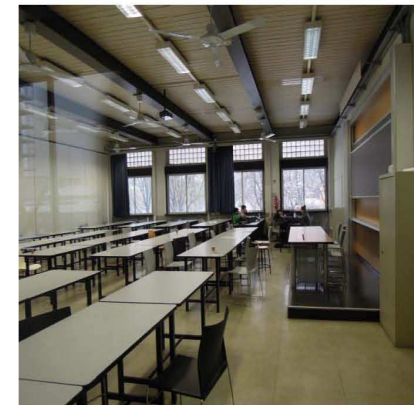


Summary

- **Context Analysis**
 - Guerrilla observation (end-users/Stakeholders)
 - As-is scenario
 - To-be scenario
 - Persona – Stakeholder
 - Agency
- **Living Labs**
- **Gamification Strategies**



CONTEXT ANALYSIS with people: Guerrilla observation in Milano



CONTEXT ANALYSIS with people: as-is scenario in Milan

STUDENTS	TEACHERS	STAFF
open the windows of the corridor in order to smoke although it is forbidden in public buildings	do not care of the fan-coil on/off condition	do not care of the fan-coil on/off condition
use the classrooms independently of the lessons and do not turn lights off when leaving	often leave lights on in their rooms	
use lifts when they can easily and healthy use the stairs	use lifts when they can easily and healthy use the stairs	use lifts when they can easily and healthy use the stairs



CONTEXT ANALYSIS: PERSONA

Paula

An employee at LTU



Figure 21 - Paula

Paula is a project manager and employee at LTU. She is 50 years old, has a husband and one 18 years old daughter that lives far away in the Swedish capital Stockholm, one hour by airplane down south from her. She lives 10 km from the university in a small house and travels by car every day. Paula is from the northern parts of Finland, and are therefore used to even colder climate then that Luleå has to offer. Paula has her own car, a Volvo XC90, and she takes care of it all by herself.



CO-DESIGNING TO BE SCENARIO in LTU



EXAMPLE OF TO BE SCENARIO

TO BE SCENARIO 1

Main Character: Seppo

Secondary characters: Janitor at Myyrmäki campus

Tools used in the envisioned activity: Wireless sensor network, ICT system to increase energy awareness and to give information about energy consumption, water and heat consumption.

Seppo works in the building unit and is responsible for coordinating the maintenance of the buildings. Seppo monitors regularly the 15 campuses of Metropolia, so he has enough to do. The daily routine takes a lot of time, and unfortunately he hasn't got as much time for the development of the buildings as he would like to have. The building automation at the Leppävaara and Myyrmäki premises has been significantly improved with the wireless sensor network and a new ICT system, which provides real time information on e.g. energy consumption. The application is also available for the whole staff and the students. In the lobby there's a screen that shows the consumption of energy, water, and heat, and gives tips on how to reduce their consumption.

Seppo has talked to the janitor at Myyrmäki campus, who told that the awareness of people has increased and that they turn off the lights more actively than before. This can be seen also in reduced electricity bills.

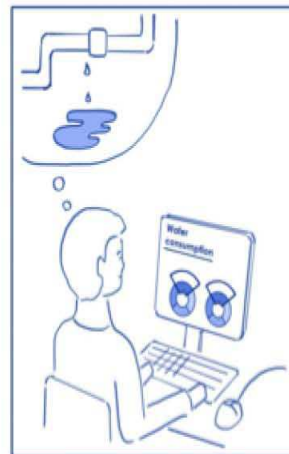


Figure 54 - Seppo monitors the energy and water consumption and discovers a leak.



Agency

- Define who can and who can't
 - HVAC – set point regulation
 - Lighting – on/off
 - Equipment



Continuous User Involvement

- Users has been involved throughout the project following the Living Labs methodology
- Typical activities include brainstorming of new ideas for energy saving, participating in experiments, follow-up of results
- Users are involved through interviews, surveys, focus groups, etc
- Different target groups/
Users/interest groups



Behaviour Change Tool	Educate			Motivate		Prompt
	Is there a problem?	Do i know what to do?	Will the solution work?	Do i care?	What will others think?	
Informal Meeting	●	●	●	●	●	●
Formal Meeting	●	●	●	●	●	●
Energy Audit	●	●	●	●	●	●
Actions Checklist	●	●	●	●	●	●
Energy Helpdesk	●	●	●	●	●	●
Corporate Policy	●	●	●	●	●	●
Metered Billing	●	●	●	●	●	●
Personal Objectives	●	●	●	●	●	●
Set Examples	●	●	●	●	●	●
Suggestions Box	●	●	●	●	●	●
web/ tv/ radio	●	●	●	●	●	●
Serious Game (with real data)	●	●	●	●	●	●
Serious Game (no real data)	●	●	●	●	●	●
Social Network - share experience	●	●	●	●	●	●
Social Network with data	●	●	●	●	●	●
Leaflet (information)	●	●	●	●	●	●
Poster/ Signage	●	●	●	●	●	●
Newsletter (stories)	●	●	●	●	●	●
Report (with real data)	●	●	●	●	●	●
Real Time Energy / Cost	●	●	●	●	●	●
Performance vs Baseline	●	●	●	●	●	●
Historic Information (graphical)	●	●	●	●	●	●
Energy Saving Tips	●	●	●	●	●	●
Competition / Incentives	●	●	●	●	●	●



Brainstorm

- HVAC
 - Too hot or too cold? Men/Women paradox
 - Shared control (90% comfortable)



Brainstorm

- Lighting
 - Last one out shuts the lights
 - Open suggestions to Energy manager
- Equipment
 - Facilitate – power cords with switches
 - Individual empowerment/responsibility



Living Lab's 5 Key principles:



Value: Value creation concerns several aspects such as economical-, business, consumer/user-value

Influence: To view users as active and competent partners and domain experts

Sustainability: Thinking about the environmental aspects

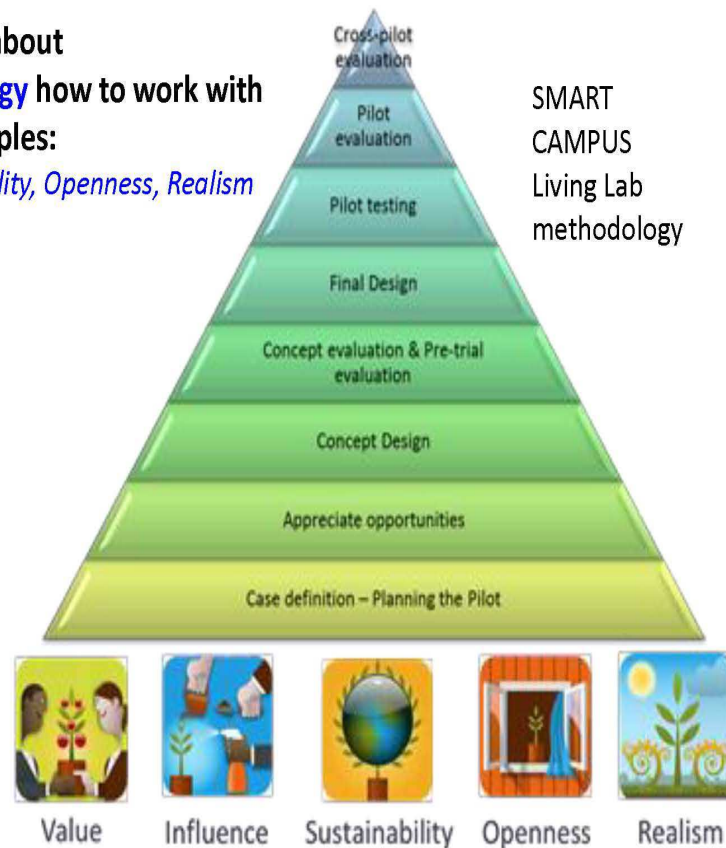
Openness: The innovation process should be as open as possible

Realism: Innovation activities should be carried out in a realistic, natural, real life setting



Think about how to work with
the 5 key principles

Each pilot should think about
their **main goal & strategy** how to work with
each one of these principles:
Value, Influence, Sustainability, Openness, Realism



The 5 Key Principles



The Living Labs methodology in practise: Phase 1: Need-finding and idea-generation

-An example:

Methods:

- Questionnaire
- Work-shops

“The challenge is to generate needs users consider relevant related to the innovation.”

Purposes

- To learn more about the user
- To obtain input on predefined ideas
- To obtain ideas for products and services

User involvement

- Generate ideas for new products and services
- Evaluate concepts

Total duration of this phase

- 1.5 months

Users involved

- Lead-users of 8 shoppers and 4 retailers



The Living Labs methodology in practise:
Phase 2: Concept development and evaluation

–An Example

*“The challenge is to separate between
needs of the service and needs in the
service.”*

Methods:

- Work-shops

Purpose

- Develop and educate developers
- **Co-create the service concept**

User involvement

- Co-developing concepts together with developers
- Generating ideas together with other users and developers
- **Being a discussion partner on suggested concepts**

Total duration of this phase

- 2 months

Users involved

- Lead-users – 10 shoppers and 3 retailers



The Living Labs methodology in practise: Phase 3: Real-life test – large scale

-An Example

“The challenge is to evaluate users’ real experiences of the final service.”

Methods:

- Questionnaires
- Interviews
- Real-life use and evaluation

Purpose

- To **learn about users experiences** of the service through large scale tests
- To **determine business opportunities** of the service

User involvement

- **Evaluation** of the service added value
- **Feedback** on business model

Total duration of this iteration

- 6 months

Users involved

- Potential shoppers
- Potential promoters of the service
- Potential retailers



Each pilot require its own Living Lab approach

Why, who and how?

Motivation

- What is the main motivation for involving users/citizens?
- What are the users' main motivations for being involved?
- What do we expect to achieve with user involvement?

The users

- What types of users should we involve, and why?
- What type of user relationship do we want to have and achieve?

The process

- What degree of user influence do we want to achieve?



Links to Living Lab Handbooks



- **Forming Future IT: the Living Lab way of User Involvement**



- **How to mobilize Users**



- **Race to Scale**

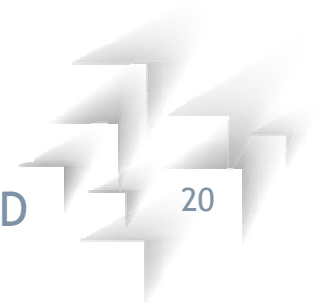


Gamification Strategies

- Using video game principles for behaviour transformation

<https://www.youtube.com/watch?v=2lXh2n0aPyw>

- **Fun!**
- Reputation-based (social visibility)
 - Social media visibility
 - #saveenergy
- Badges, ranking systems (points), competitions
 - Special events/tasks give badges



Brainstorm

- Shut down computers/laptops
 - Eco-motivator/Janitor leaves chocolate/"good job" sticker
- Elevators:
 - Calory counter (up and down)
- Read more: Gamified Energy Efficiency Programs



Payer-User Gap

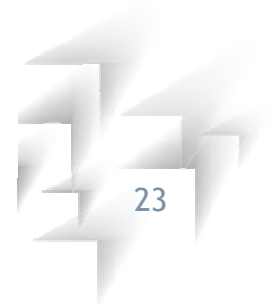
Sometimes who pays the electricity is not the same entity as who uses it:

- Restaurant rent includes fixed electricity/water fee
- New business model, consumption-based



Rebound Effect

- Old behaviours tend to return
 - Prompt / Re-assess / New training
- Community motivation, continuous action
- Projects (rewards) need to be limited in time
 - No cinema tickets forever, but a “eco season” every year
(the EU does it, with the European Sustainable Energy Week – federated events!)



TAKING
COOPERATION
FORWARD



Krakow, 22 February 2017



The Living Labs methodology - in practice



Francesco Molinari, mail@francescomolinari.it

Part I - What is a Living Lab?

“The Blind Men and the Elephant”

Individual components and the full picture (Janus-like)

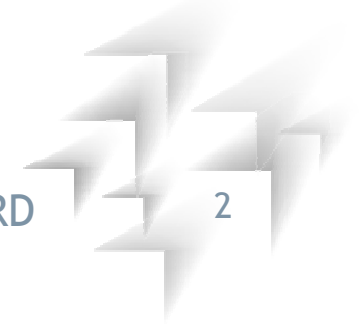
The ENOLL and its 11th wave call for candidatures

Part II - Using the Living Lab approach in the project pilots

Overview of the process adopted in Treviso

(If time allows)
Description of individual activities

Timeline of the Treviso pilot



THE PROBLEM



How the customer explained it



How the project leader understood it



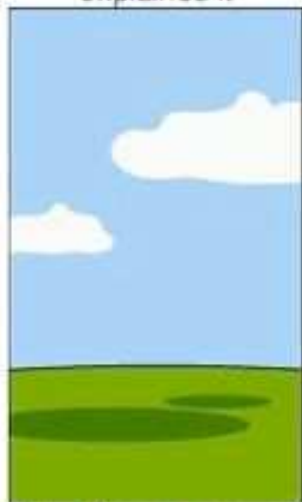
How the engineer designed it



How the programmer wrote it



How the sales executive described it



How the project was documented



What operations installed



How the customer was billed



How the helpdesk supported it



What the customer really needed



WHAT IS A LIVING LAB?

The Blind Men and the Elephant **John Godfrey Saxe** **(1816-1887)**

It was six men of Indostan
To learning much inclined,
Who went to see the Elephant
(Though all of them were blind),
That each by observation
Might satisfy his mind.

The First approached the Elephant,
And happening to fall
Against his broad and sturdy side,
At once began to bawl:
"God bless me! but the Elephant
Is very like a wall!"

The Second, feeling of the tusk,
Cried, "Ho! what have we here
So very round and smooth and sharp?
To me 'tis mighty clear
This wonder of an Elephant
Is very like a spear!"

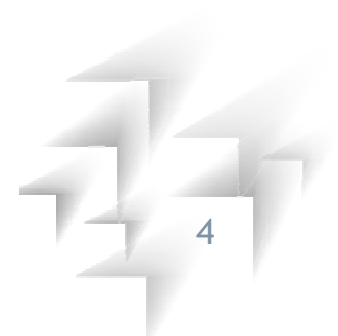
The Third approached the animal,
And happening to take
The squirming trunk within his hands,
Thus boldly up and spake:
"I see," quoth he, "the Elephant
Is very like a snake!"

The Fourth reached out an eager hand,
And felt about the knee.
"What most this wondrous beast is like
Is mighty plain," quoth he;
"Tis clear enough the Elephant
Is very like a tree!"

The Fifth, who chanced to touch the ear,
Said: "E'en the blindest man
Can tell what this resembles most;
Deny the fact who can
This marvel of an Elephant
Is very like a fan!"

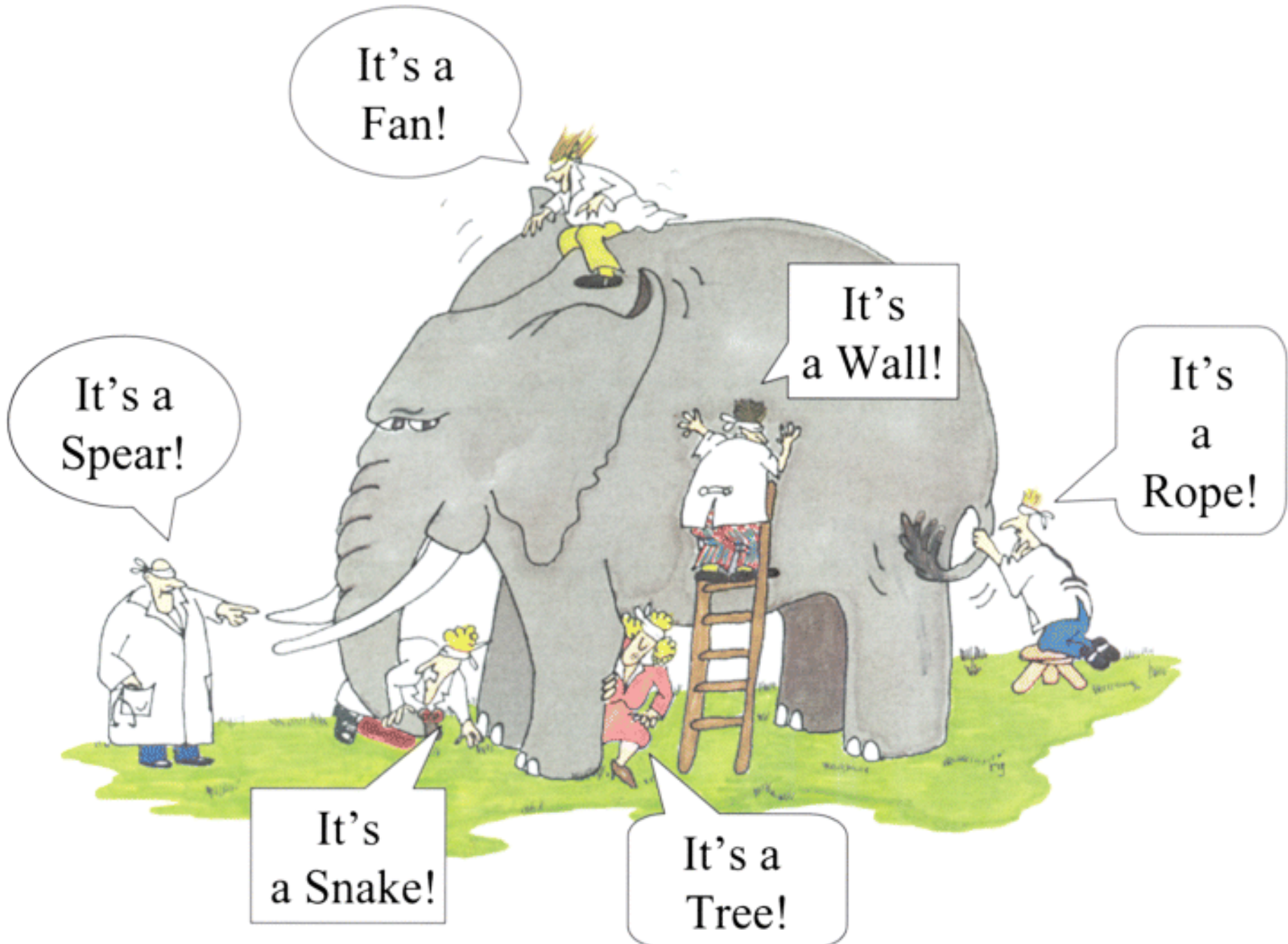
The Sixth no sooner had begun
About the beast to grope,
Than, seizing on the swinging tail
That fell within his scope,
"I see," quoth he, "the Elephant
Is very like a rope!"

And so these men of Indostan
Disputed loud and long,
Each in his own opinion
Exceeding stiff and strong,
Though each was partly in the right,
And all were in the wrong!

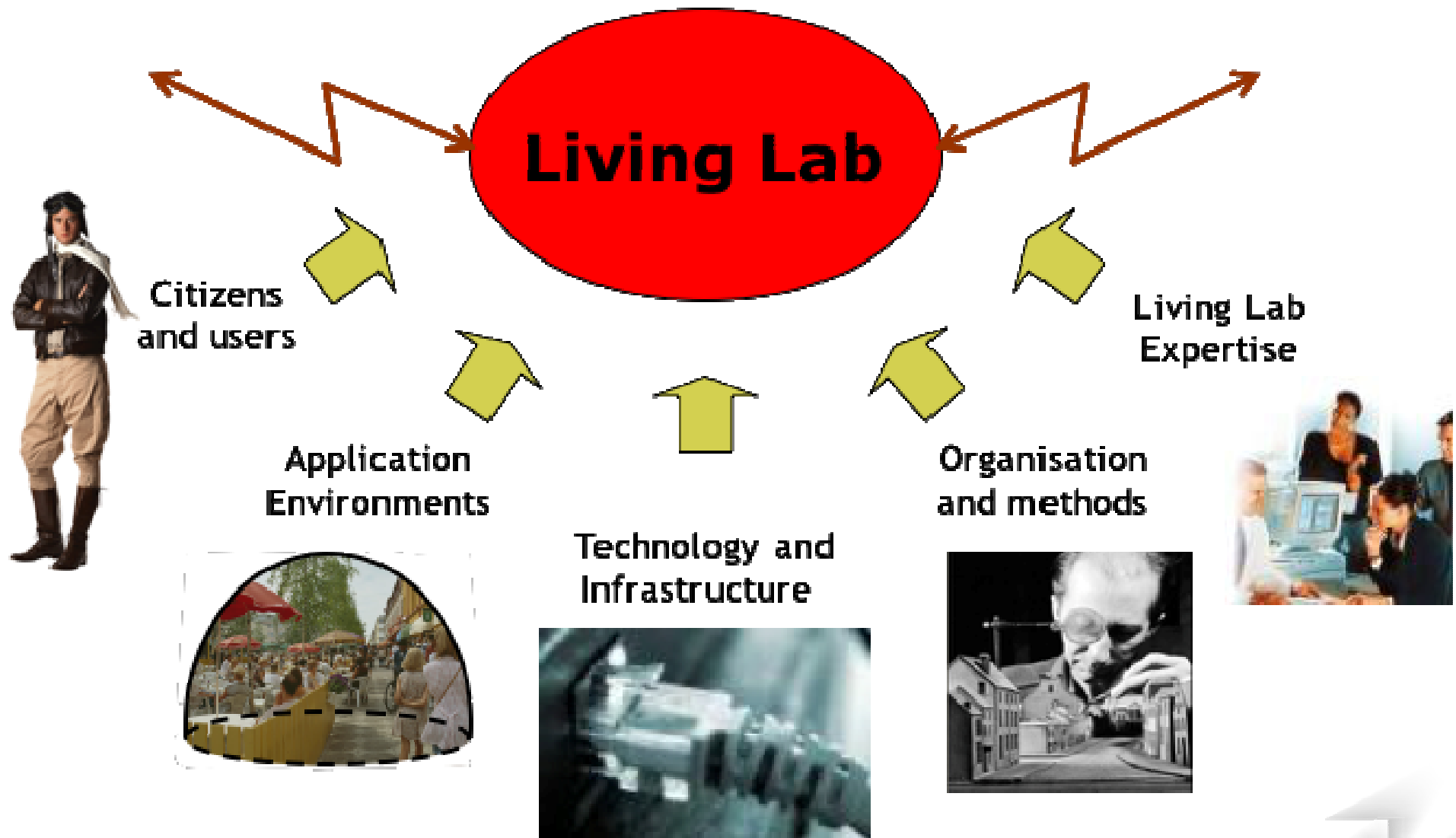


WHAT IS A LIVING LAB?

<https://cviteacher.files.wordpress.com/2014/04/blind-men-and-the-elephant.gif>



WHAT IS A LIVING LAB?



Mikael Börjeson, CDT - Luleå University of Technology, 2006



WHAT IS A LIVING LAB?



“Wisdom of the crowd”



Citizens
and users

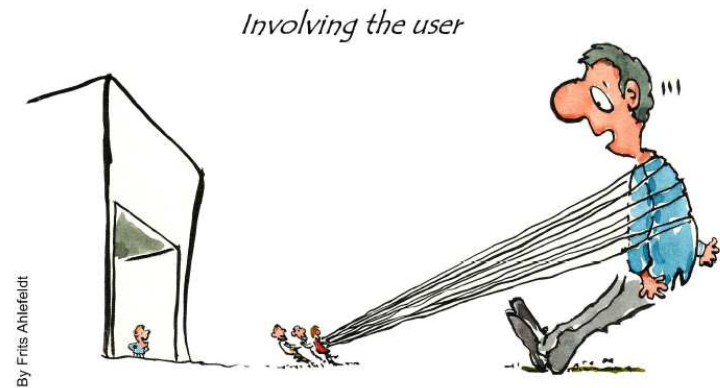


Expert users



Normal people

Users as guinea pigs



WHAT IS A LIVING LAB?



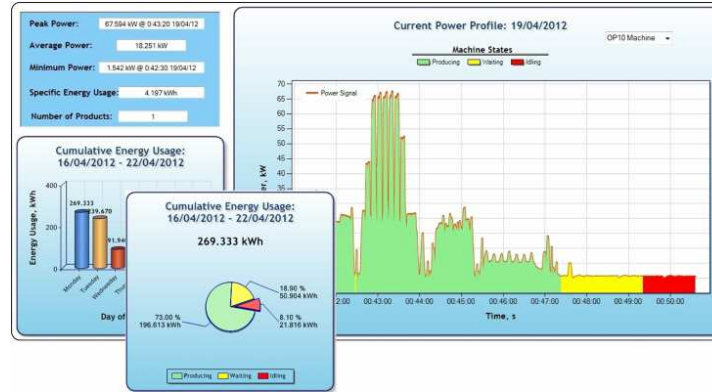
Application
Environments



© Original Artist
Reproduction rights obtainable from
www.CartoonStock.com



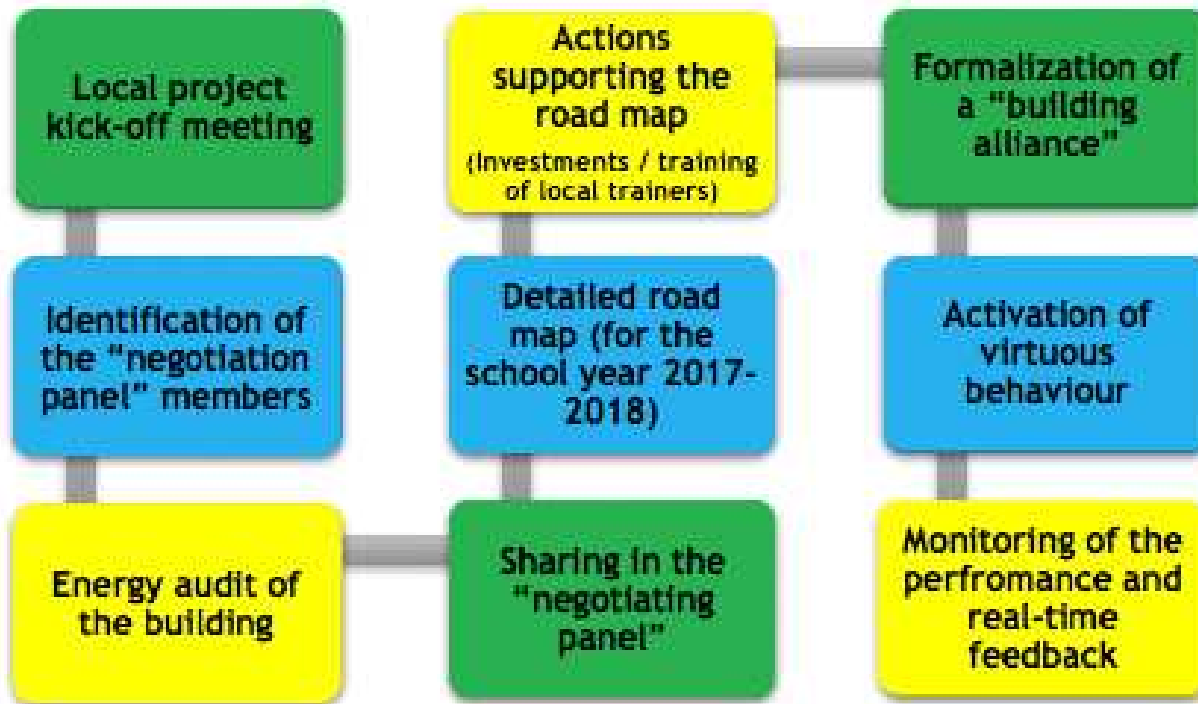
WHAT IS A LIVING LAB?



Technology and
Infrastructure



WHAT IS A LIVING LAB?



ideation



Organisation and methods

BRAINSTORMING

THINK OUTSIDE THE BOX

X	O	O
O	O	X
X	X	O

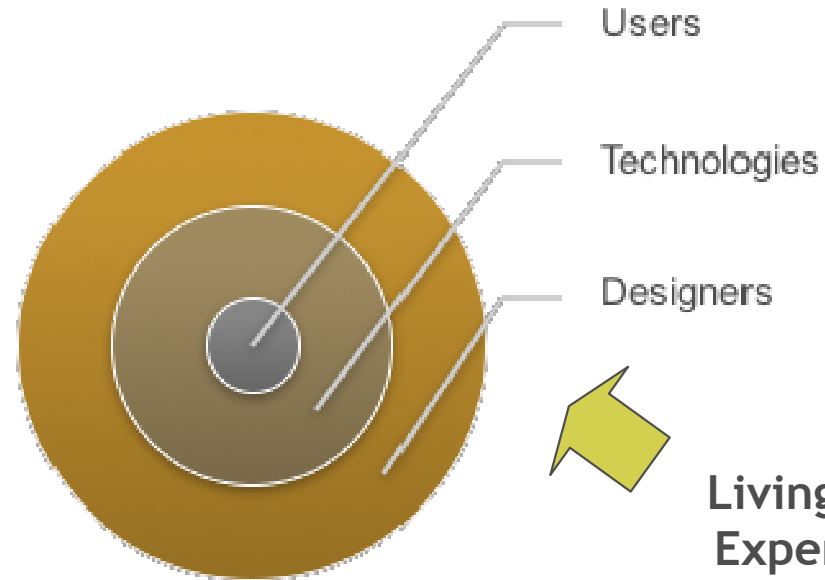
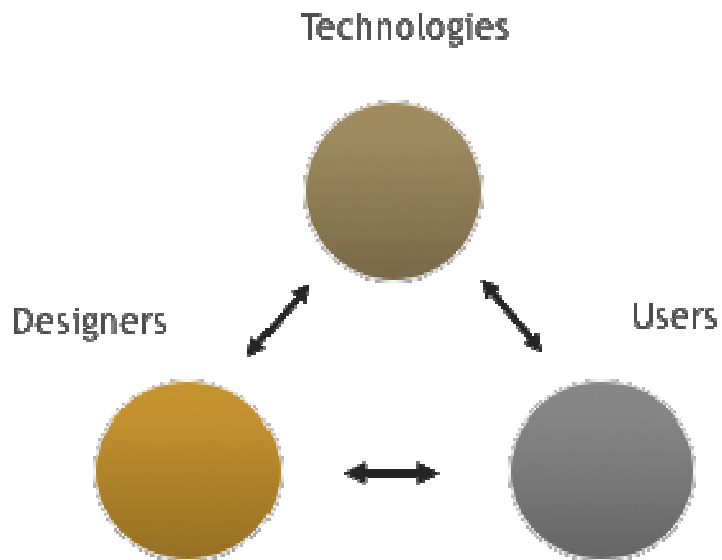


Collaborate

TAKING COOPERATION FORWARD

WHAT IS A LIVING LAB?

From User Centred Design...

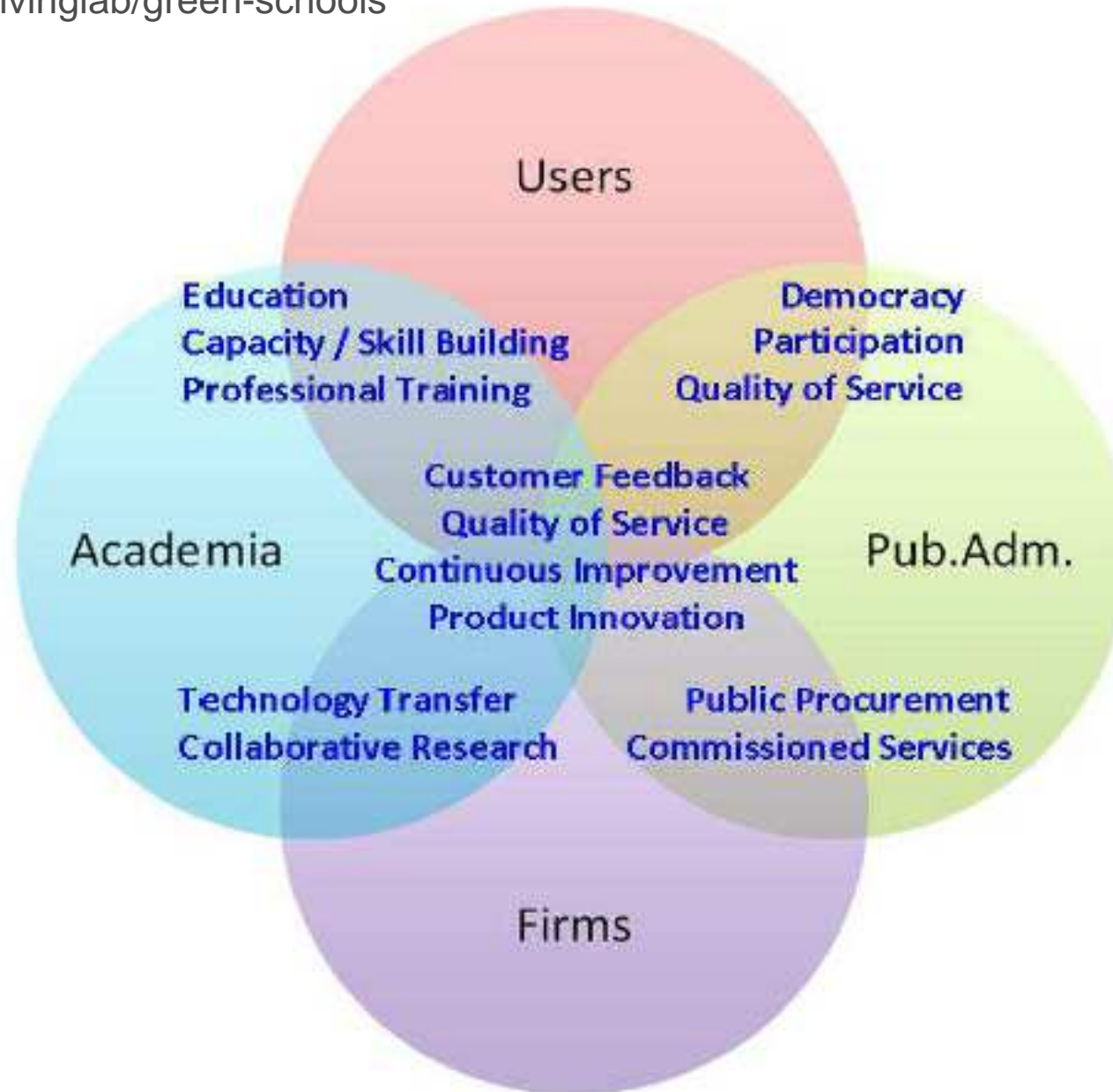


...To User Driven Design!



THE GREEN SCHOOLS LIVING LAB

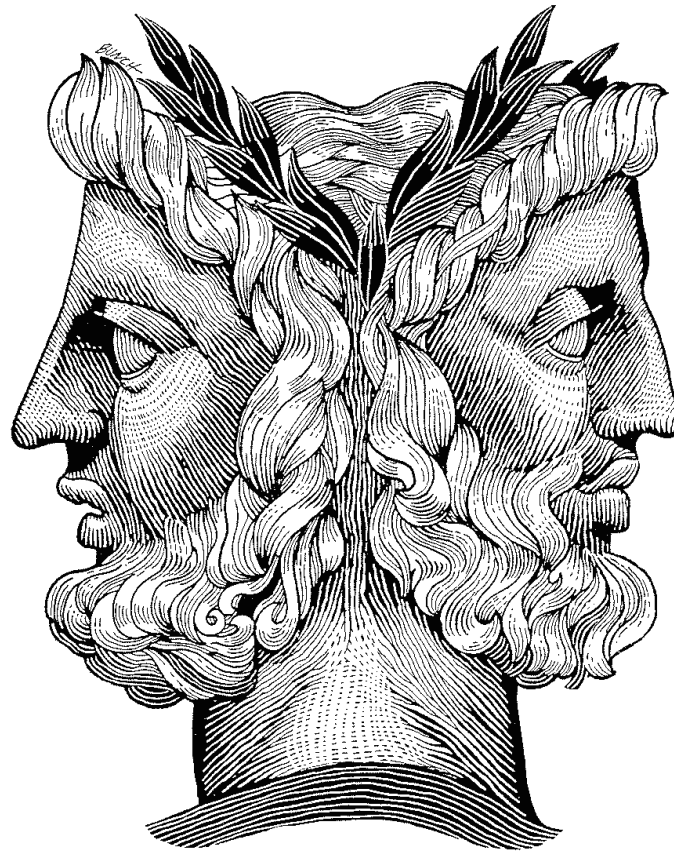
<http://enoll.org/livinglab/green-schools>



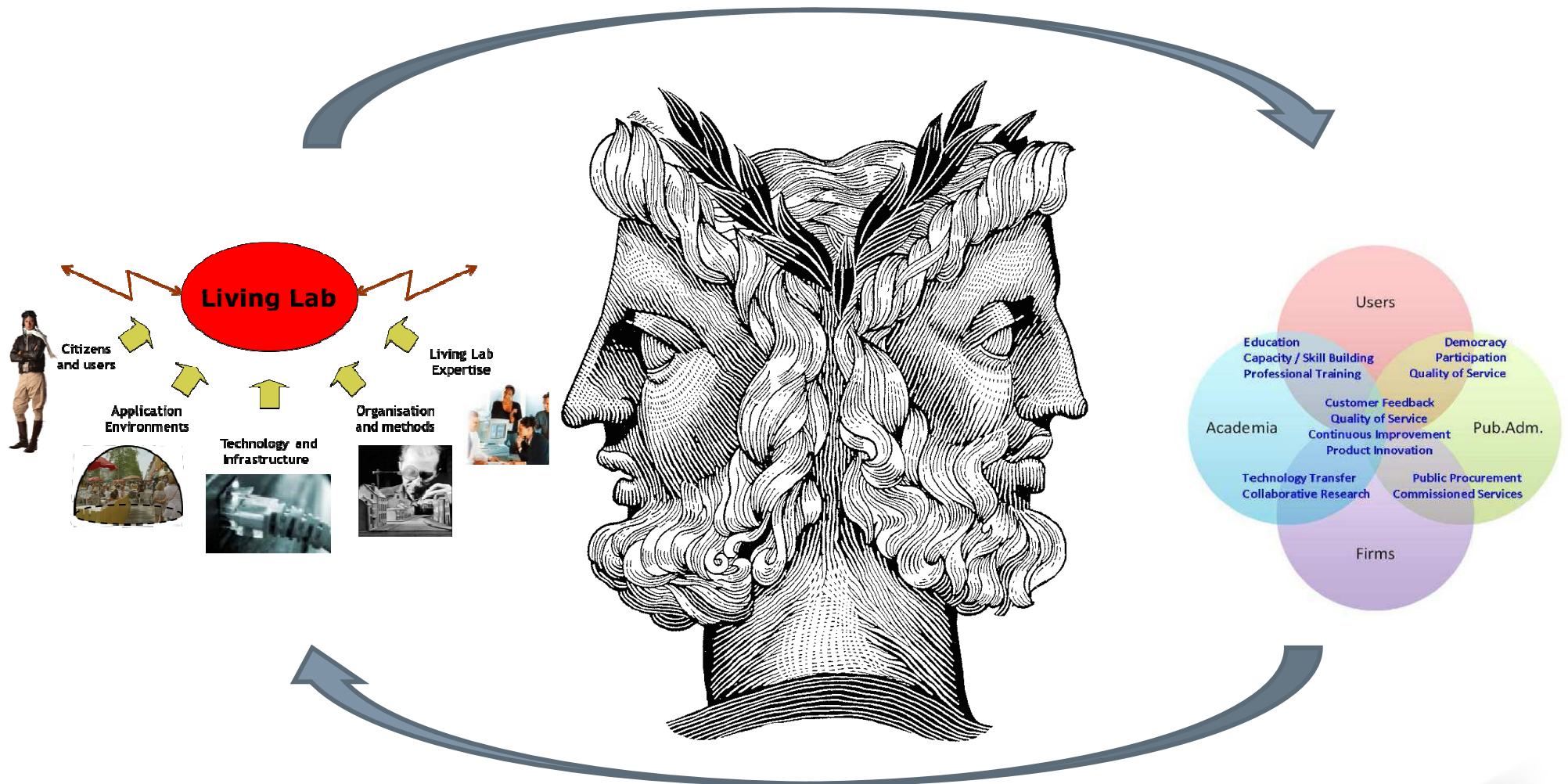
**European
Network of
Living Labs**



TO CONCLUDE



TO CONCLUDE

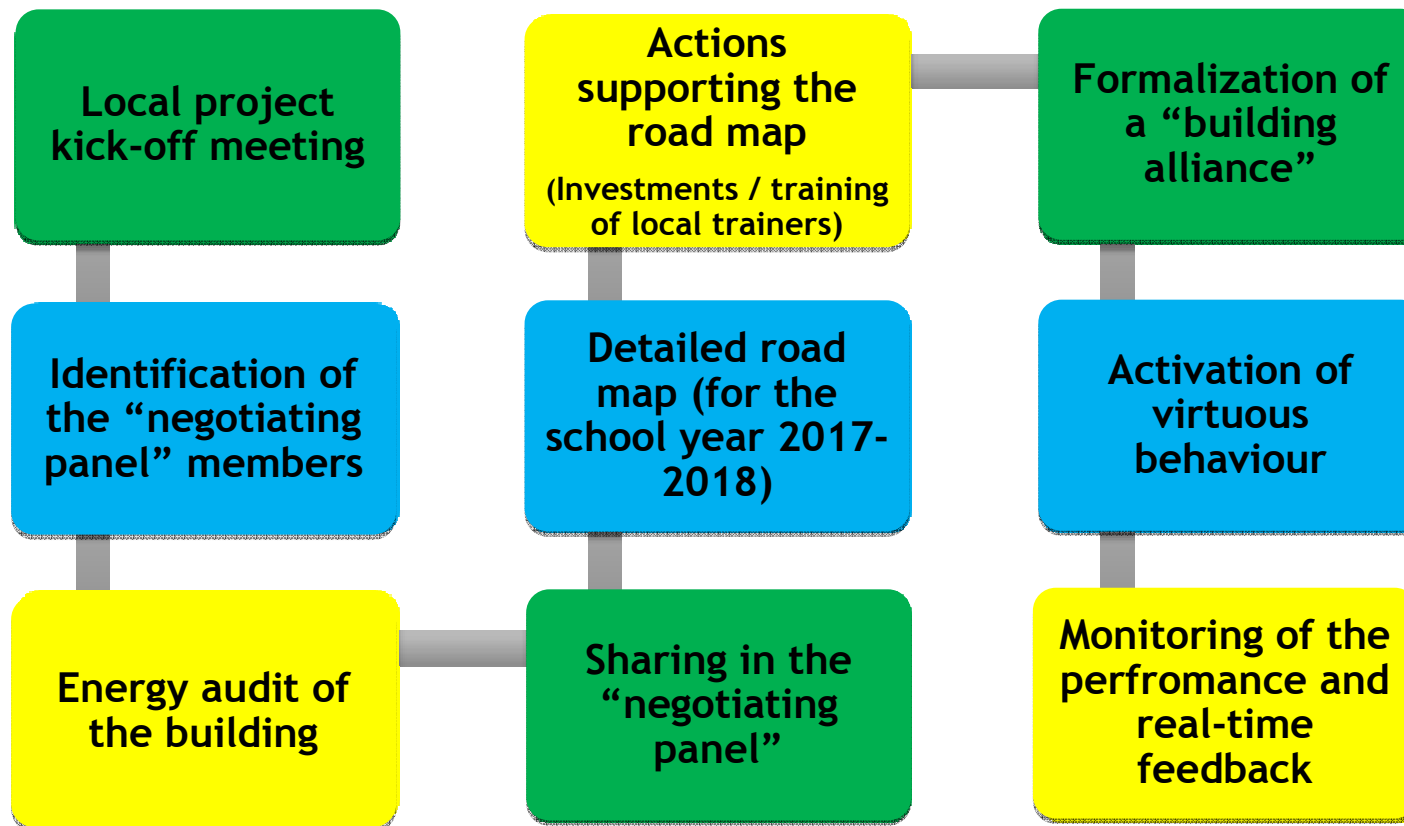




The 11th wave for ENoLL Membership is open



THE PROCESS ADOPTED IN TREVISO



Key to colours: yellow Province of TV, blue building stakeholders, green both



LOCAL PROJECT KICKOFF MEETING

Province and
building
stakeholders



Objectives:

- Presentation of the objectives of the project to all the building stakeholders
- Discussion of the starting points: SWOT, barriers and constraints

Expected results:

- Start of a steady collaboration
- Exchange of contact details for the project
- Planning of next steps



SWOT ANALYSIS

<h2>Strengths</h2> <p>Example: recently built or renovated building</p>	<h2>Weaknesses</h2> <p>Example: building used promiscuously by different subjects</p>
<h2>Opportunities</h2> <p>Example: resources in the budget of the owner that have not been allocated yet, and that can be used properly on the basis of the energy audit offered by the Province</p>	<h2>Threats</h2> <p>Example: scenario changes that are expected (but that have not occurred yet) due to external events that cannot be controlled</p>



BARRIERS AND CONSTRAINTS

List of barriers

By barrier we mean a hindrance to the fulfilment of the programme, whose persistence actually prevents the achievement of the objectives and that, as a consequence, must be removed

List of constraints

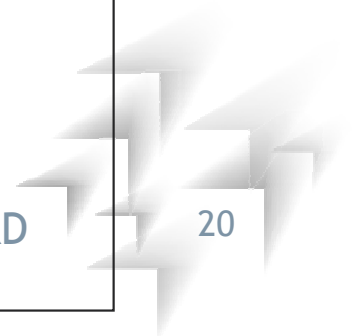
By constraints we mean external conditions we have to take into account during the implementation of the programme, and that can be lessened or handled, but not removed

Actions to be implemented

To remove the above mentioned hindrances

Actions to be implemented

To lessen or handle the conditions mentioned above



IDENTIFICATION OF THE “NEGOTIATING PANEL MEMBERS”

**Building
stakeholders**

← Within January 2017

Objectives:

- Establishing a steady group to supervise and monitor the project activities, a group that is really representative of all the interests at stake within the building

Expected results:

- Pilot start-up meeting
- Scheduling of periodic meetings during the year
- Internal rules (facsimile provided by the Province)



Province of
Treviso

← Within February 2017

Objectives:

- Identifying precisely needs, limits and improvement potentials of the building energy efficiency, involving its occupants and the other relevant stakeholders in the audit process

Expected results:

- Clear indication of efficiency improvement measures to be implemented in terms of:
 - Technological investments
 - Organizational measures (e.g. opening and closing times)
 - Behavioural change



SHARING OF THE ENERGY AUDIT RESULTS

Province and
building
stakeholders

← Within March 2017

Objectives:

- Informing the “negotiating panel” members of the audit results and of its implications
- Transferring the basic contents to all the building population, through one or more ad hoc events

Expected results:

- Awareness raising of the stakeholders
- Devising a sustainable road map



**Building
stakeholders**

← Within May 2017

Objectives:

- Developing a list of activities to be implemented in the school year 2017-2018

Expected results:

- Involvement of all the building stakeholders in the process
- Setting achievable and objectively measurable objectives in a short time span
- Devising innovative ideas to promote the achievement of the road map objectives with the involvement of all the stakeholders
- Preparing the ground for a reinvestment plan of part of the benefits obtained by the owner after the implementation of the activities



Province of
Treviso

← Within June 2017

Objectives:

- Accompanying and supporting the road map objectives through:
 - Technological investments (primarily: “smart meters” and related “real time” monitoring service - pursuant to a usage agreement with the bodies)
 - Actions of “training to the local trainers” (12 days divided into 3 modules, with the resources and the tools acquired during the Krakow event in February 2017 and based on a requirements analysis performed by Agenda 21)
 - Possible integration/coordination with investments planned by the owner

Expected results:

- Facilitating the achievement of the road map objectives
- Making it possible to objectively compare the improvements obtained and the related rewards



FORMALIZATION OF A “BUILDING ALLIANCE”

Province of
Treviso and
building
stakeholders

← Within June 2017

Objectives:

- Engaging reciprocally the Province and all the building stakeholders (involved in the “negotiating panel”) in achieving the detailed road map objectives and in sharing the deriving benefits, after implementing, where they are not already in place, the technological tools for monitoring and sharing the building energy performance

Expected results:

- Definition of the method for calculating and sharing the benefits deriving from the road map in favour of the building stakeholders
- Transformation of the alliance into a commitment for all the stakeholders



**Building
stakeholders**

← Within June 2018

Objectives:

- Implementing, during the school year 2017-18, the activities planned in the detailed road map (made possible by the technological investments and the training) and achieving the relevant results through a collective effort of all the building stakeholders

Expected results:

- Achievement of the detailed road map objectives
- Achievement of the benefits related to the performance
- Implementation of the necessary behavioural and/or organizational changes related to the building management



Province of
Treviso

← Within June 2018

Objectives:

- Performing periodic checks of the patterns of the main indicators of consumption and energy efficiency in the building
- Communicating transparently and with the frequency set in the road map, the monitoring results to all the involved stakeholders

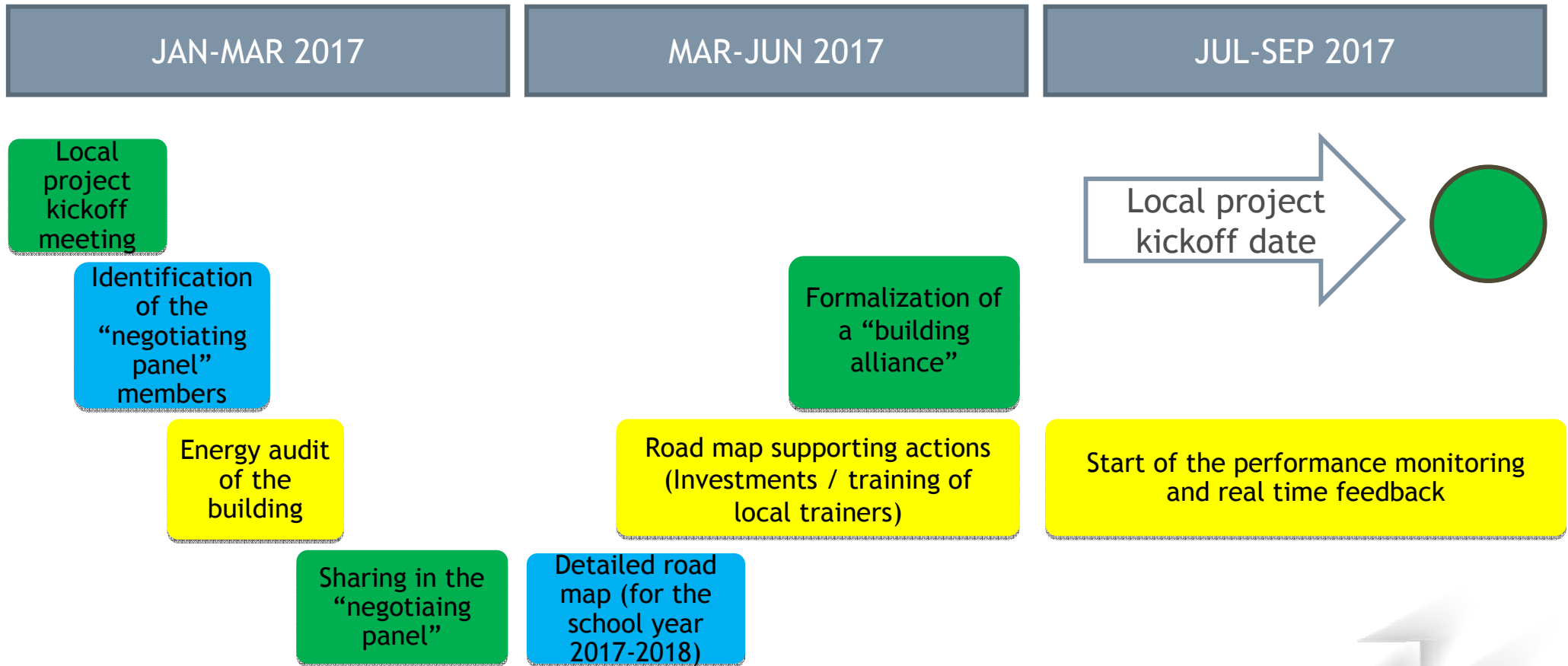
Expected results:

- Speeding up the achievement of the objectives or the correction of possible deviations during the implementation
- Spreading the culture and awareness of the importance of measuring the results as a guide to changing actions



TIMELINE OF THE TREVISO PILOT

GANTT Diagram



THANK YOU FOR YOUR ATTENTION



Francesco Molinari
External expert, Province of Treviso
Project TOGETHER



www.interreg-central.eu/together



mail@francescomolinari.it



+39 347 333 7434



[togetherprtv2016](https://www.facebook.com/togetherprtv2016)



[linkedin.com/in/central-europe-together-82278512b](https://www.linkedin.com/in/central-europe-together-82278512b)



[@ce_together](https://twitter.com/ce_together)



EURONET 50/50 MAX project

– increasing energy efficiency in public buildings through
change of behaviours



Patrycja Płonka
Project Manager



Association of Municipalities Polish Network „Energie Cites”

31-016 Kraków, 17 Sławkowska Str.

phone/fax: +48 12 429 17 93

e-mail: patrycja.plonka@pnec.org.pl



Co-funded by the Intelligent Energy Europe
Programme of the European Union

www.euronet50-50max.eu

EURONET 50/50 project



Objective Implementation of innovative 50/50 methodology in at least **50** schools from **9** European countries and creation of the European Network of Energy Saving Schools

Program Intelligent Energy Europe (IEE)

Duration May 2009 - May 2012

Total budget 1.049.678 €

Partners

- **Diputació de Barcelona (DIBA) – COORDINATOR**
- Independent Institute for Environmental Concerns (UFU e.V.)
- Local Agency for Energy and Environment (ALESA srl.)
- Lake Balaton Development Coordination Agency (LBDCA)
- **Association of Municipalities Polish Network “Energie Cites” (PNEC)**
- Energy agency of Savinjska, Šaleška and Koroška region (KSSENA)
- Almada City Council (Almada)
- University of Vaasa (VEI)
- Region of Crete



Co-funded by the Intelligent Energy Europe Programme of the European Union

EURONET 50/50 MAX - continuation of a successful initiative!



- Objectives**
- mobilizing energy savings in public buildings through the implementation of the 50/50 methodology in **500** schools and nearly **50** other public buildings from **13** EU countries
 - wide dissemination of the 50/50 concept

Program Intelligent Energy Europe (IEE)

Duration April 2013 - April 2016

Total budget 1.590.479 €

Partners 16 partners from 13 European countries (with the Barcelona Provincial Council as coordinator)

A map of Europe is shown with a yellow background. The map is divided into countries, with several countries highlighted in light blue. A green thought bubble with a blue outline is positioned above the map, containing the text "New countries, New schools, New buildings!".

**New countries,
New schools,
New buildings!**



50/50 concept



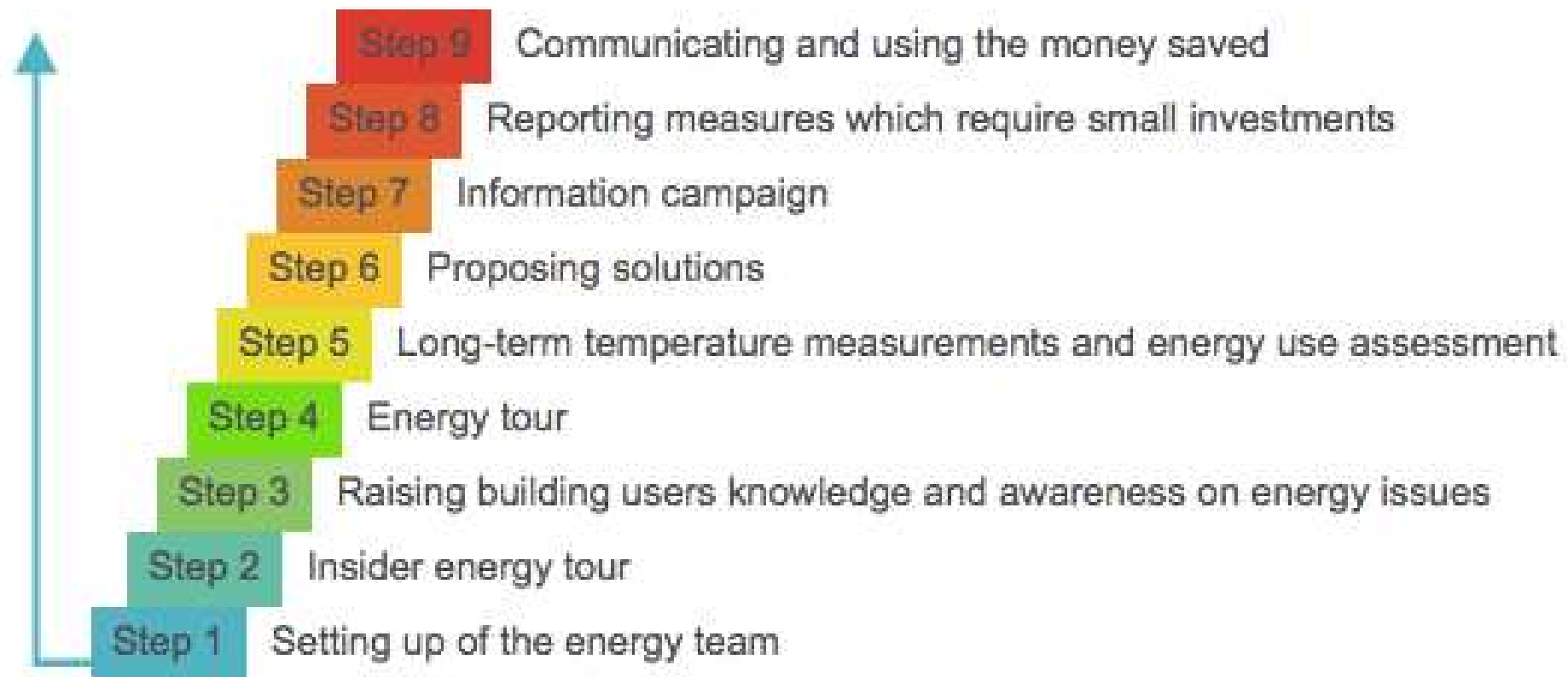
- ... actively involves building users in the energy management process and teaches them sustainable behaviours through practical action (these are the building users who are responsible for **evaluation** of initial situation of the building, **designing** and **implementation** of energy efficiency measures and **organisation** of information campaign)
- ... creates economic incentive to save energy, both for building users and for local authorities who pay the bills:
 - ✓ **50%** of the savings achieved thanks to the energy efficiency measures undertaken by the users is **returned to them** through a financial payout;
 - ✓ another **50%** stays within the local authority that pays energy bills.
- As a result – everybody wins:
 - ✓ building users raise their energy awareness, improve their energy habits and receive additional funds;
 - ✓ local authorities pay less for energy used in their buildings;
 - ✓ local community gets cleaner local environment.



50/50 methodology in schools



Implementation of 50/50 methodology in schools consists of 9 steps:



Co-funded by the Intelligent Energy Europe Programme of the European Union

Step 1. Setting up of the energy team



Team members:

- a group of pupils (from one class or different classes & grades)
- 1-2 teachers
- caretaker

Team tasks:

- analysis and evaluation of the school's energy situations
- proposing energy efficiency measures (change of behaviour, small repairs and interventions)
- implementation of proposed measures
- organisation of education & information campaign addressed to other pupils, teachers, staff and members of the school society



Most of the tasks should be done during the heating period. In warmer months the team can work on other problems, e.g. on **reducing water consumption** or **improving waste management and segregation**.



Co-funded by the Intelligent Energy Europe Programme of the European Union

Steps 2 & 3. Insider energy tour and theoretical kick-off



In order to successfully carry out all further activities both teachers and pupils need to prepare:

- **teachers** – by taking part in the insider energy tour to get to know the school building better and find out what is worth showing the pupils;
- **pupils (both from energy team and others** – by learning more about energy, energy use in everyday life, energy efficiency, RES use and climate change (dedicated lessons, lectures, study tours, own research, etc.)



Co-funded by the Intelligent Energy Europe Programme of the European Union

Step 4. Energy tour



During the energy tour pupils **inspect whole school building** in order to check where energy enters the building, how it is distributed, where it is used and what aspects of school's operation influence energy consumption.

Assisted by the caretaker, they check and analyse *inter alia*:

- technical state of the building
- heating system
- external and internal lighting
- used electrical & electronic equipment
- water usage points

To be as thorough as possible the pupils visit all school rooms, including:

- classrooms
- corridors
- staircases
- teachers' room
- director's office
- bathrooms and toilets
 - gyms
 - boiler room
 - storage rooms

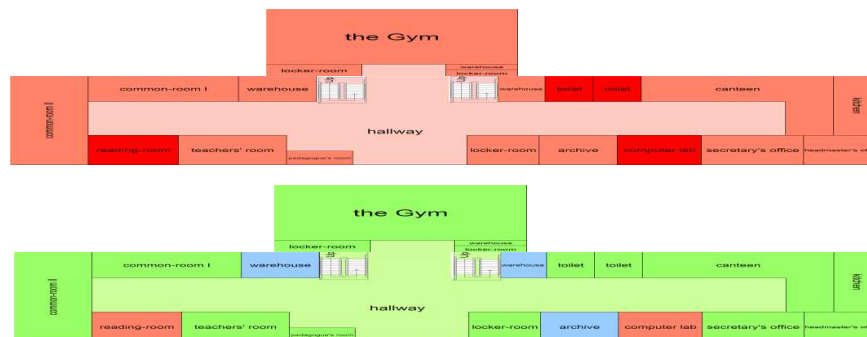
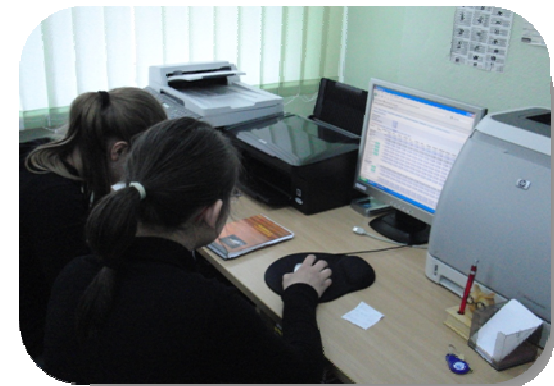


Co-funded by the Intelligent Energy Europe Programme of the European Union

Step 5. Long-term temperature measurements & energy use assessment



- **measuring** of temperatures, light brightness and energy consumption of different devices used at school (computers, printers, photocopiers, etc.)
- **computer activities:**
 - monitoring of energy consumption
 - calculation of carbon footprint
- making **temperature profiles** of the schools
- conducting surveys among their colleagues, teachers and other members of school society and observing their behaviours



Co-funded by the Intelligent Energy Europe Programme of the European Union

Step 6. Development of the action plan for reducing energy consumption at school



After assessing energy situation of their schools, the energy teams **propose energy efficiency measures** and implemented them to **achieve energy and financial savings**.

The measures are mostly linked with changing users behaviours and some small repairs/interventions

Some of the proposed solutions are following:

- **labeling** light switches and water taps;
- proper regulation of the heating system;
- organisation of **School Environmental Service**, whose members turn off unnecessary light or equipment and report any damages like leaking taps;
- preparation of **bulletin board displays** and/or poster exhibitions with tips how to save energy;
 - proper airing of the classrooms;
 - awarding classes, who manage to use energy efficiently
 - making tea in more efficient way.



Step 7. Information campaign



Energy team’s task is also to organise an **education & information campaign** in order to share their findings with the rest of the school society and engage them in energy saving activities.

There are many possible **ways of communicating** with other pupils, teachers and family members, including:

- preparation of posters and bulletin board displays
- development of dedicated websites
- preparation of school contests & „energy performances”
- writing articles for school newspapers
- organisation of school energy days
 - presentation of the project and its results during school event
 - organisation of dedicated workshops
 - and many others!



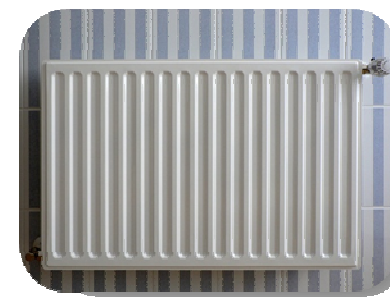
Step 8. Reporting measures which require small investments



Although the main aim of the 50/50 methodology are non-investment energy savings, energy teams can also propose some **small investments** to learn that also **small amounts of money can make a big change!**

What small investments can they propose?

- placing silver foil behind the radiators
- insulation of drafty windows
- installation of thermostatic valves to regulate the temperatures
 - separation of light switches
 - replacement of old lamps with energy efficient ones



© copyright by Bios; licensed under GNU Free Documentation License 1.2



© copyright by Coyau; licensed under CC-BY-SA-3.0

To implement them the team needs to address right person/ institution with the request for support.



© copyright by R/DV/RS; licensed under CC BY 2.0



Co-funded by the Intelligent Energy Europe Programme of the European Union



Step 9. Calculating, communicating and using the money saved



After each year of 50/50 implementation at school energy and financial savings are calculated and whole school community learns:

- how much kWh of electricity and heat have been saved;
- how big was related CO₂ reduction;
- how much money the school got from the municipality.

The savings are calculated using the on-line calculation tool available on the project website (www.euronet50-50max.eu)

Energy team takes part in the decision on using the money saved!!!



KROK 2: WPROWADŹ WARTOŚCI REFERENCYJNE I DANE NA TEMAT ŻUŻYCIA ENERGII W ROKU BIEŻĄCYM

Wypełnij poniższą tabelę podając następujące dane:

- zużycie poszczególnych nośników energii w latach referencyjnych
- suma stopniodni grzania w latach referencyjnych
- zużycie poszczególnych nośników energii w roku bieżącym
- suma stopniodni grzania w roku bieżącym
- ceny poszczególnych nośników energii w roku bieżącym

	Lata referencyjne		Kolejne lata realizacji projektu 50/50			
Energia elektryczna - zużycie (w kWh)						
Energia elektryczna - cena (w PLN / kWh)						
Gaz ziemny - zużycie (w m ³)						
Gaz ziemny - cena (w PLN / m ³)						
Suma stopniodni grzania (w °C dni)						

Zapisz

Uwagi:

- Gdy będziesz wprowadzać dane, upewnij się, że:
 - o wszystkie niezbędne pola zostały wypełnione;
 - o wprowadzone dane są dokładne i znajdują odzwierciedlenie w dokumentach (faktury itd.);
 - o wprowadzone dane są podane w odpowiednich jednostkach.
- Wszystkie wprowadzone przez Ciebie dane i informacje zostaną zachowane w systemie i będziesz miał do nich dostęp w dowolnej chwili.
- Jeżeli chcesz jeszcze raz zapoznać się z metodologią obliczeń w ramach projektu 50/50, zanim wprowadzisz dane, kliknij **tutaj**.



Co-funded by the Intelligent Energy Europe Programme of the European Union

Step 9. Calculating, communicating and using the money saved



New equipment



New educational materials and tools



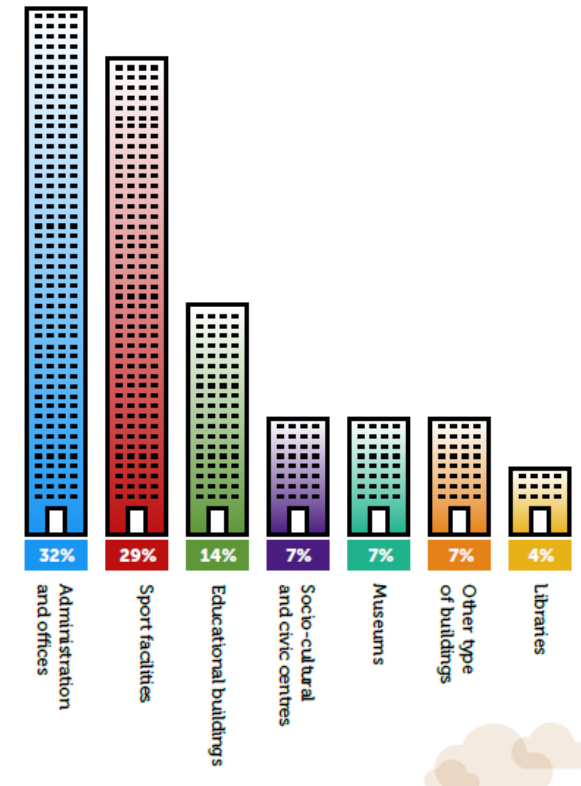
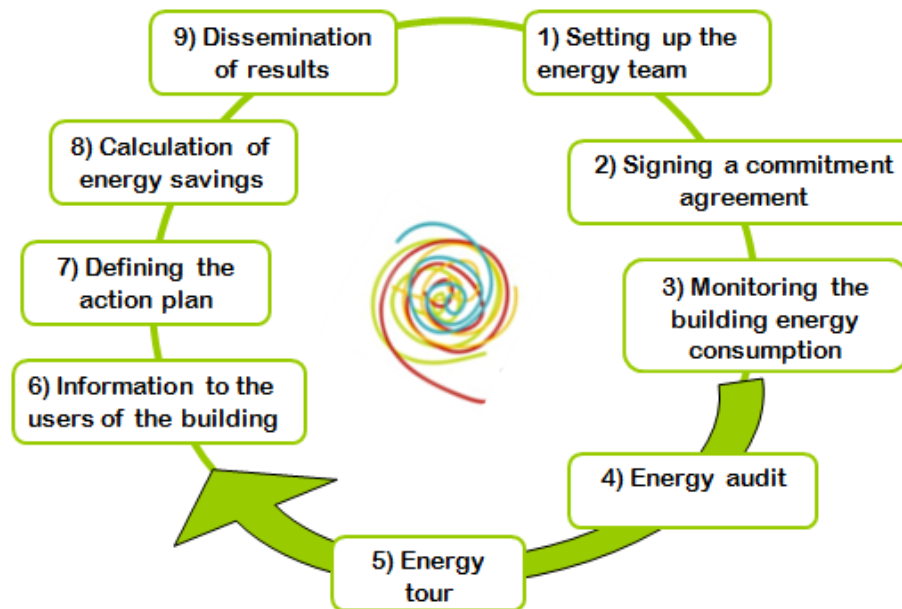
Trips



Co-funded by the Intelligent Energy Europe Programme of the European Union

50/50 methodology in other public buildings

50/50 steps in public buildings



Preliminary results on project level



The Savings in schools

66.65 % of the 340 schools obtained savings (67.71% in 2014, the first year, and 65.58% in 2015, the second year of the project).



- Schools with savings
- Schools without savings

Each of these schools saved

- 11.61 %
 - 40 538 kWh
 - 2 760 EUR
 - 12.71 t CO₂
- on average.

The energy consumption of the group of schools with savings has been reduced by **11.6 %** on average in comparison to the reference years. In total these are **17 799 288 kWh** and **1 289 292 Euro** and **5 636 t CO₂**, that have been saved.

Savings in other public buildings

77 % of the 27 non-school buildings obtained savings (76.19% in 2014, the first year, and 77.87% in 2015, the second year of the project).



- Buildings with savings
- Buildings without savings

Each of these buildings saved

- 10.85 %
 - 28 436 kWh
 - 2 800 EUR
 - 8.51 t CO₂
- on average.

The energy consumption of the non-school buildings with savings has been reduced by **10.85 %** on average in comparison to the reference years. In total these are more than **1 080 426 kWh** and **105 110 Euro** that have been saved. **330 t CO₂** less have been emitted to the atmosphere.



Results in Poland



Electricity savings

73 schools (54,9%)

Averages:

8 823 kWh

12,99%

1 190,10 EUR

4,20 t CO₂

Heat savings

68 schools (51,1%)

Averages:

44 873 kWh

11,37%

2 138,18 EUR

16,10 t CO₂

Total savings

72 schools (54,1%)

Averages:

45 709 kWh

9,49%

2 951,62 EUR

17,85 t CO₂



Strengths

- Euronet 50/50 max enhances the possibilities of public buildings to save energy with just changing behaviors and increases their knowledge and motivation on climate change action
- Strong potential of public buildings to achieve energy savings with just changing behaviors.
- High possibilities to extent an integrated approach, such as 50/50, bringing stakeholders together
- 50/50 as an effective tool to save energy at school and increase awareness on energy and climate change
- 50/50 is a motivating methodology that empowers pupils and users of buildings to get energy smart.

Weaknesses

- Lack of time
- Motivation, knowledge
- Obtaining consumption data
- How to return savings (administrative and legal barriers)
- Include 50/50 in regional and/or national strategies and plans.



7 good reasons to start a 50/50 project in your municipality



- The 50/50 method can be implemented in many different types of public buildings and facilities: schools, sports facilities, municipal offices, social-cultural spaces (libraries, civic centres, museums, etc.) and others.
- If the energy use of the school or public building is reduced, it decreases the money the municipality pays for the energy as well.
- You can achieve energy savings without making large investments, through behavioural changes in the use of the facilities, reduce energy bills and get extra money for new investments in the building.
- A successful 50/50 project in your school can be a lighthouse project for other schools and public buildings in the region. It inspires your citizens and local stakeholders to follow your example and become more energy efficient.
- Some energy saving measures, like the readjustment of the heating system, will reduce the energy bills for the duration of the project and beyond.
- A 50/50 project in your schools and buildings can help you to reduce CO₂ emissions and to achieve your local/regional climate and energy targets. It proves your commitment towards a more sustainable future and energy smarter society.
- You can increase the reliable energy supply in your municipality by using the 50/50 method. The less energy is used, the less energy has to be provided.



Co-funded by the Intelligent Energy Europe Programme of the European Union



E-pack



- Measuring devices

- Guidebooks

FOR SCHOOLS



Digital thermometer



Energy consumption meter

Digital luxmeter



FOR NON SCHOOL BUILDINGS

- Other useful materials, including lesson scenarios, educational movies, games, etc.



On-line energy consumption meter



Co-funded by the Intelligent Energy Europe Programme of the European Union

THANK YOU

Patrycja Płonka
Project Manager

www.euronet50-50max.eu



Association of Municipalities Polish Network „Energie Cités”

31-016 Kraków, 17 Sławkowska Str.

phone/fax: +48 12 429 17 93

e-mail: patrycja.plonka@pnec.org.pl



Co-funded by the Intelligent Energy Europe
Programme of the European Union

**SAVE ENERGY PILOT
MANCHESTER**

**TAKING
COOPERATION
FORWARD**



Manuel Nina



Director of innovation

SNAP! Solutions Portugal





The Pilot Building





History

Civic building constructed 1877, neo-Gothic style. (100M€ today)

Triangular island site, with 3 main ranges enclosing a triangular courtyard mostly filled by a rectangular Great Hall.

Three storeys and attics

Construction - sandstone facing to a brick carcass, slate roofs. Gas lit originally.





Internal Views





Rooms and Uses

- 3,500 staff
- Conferences
- Weddings/public functions
- Committee Rooms
- Sculpture Hall
- Seven staircases
- Great Hall – 4000m² of marble flooring
- 4 state rooms





Energy Use 2007-8 & 2008-9

	2007/2008 kWh	2007/2008 Cost	2008/2009 kWh	2008/2009 Cost
Mar	156,902	£12,417	143,311	£8,239
Apr	132,494	£7,309	142,068	£11,726
May	150,247	£8,832	125,192	£10,497
Jun	131,156	£7,647	121,284	£12,194
Jul	133,312	£7,740	120,010	£12,105
Aug	124,545	£7,306	112,655	£13,345
Sep	136,905	£7,989	131,167	£16,791
Oct	160,887	£9,147	153,898	£18,815
Nov	167,609	£9,498	152,004	£18,573
Dec	154,877	£8,795	163,600	£19,869
Jan	146,827	£8,451	145,159	£18,480
Feb	140,940	£8,166	146,950	£18,708
Total	1,736,698	£103,295	1,657,295	£179,342





Electricity use 27th Jan 2009





Electricity Use February 2009





Potential Areas of Work

- Re-lamping – impact of new lamps
- PC energy use
- Production kitchen – measure impact
- Elevators

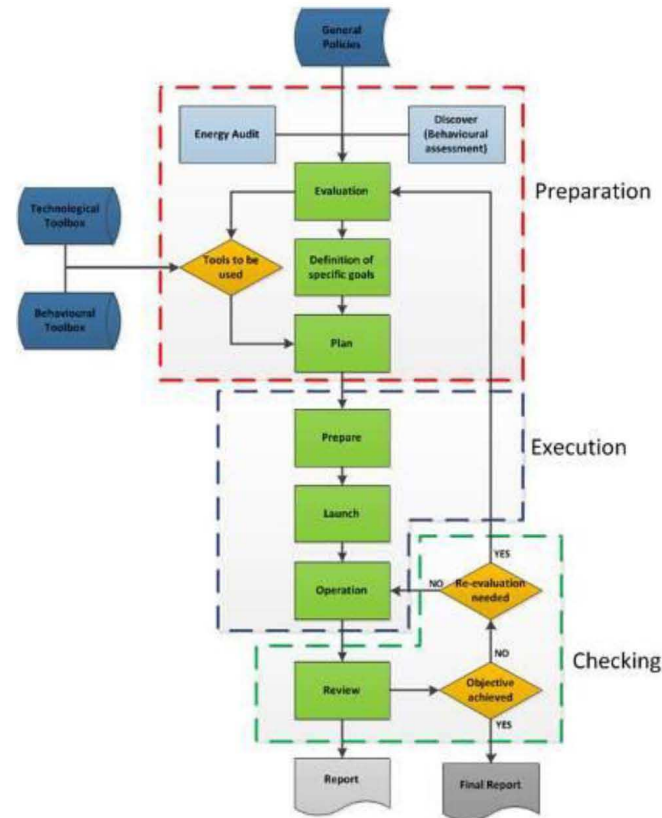
- Behaviour change – influencing custom and practice





User Behaviour Transformation Methodology

- Preparation
- Execution
- Checking





Preparation Phase

- *Evaluate* the pre-requisite such as General policies, City objectives, EU goals other existing policies. Also evaluate the users and their needs for achieving the goals.
- Make an energy Audit of the building (often done by local authorities)/observation
- *Define* the goals based on the input from the evaluation. What is possible to achieve and what cost is acceptable for achieving this.
- Select the needed tools from the Behaviour Toolbox (includes technology?).
- *Plan* your activities. One of the most important tasks is to plan for the user involvement. Plan the meeting schedule, how to provide information etc. to the users. Also consider, who is the user? Of course people in the building, but perhaps also local management, house owner, and visitors?



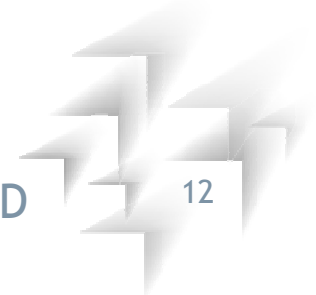


Changing behaviours

Our actions are generally dependent on the questions that are asked and answered by our sub-conscious mind:

- **Is there a problem?**
- **Do I care?**
- **Do I know what to do about it?**
- **Will the solution work?**
- **What will others think about what I do?**

When attempting to change the behaviour of other people we need to use educational techniques to answer questions **1, 3 and 4** along with motivational techniques to answer questions **2 and 5**. Even when we are fully educated and motivated, we still often need a reminding prompt to do the right thing.

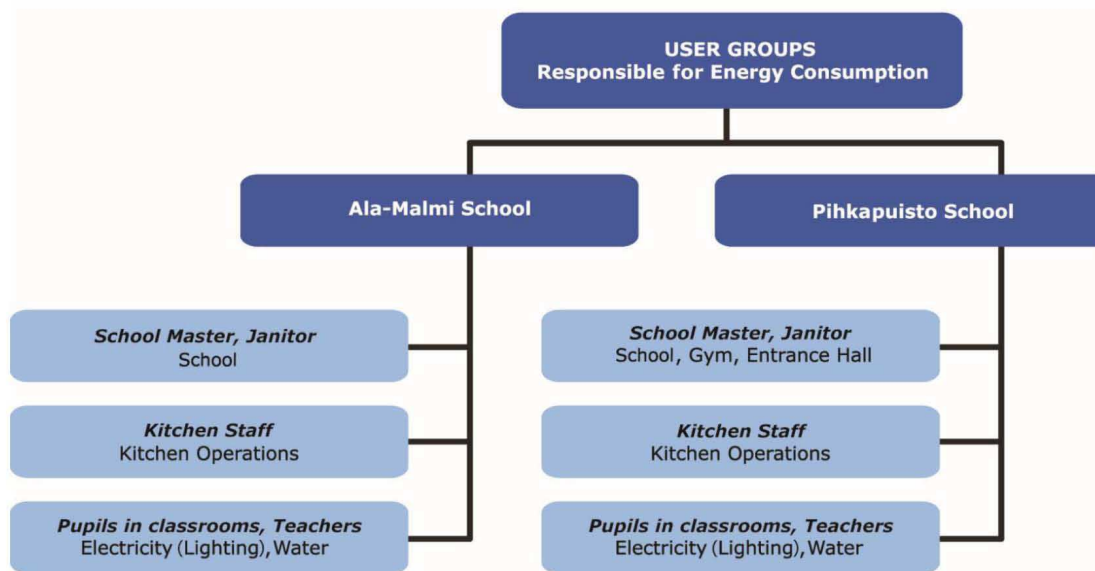




Behaviour Change Tool	Educate			Motivate		Prompt
	Is there a problem?	Do i know what to do?	Will the solution work?	Do i care?	What will others think?	
Informal Meeting	●	●	●	●	●	●
Formal Meeting	●	●	●	●	●	●
Energy Audit	●	●	●	●	●	●
Actions Checklist	●	●	●	●	●	●
Energy Helpdesk	●	●	●	●	●	●
Corporate Policy	●	●	●	●	●	●
Metered Billing	●	●	●	●	●	●
Personal Objectives	●	●	●	●	●	●
Set Examples	●	●	●	●	●	●
Suggestions Box	●	●	●	●	●	●
web/ tv/ radio	●	●	●	●	●	●
Serious Game (with real data)	●	●	●	●	●	●
Serious Game (no real data)	●	●	●	●	●	●
Social Network - share experience	●	●	●	●	●	●
Social Network with data	●	●	●	●	●	●
Leaflet (information)	●	●	●	●	●	●
Poster/ Signage	●	●	●	●	●	●
Newsletter (stories)	●	●	●	●	●	●
Report (with real data)	●	●	●	●	●	●
Real Time Energy / Cost	●	●	●	●	●	●
Performance vs Baseline	●	●	●	●	●	●
Historic Information (graphical)	●	●	●	●	●	●
Energy Saving Tips	●	●	●	●	●	●
Competition / Incentives	●	●	●	●	●	●



SAVE ENERGY
User Groups and Agency Power





Empowering users



- Who is pushing forward?
- Who gives more suggestions?

- Eco-motivators
- Team leaders

- Extra training (internal project)





Execution Phase

- *Prepare* by installing technology, establishing reference baseline, correction factors etc. The reference baseline can normally be established in two ways. Either by having historical energy consumption data (or plan for your own reference period where you establish these historical data) or by having a reference building to compare with (often more complicated to ensure that the two buildings are the same and that operation of the reference building is not influenced by what is happening in the test building).
- *Launch* the program officially, involving all the users so that everyone is aware and committed.
- *Operate* the execution by monitoring technology, users and building to see that everything is running normally and according to plan. Do we need to re-evaluate the goals? If so jump back to the preparation phase.





Checking

- *Review* the progress and analyse the intermediate results. What adjustments are needed? Have the goals been reached?
- Send short intermediate reports about the current status compared to the goals after every Review.
- A final report should be issued stating the results compared to the defined goals when you have finished the process.



CASE STUDY

SMART CAMPUS PROJECT

TAKING
COOPERATION
FORWARD



Manuel Nina

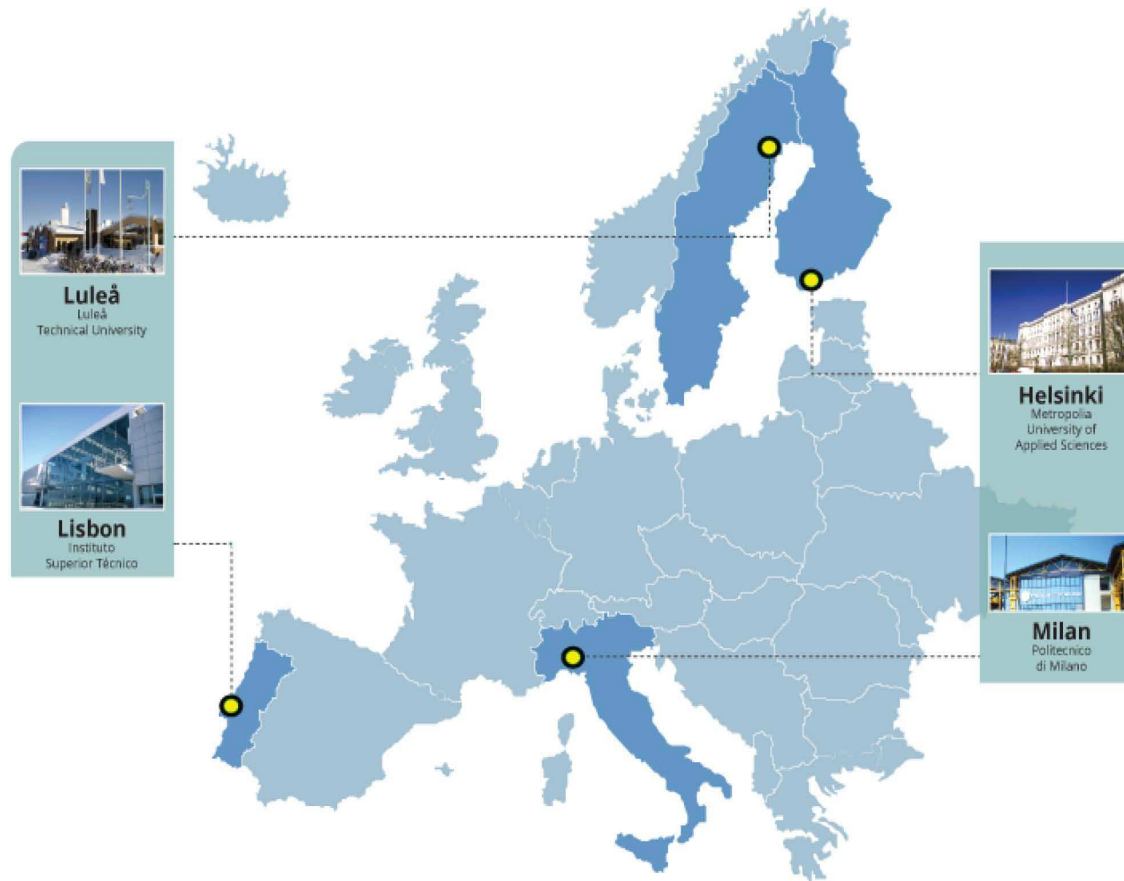


Director of innovation

SNAP! Solutions Portugal



Pilots





VIDEO POLIMI



Video Polimi Pilot

- Old Building
 - High energy consumption
- Different kinds of users
 - Teachers Offices
 - Classrooms
- Low budget for intervention – focus on behaviour

- Strange Behaviours
- “Guerrilla discovery” – user engagement (living lab + design thinking)
- Replicable solutions/programs



Video Polimi Pilot (Solution)

Involve all types of stakeholders from the beginning

- Teachers
- Students
- Staff
- ICT + Energy + Facility Management



CONTEXT ANALYSIS with people: Guerrilla observation in Milano



STUDENTS	TEACHERS	STAFF
open the windows of the corridor in order to smoke although it is forbidden in public buildings	do not care of the fan-coil on/off condition	do not care of the fan-coil on/off condition
use the classrooms independently of the lessons and do not turn lights off when leaving	often leave lights on in their rooms	
use lifts when they can easily and healthy use the stairs	use lifts when they can easily and healthy use the stairs	use lifts when they can easily and healthy use the stairs



MAIN ACTIVITIES CARRIED OUT

DATA AND INFORMATION CAPTURING :

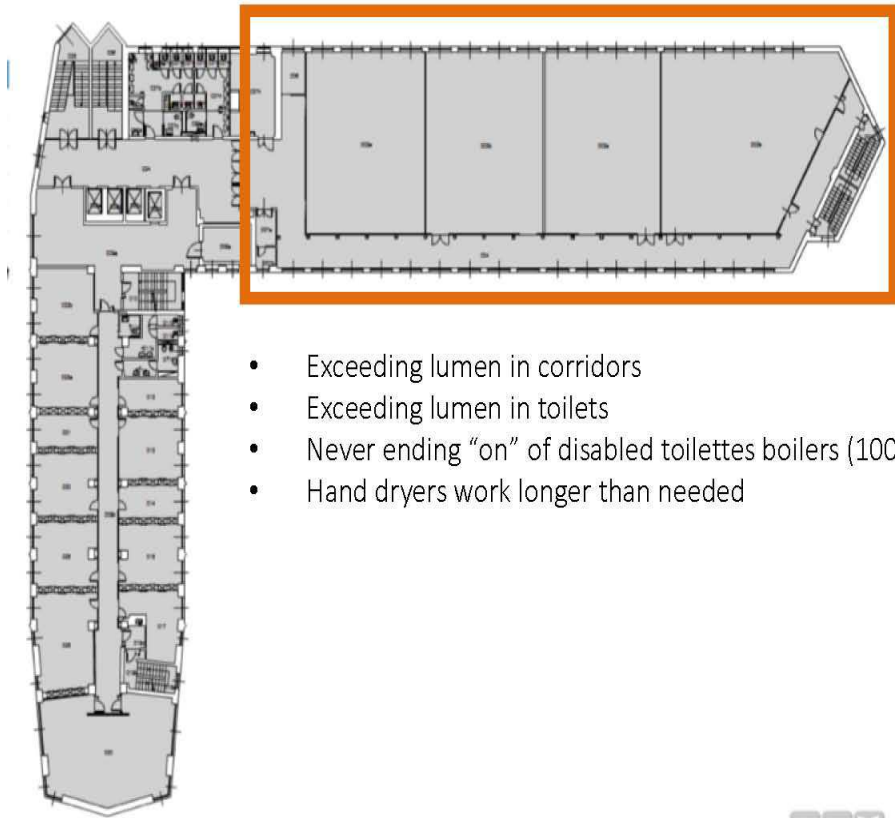
- 1) map energy consuming/measuring devices and infrastructures
- 2) entering the consumption monitoring system

FIELD OBSERVATIONS TO CAPTURE MAIN SYSTEM AND BEHAVIOURAL PROBLEMS:

- 1) with energy management officers
- 2) by students and teachers



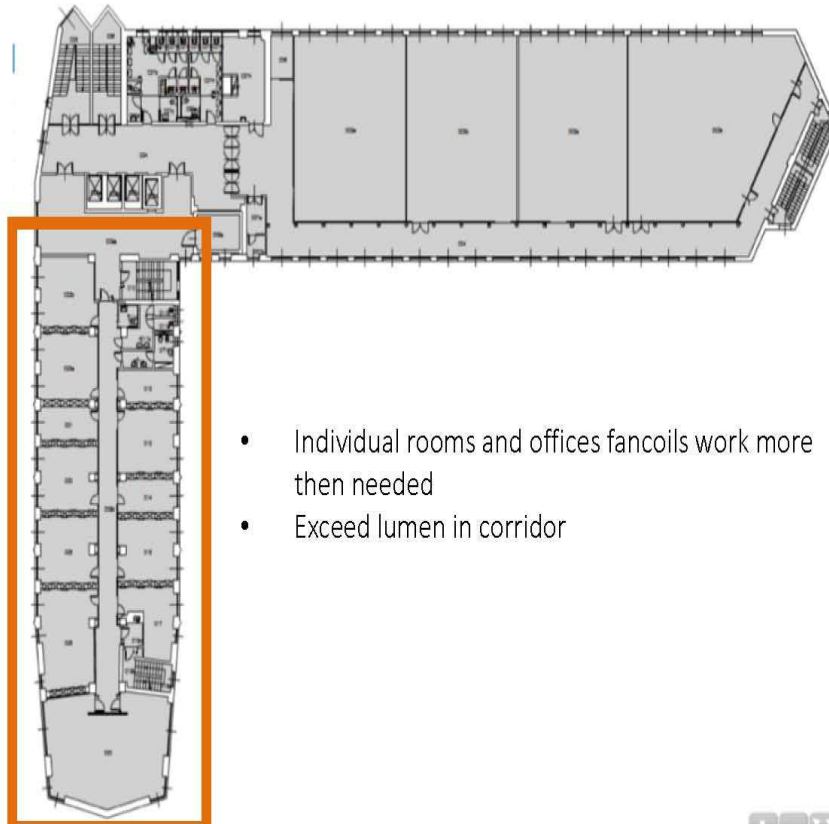
Electric over-consumption mapping (with Energy Manager)



- Exceeding lumen in corridors
- Exceeding lumen in toilets
- Never ending “on” of disabled toilettes boilers (100 l)
- Hand dryers work longer than needed



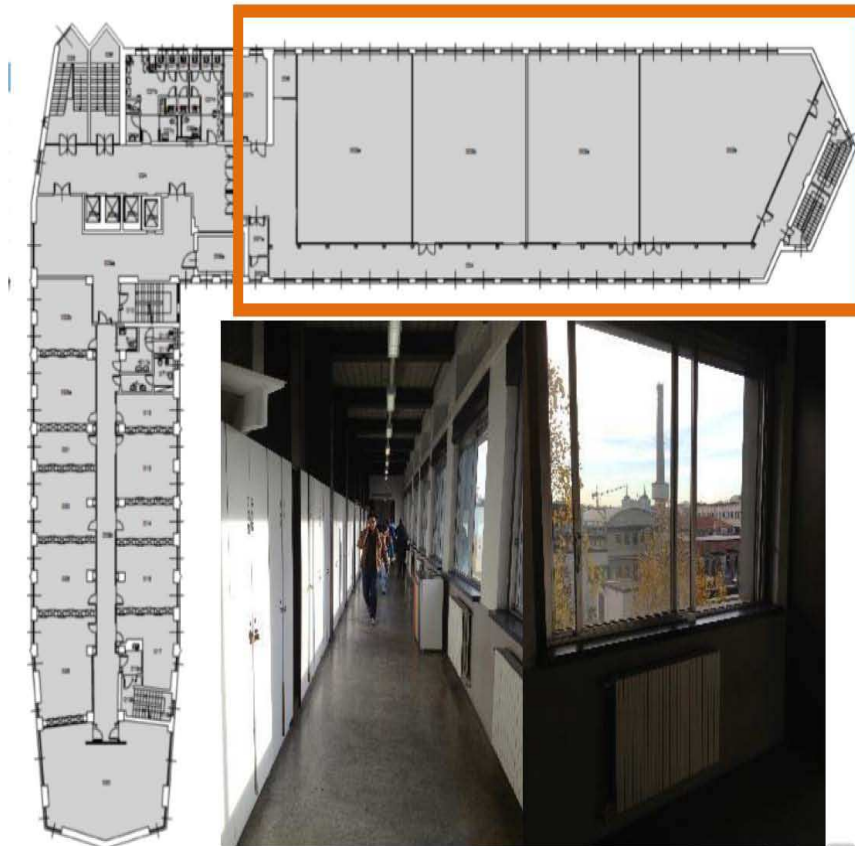
Electric over-consumption mapping (with Energy Manager)



- Individual rooms and offices fancoils work more than needed
- Exceed lumen in corridor



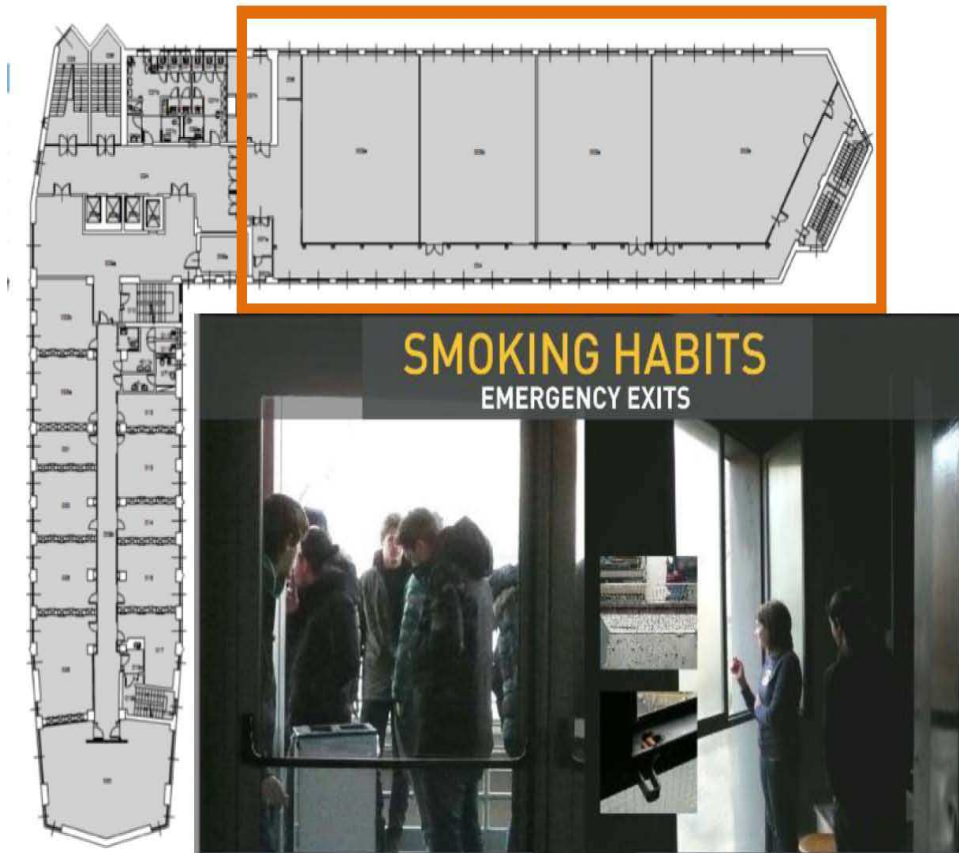
Behavioural issues mapping (by students)



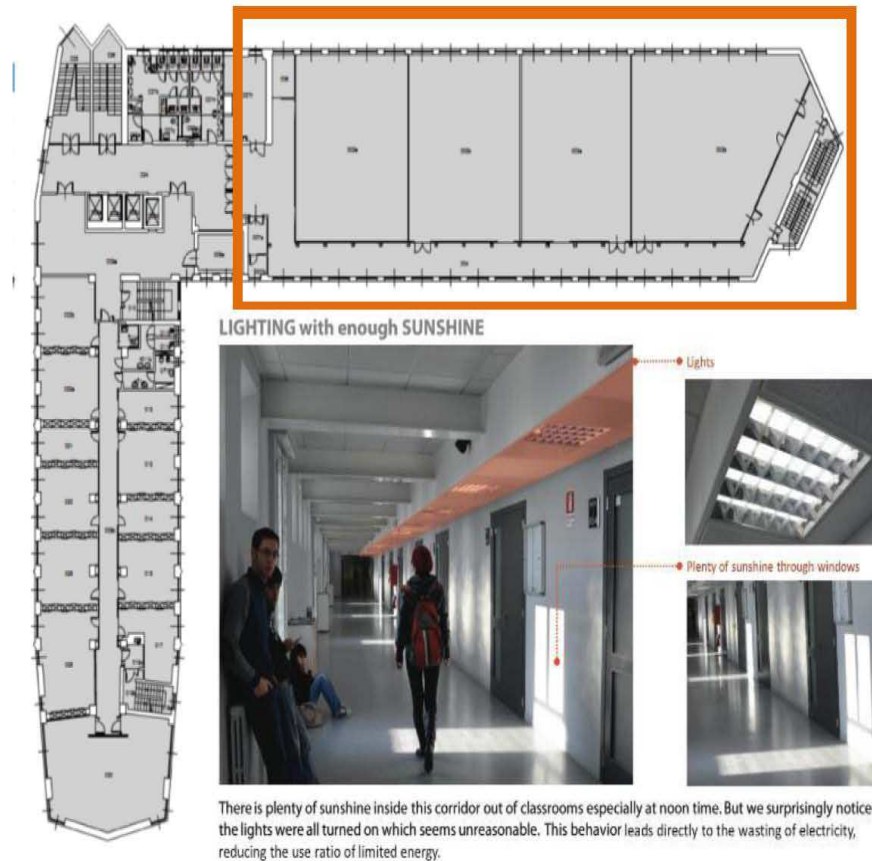
There are so many heaters along the narrow long corridor which bring a large waste of energy, and even heating when windows are opened



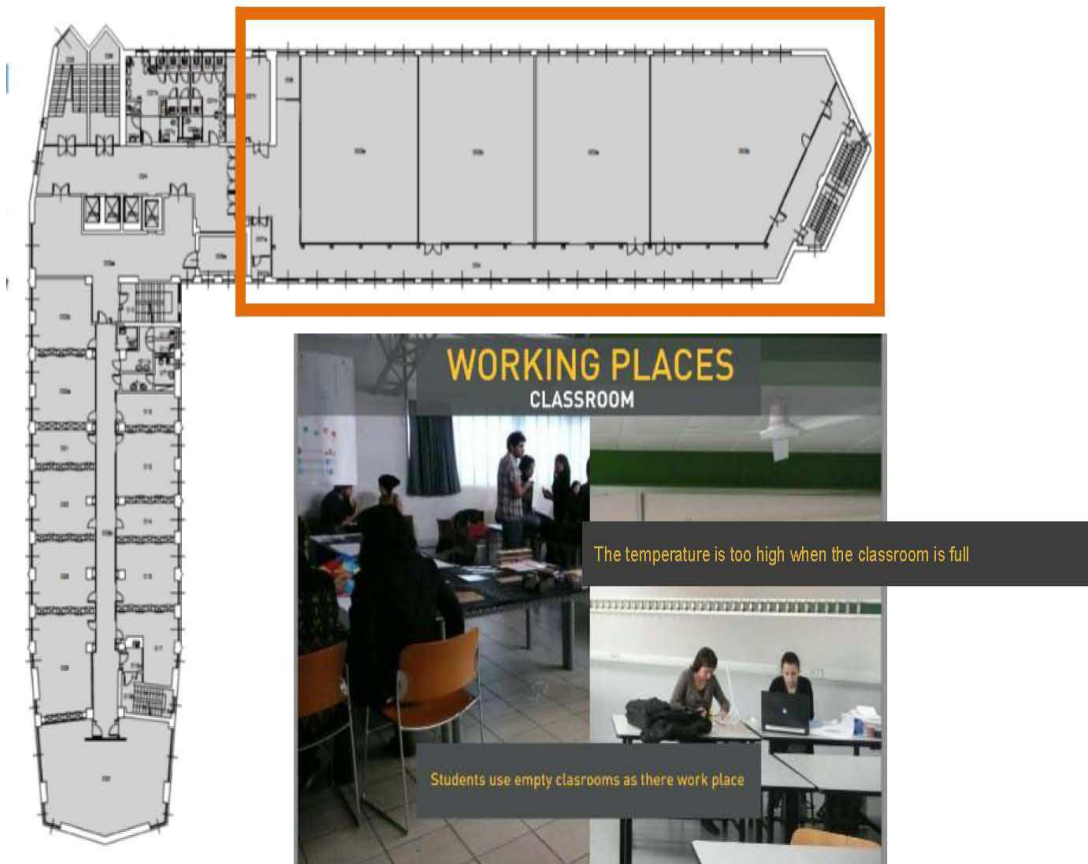
Behavioural issues mapping (by students)



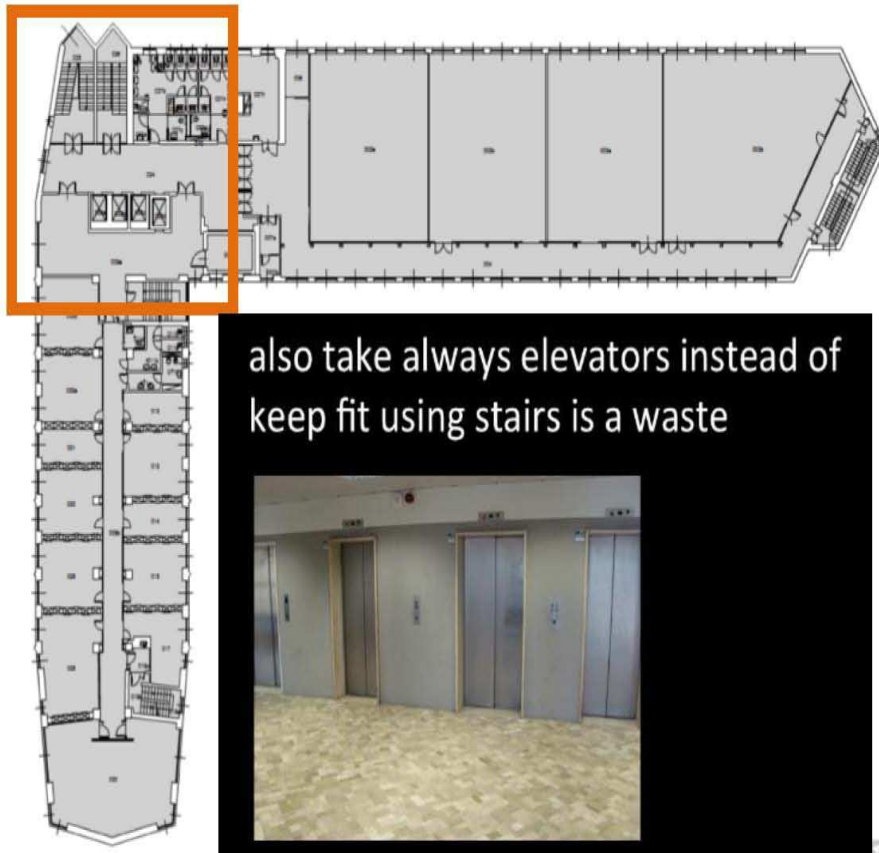
Behavioural issues mapping (by students)



Behavioural issues mapping (by students)



Behavioural issues mapping (by students)



CRITICAL USER BEHAVIOURS

STUDENTS	TEACHERS	STAFF
open the windows of the corridor in order to smoke although it is forbidden in public buildings	do not care of the fan-coil on/off condition	do not care of the fan-coil on/off condition
use the classrooms independently of the lessons and do not turn lights off when leaving	often leave lights on in their rooms	
open the windows in the classroom when heating is on and the temperature too high	do not check the lights in the classroom because they cannot	do not check the classroom temperature because they cannot regulate the heating system in each classroom
use lifts when they can easily and healthy use the stairs	use lifts when they can easily and healthy use the stairs	use lifts when they can easily and healthy use the stairs



CRITICAL USERS' BEHAVIOURS

STUDENTS	TEACHERS	STAFF
open the windows of the corridor in order to smoke although it is forbidden in public buildings	do not care of the fan-coil on/off condition	do not care of the fan-coil on/off condition
use the classrooms independently of the lessons and do not turn lights off when leaving	often leave lights on in their rooms	
open the windows in the classroom when heating is on and the temperature too high	do not check the lights in the classroom because they cannot	do not check the classroom temperature because they cannot regulate the heating system in each classroom
use lifts when they can easily and healthy use the stairs	use lifts when they can easily and healthy use the stairs	use lifts when they can easily and healthy use the stairs

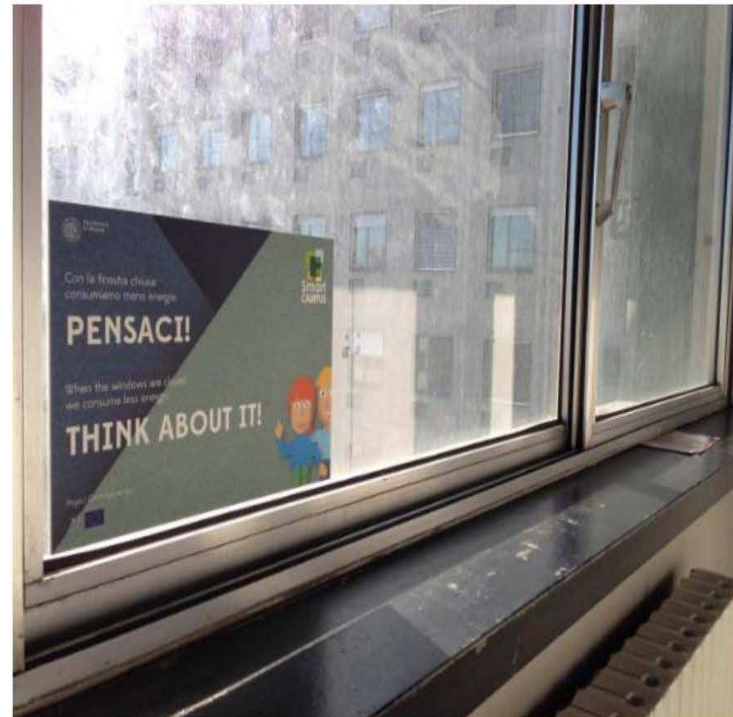


Pilot users (stakeholder mapping/Personas)

 	 	 	 
Name: Amedeo Age: 22 Position: Undergraduate Major: Engineer	Name: Melody Age: 21 Position: Undergraduate Major: Engineer	Name: Paolo Age: 48 Position: Professor Major: Mathematics	Name: Valentina Age: 41 Position: Campus Staff



20% Savings



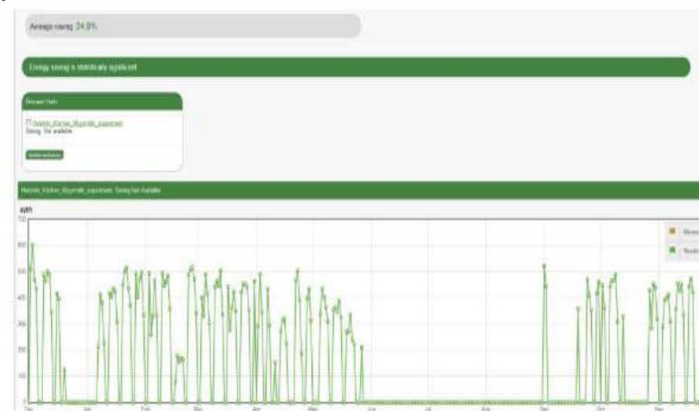


Helsinki Pilot



Kitchen Pilot

- Existing kitchen equipment used – **just UBT**
- The role of the kitchen staff is crucial
- **Several workshops for training the staff**
- Electricity consumption of the equipment measured
- Feedback with kitchen info-TV system



Example of info-TV page

Myyrmäki : sähkönkulutus / electricity consumption

Miksi säästää energiaa?

Energiantuotanto kuluttaa uusiutumattomia luonnonvaroja ja aiheuttaa ympäristöhaittoja kuten kasvihuonepäästöjä. Energiankulutusta pienentämällä voit säästää ympäristön lisäksi myös kukkaroasi. Käytätkö sinä jo vihreää energiaa?

Why save energy?

Energy production consumes nonrenewable resources and causes environment problems like greenhouse gases. By decreasing your energy consumption you can save both the environment and your wallet. Do you already use green energy?



MWh


Tänään
Today


MWh

Tämä viikko
This week

GWh

Tämä kuu
This month

 Kulutus alittaa keskiarvon
The consumption is less than the average

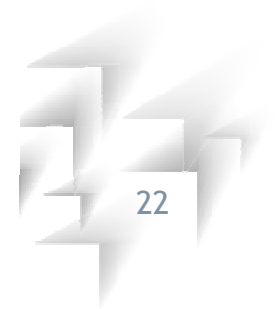
 Kulutus ylittää keskiarvon
Consumption exceeds the average



Ota auton hankinnassa huomioon omat käyttötarpeet. Tee hankintapäätös järjestä äläkä tunteella

11:00
17. huhtikuu







Pilot Savings

Pilot	Scenario	Savings	Consumption			Intervention	
			Lighting	HVAC	Equipment	UBT	Technology
Helsinki	Lighting	57-65%	X			X	X
	Lighting	42%	x			X	
	Kitchens	17-25%			X	X	
Lisbon	Offices	12%	X	X		X	
	Library	42%	x	x		x	X
Lulea	Offices	22-24%	x		x	x	
	Car heaters	25%			x	x	
POLIMI	Classroom	64%		x			x
	Classroom	32%		X		X	
	Classroom	64%	X				X
	Corridor	20%		X		x	
	Offices	43-67%		x		X	x

