



SAVE ENERGY

ENoLL 2nd annual Seminar in Vuokatti, Finland
18th September 2009

Asko Kippo, project manager of Helsinki Pilot
Helsinki Metropolia University of Applied Sciences



Content of Presentation:

Start	End	Description of Item	Responsibility
		Save Energy Project	
		Organization & Work Groups	
		Pilot Design Work	
		How to change behavior and operation ?	
		Description of technology	
		Pilot scale laboratory system	
		Action plan at pilot schools	
		Roles & Activities for users	
		Time schedule	



SAVE ENERGY

CIP / IEE / ICT / PSP - 2008

Under the Programme

CIP, Competitiveness and Innovation Framework Programme

IEE, Intelligent Energy - Europe

ICT, Information and Communication Technology

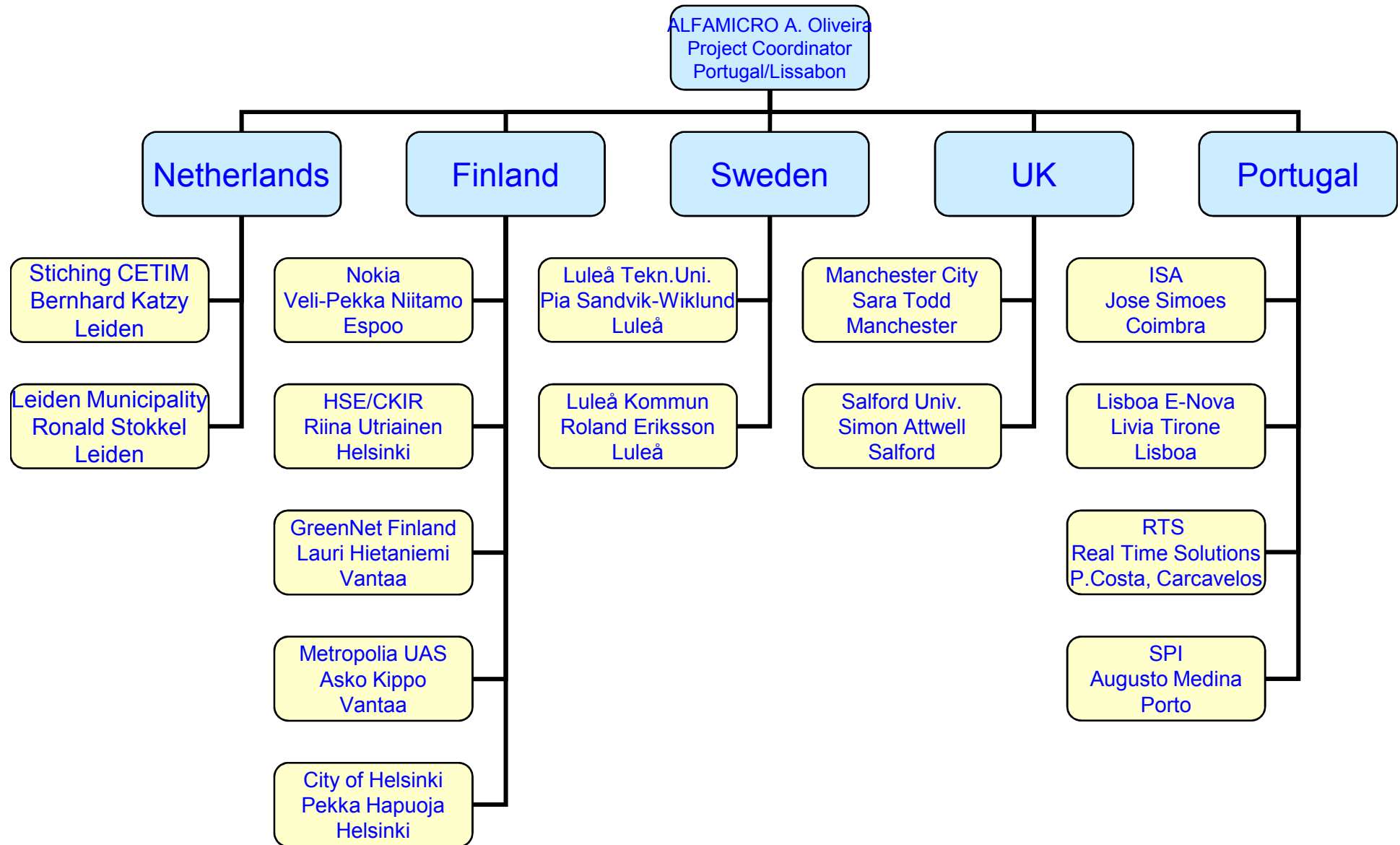
PSP, Policy Support Programme

1. Call for Proposals: closed 26.06.2008

2. Call for Proposals: closed 05.09.2008

Asko Kippo

11.03.2009





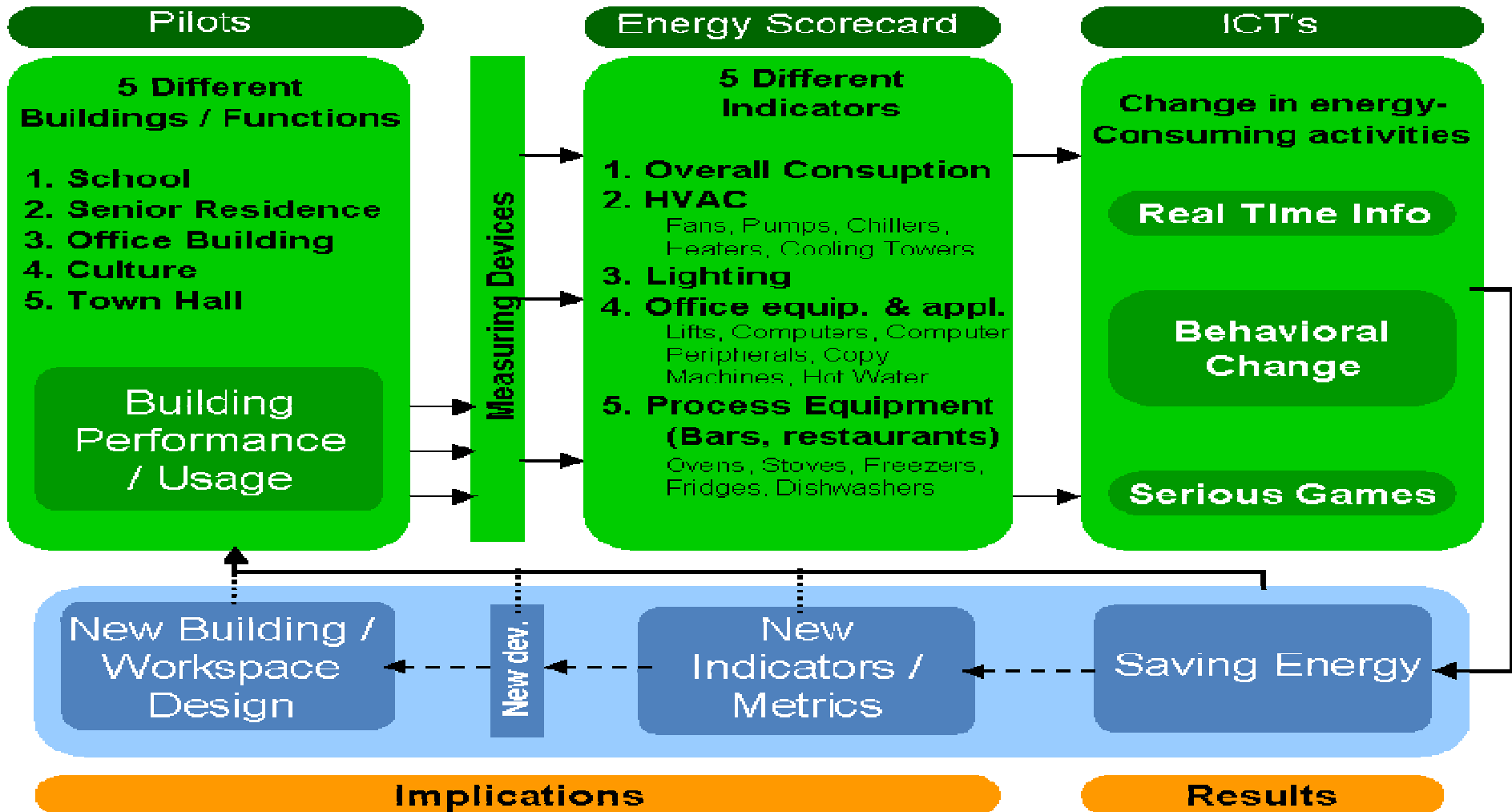
Objectives:.

Service

- The project will demonstrate the substantial Energy Savings*
- 20% from energy consumption transformation behaviour and*
- 5% from smart ICT energy management that can be achieved in public buildings through the use of services enabled by ICT in particular by supporting the user transformation behaviour.*
- The social acceptability of energy efficiency will be enabled by the motivated education of the users, playing the **SAVE ENERGY Serious Game** in different creative and compelling settings.*
- Furthermore, **the eco-conscious educated user** will be empowered with real time ubiquitous information and decision making guidance that will enable and motivate the interaction leading to energy efficiency.*



Content





Pilots framework:

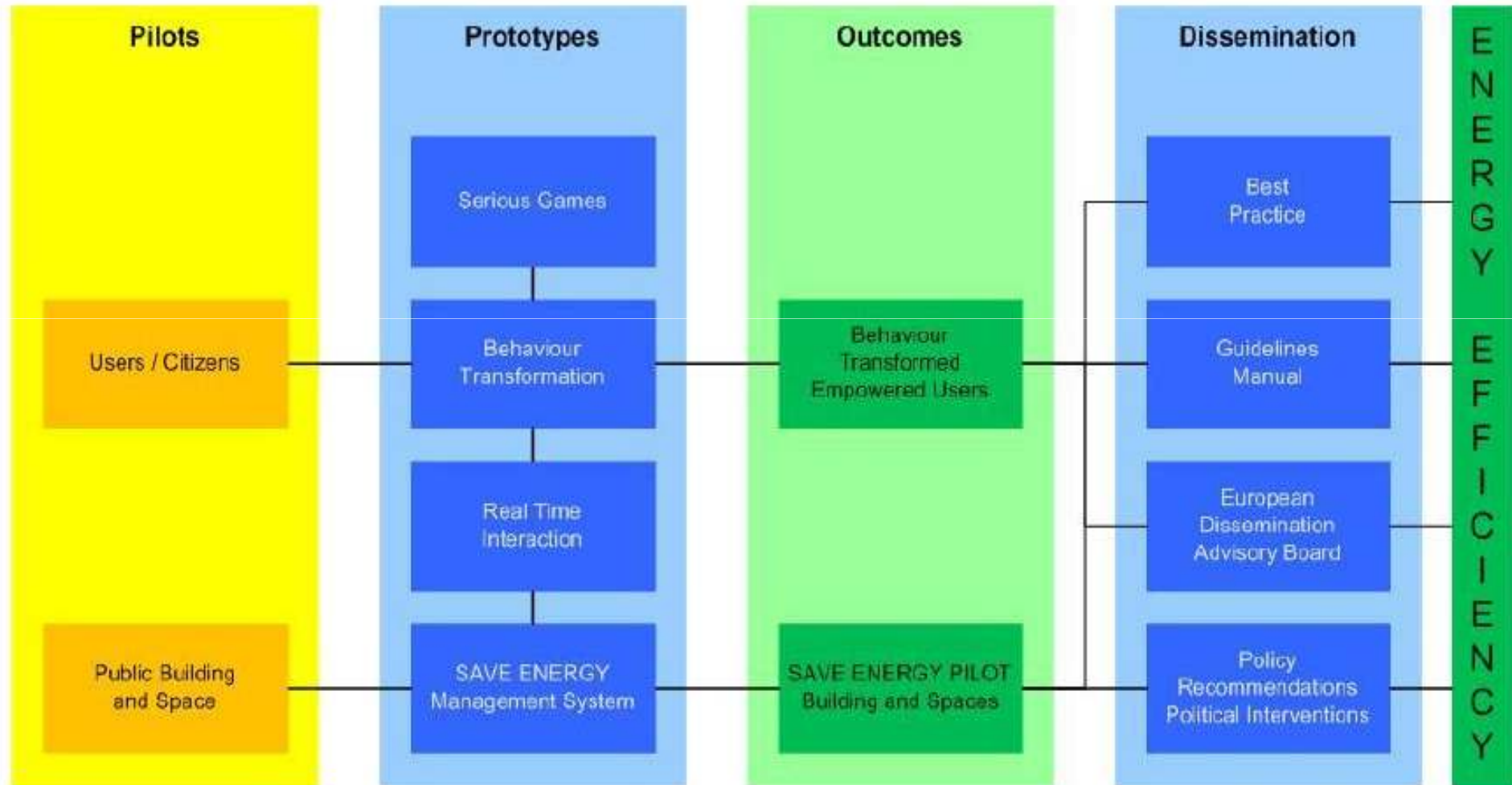


Figure 2: SAVE ENERGY Pilots Framework



Integrated Approach:

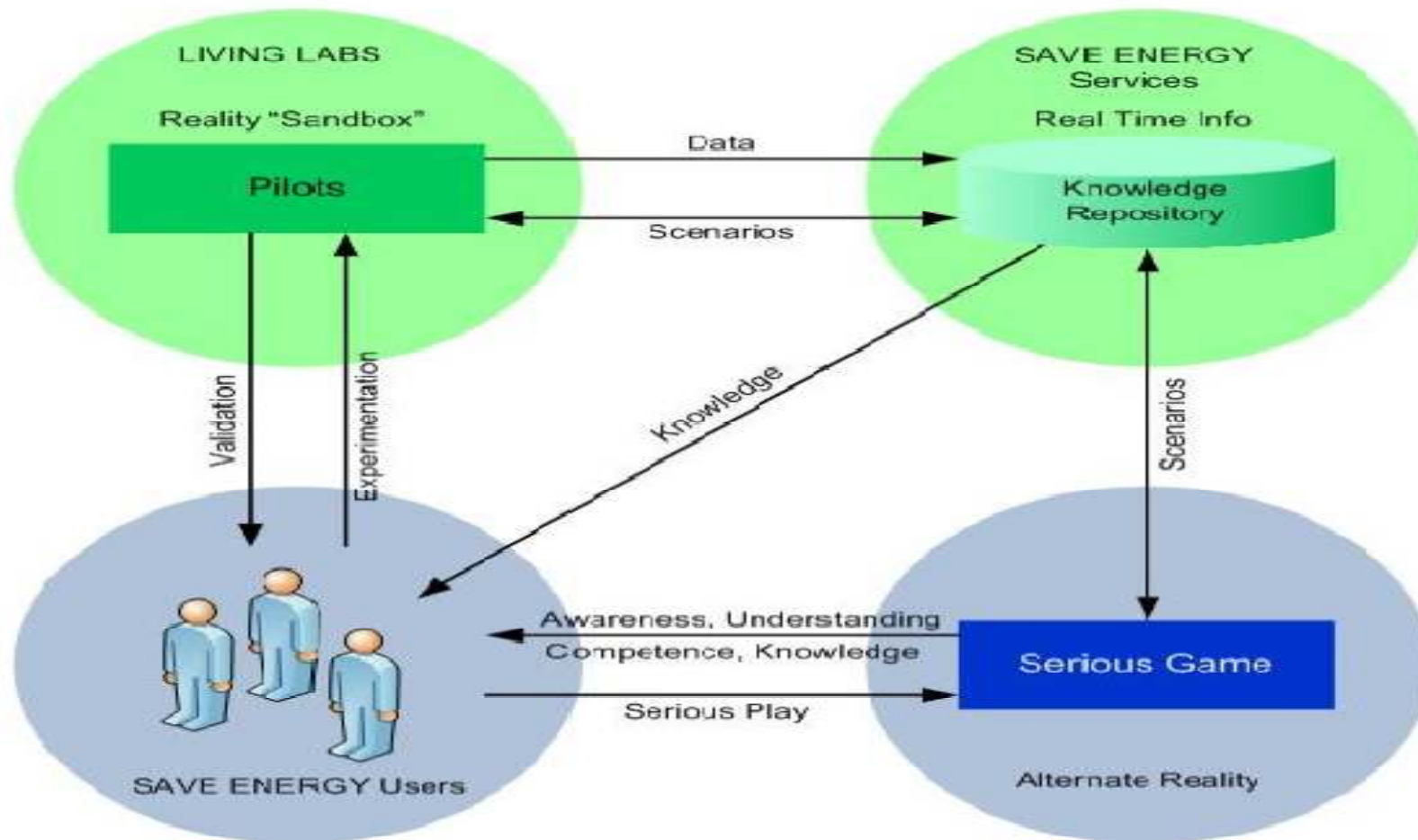
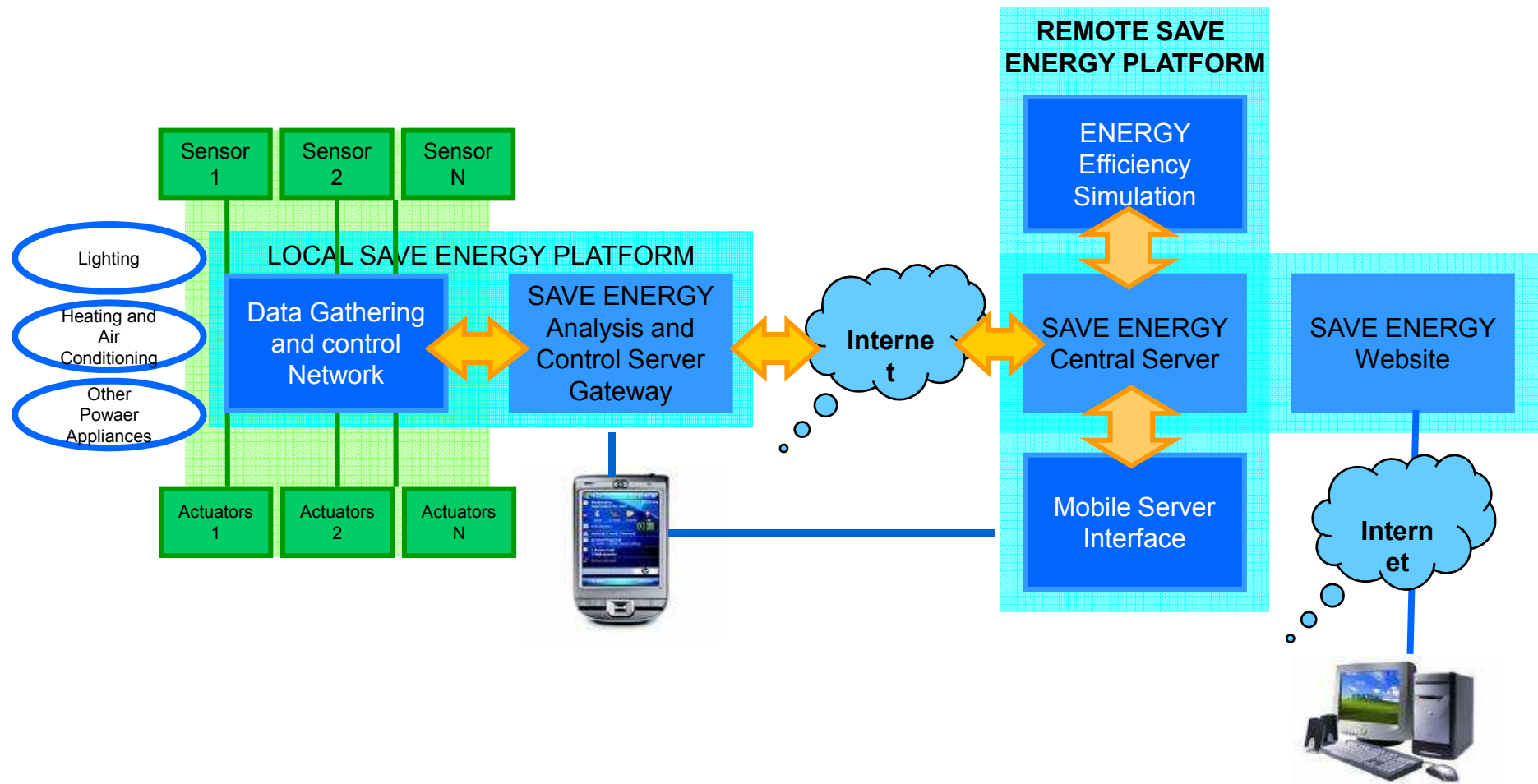


Figure 3: SAVE ENERGY integrated approach



Save Energy ICT Platform:





ITC Energy Efficiency management system

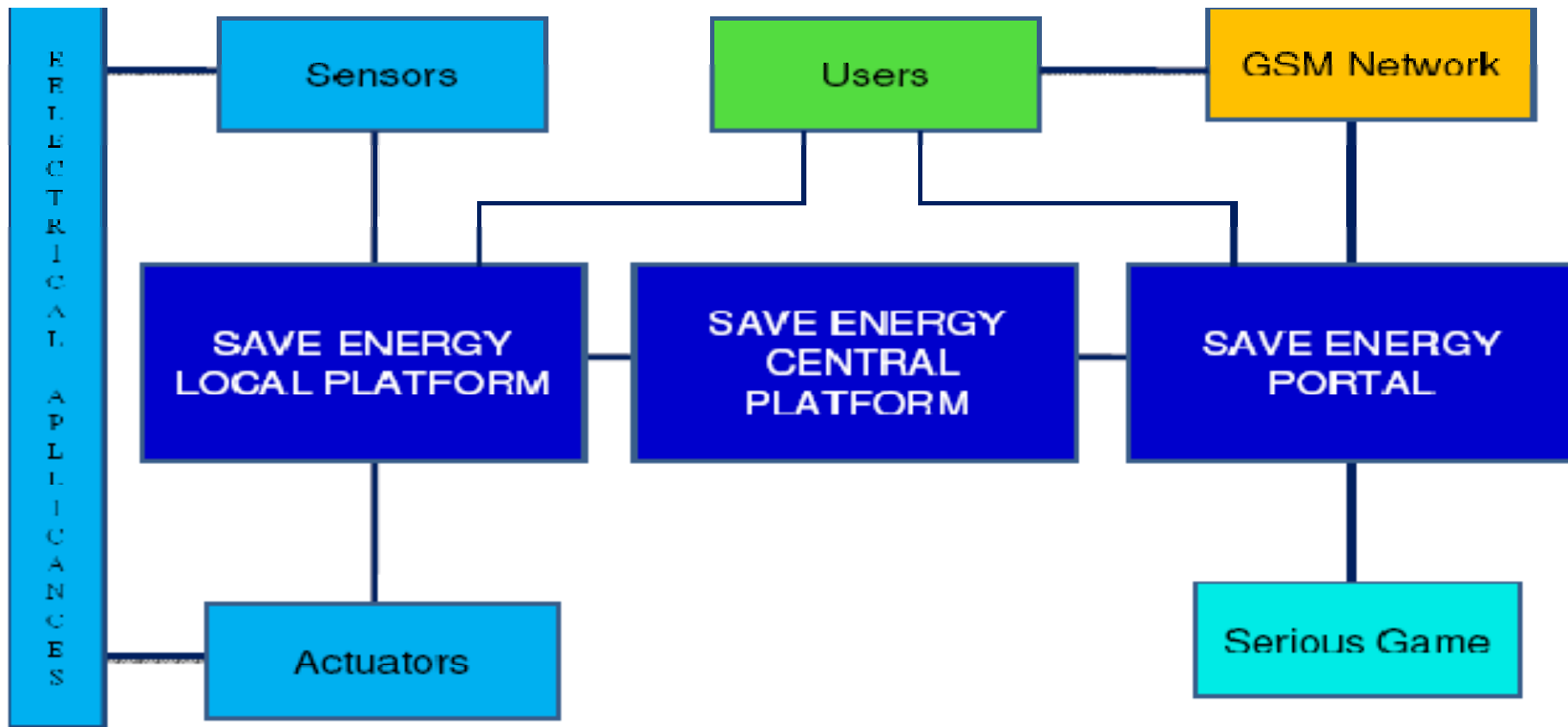
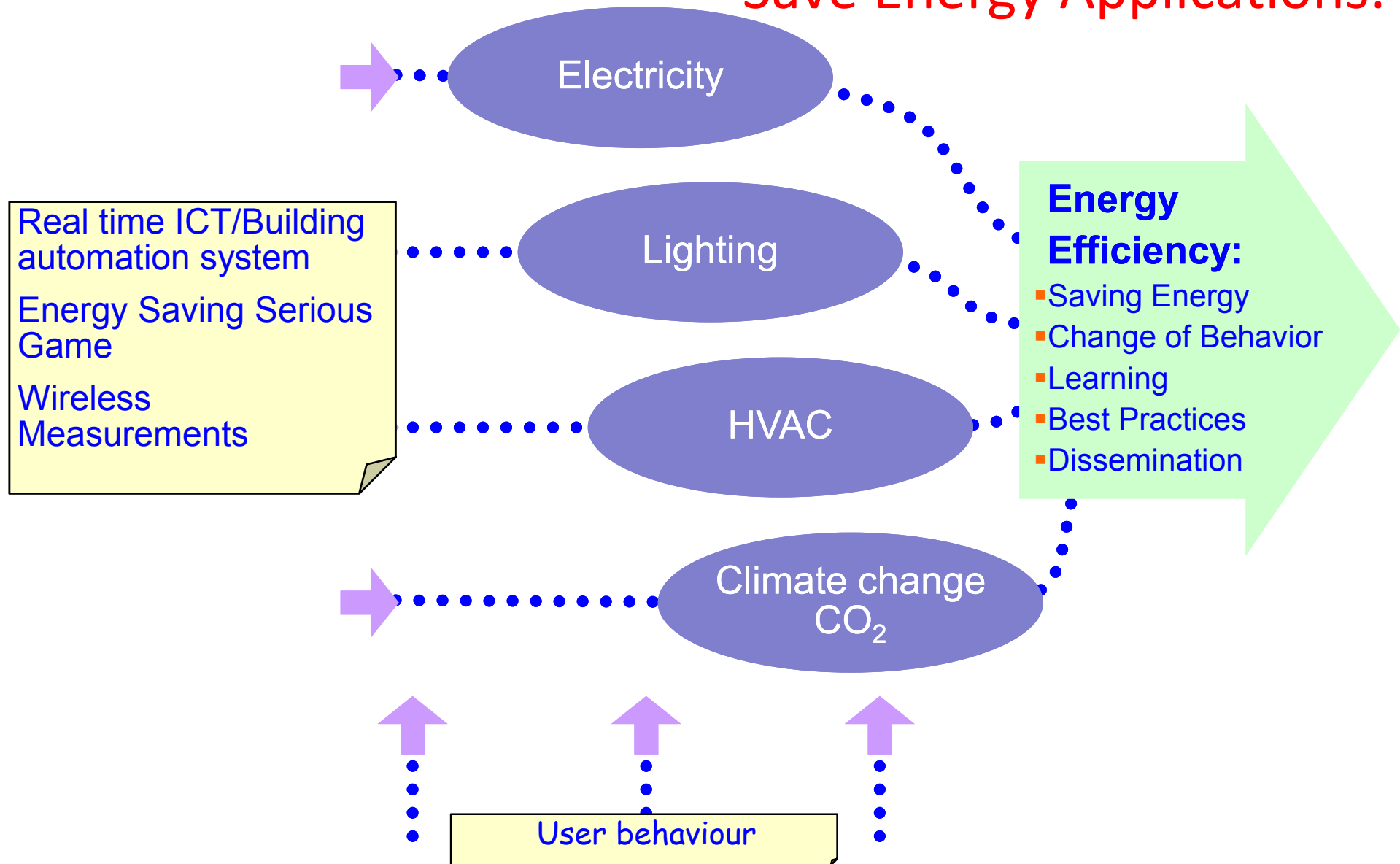


Figure 6: SAVE ENERGY ITC Energy Efficiency management system



Save Energy Applications:





Asko Kippo
Project Manager
Helsinki Metropolia UAS



City of Helsinki

Centre of Premises; Director Pekka Hapuoja,
Juha Haapasalo, Jukka Järvenranta, Kari
Niittymäki, Erkki Pihkoluoma,
Education Dept: Paula Tähtinen
Public Work Dept; Katri Kuusinen, Pälvi
Holopainen, Timo Posa, Toivo Sahlsten
Palmia Food Services: NN

Ala-Malmi Comprehensive School

Principal Rita Huhtala
Teachers; Snellman, Makkonen, Pajunen,
Tiainen
Janitor; Heikkinen
Pupils; Aikio, Kujala, Pirttioja, Tanskanen, Zec

Pihkapuisto Comprehensive School
(low level)

Principal Pirkko Kaskinen
Teachers; Huurre, Grohn, Hast, Mäntyniemi,
Oikarinen, Vuorio
Janitor Ortela
Pupils: NN, NN

Helsinki School of Economics/CKIR

Director Seija Kulkki
Riina Utriainen, Ben Cowley, NN1, NN2

Green Net Finland ry

Managing Director Lauri Hietaniemi
Anu Hassinen, **Suvi Häkämies**

Nokia Oyj

Director Veli-Pekka Niitamo

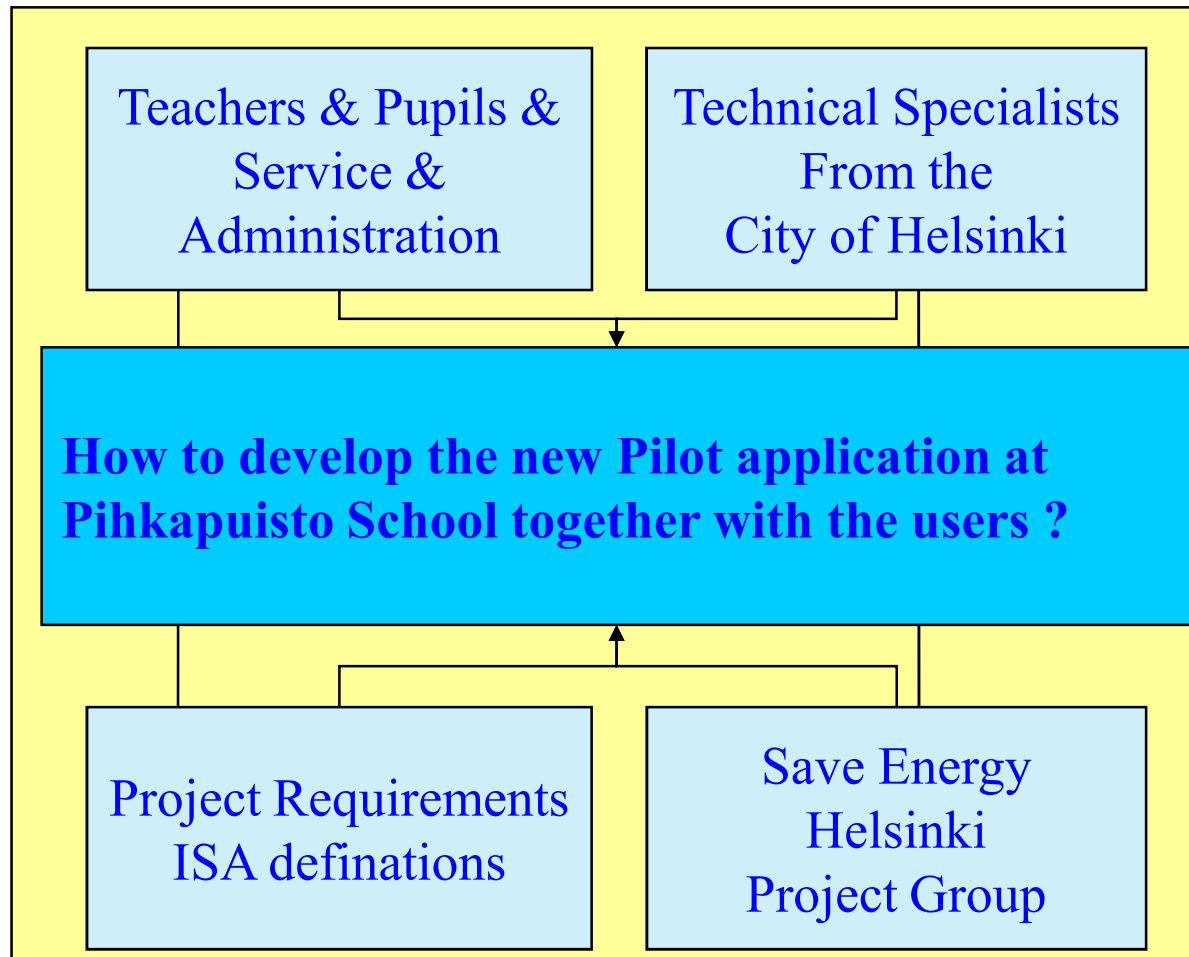
Helsinki Metropolia University of Applied
Sciences

Teachers; **Kai Virta, Tapio Kallasjoki,** Riitta
Lehtinen, Carola Fortelius, Jukka Pirinen, Arto
Ekstöm, Kaija Haapasalo
Eng.Students: Matti Olin, Ville Olkkonen,
Samuli Rasinmäki, Anssi Ulmanen, Tuomas
Lehtonen, + kitchen logistics group



Save Energy Helsinki Pilot Design

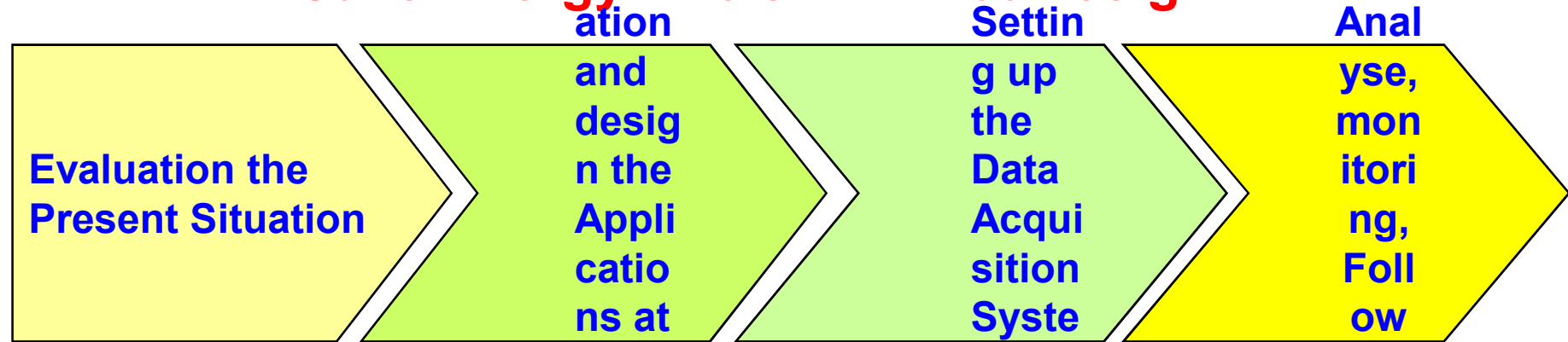
**Basic
Description
In
Save Energy
Project Plan**



**Succeeded
Pilot
Defination**



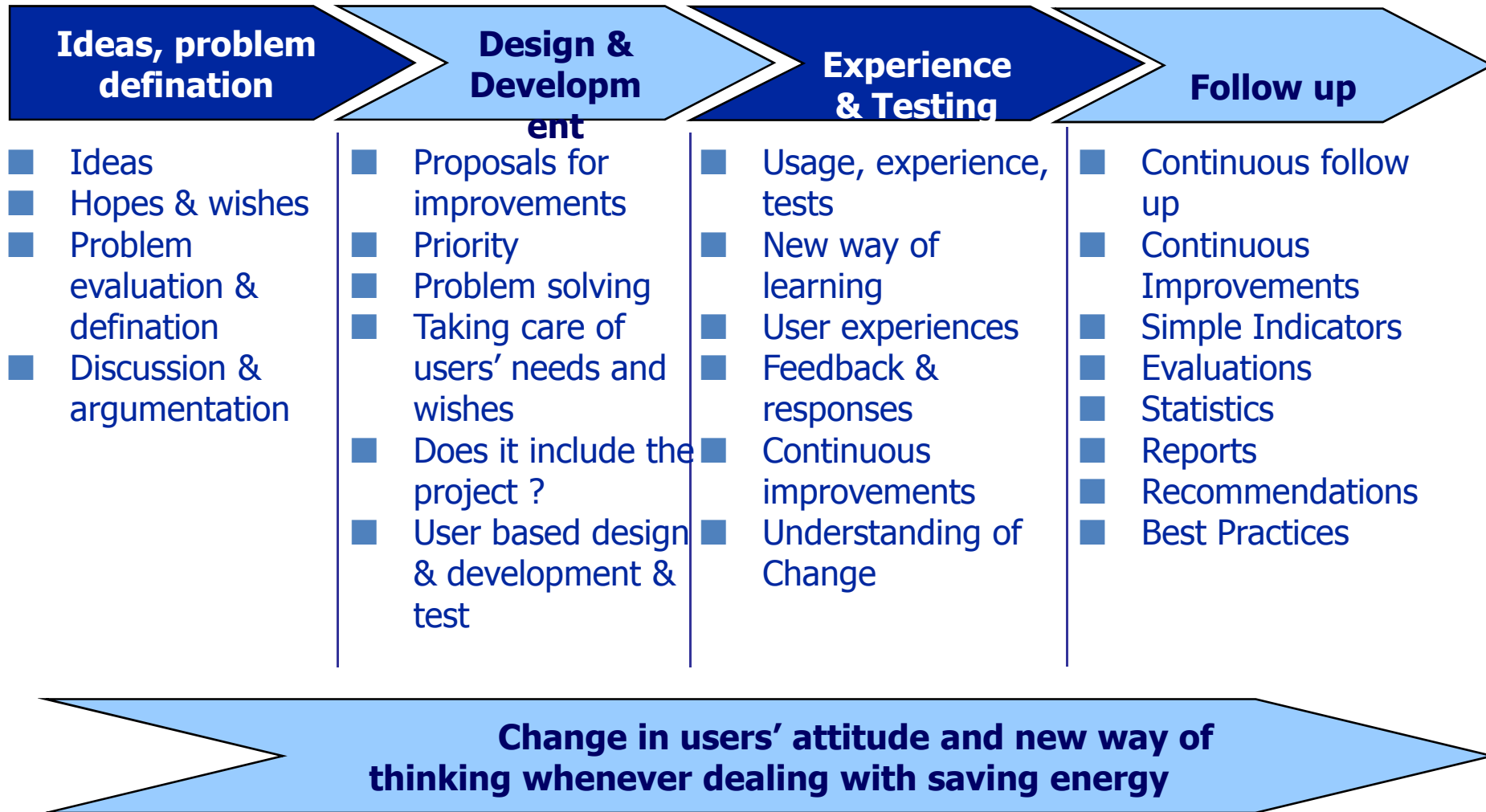
Save Energy: Helsinki Pilot Design



- | | | | |
|--|--|---|--|
| <ul style="list-style-type: none"> ■ Present way to use ■ Found problems ■ Users requirements ■ Experience from the technical expert of the buildings and HVAC ■ Brainstorming, proposals, improvements, what is possible, what is sensible | <ul style="list-style-type: none"> ■ Detailed design of applications ■ Available historical data, conclusions ■ Earlier Energy Audits ■ New Energy Audits ■ Use of present building automation ■ Technical Drawings ■ Pilot applications ■ New wireless monitoring ICT system with intelligent sensors | <ul style="list-style-type: none"> ■ Measurement data will be monitored via the old building automation system and using the new wireless sensor based system (There, ISA) ■ Lab pilot scale system for PLC development ■ Data will be analysed and sent to the main server system | <ul style="list-style-type: none"> ■ Analyse of the measurements ■ Update the database |
|--|--|---|--|

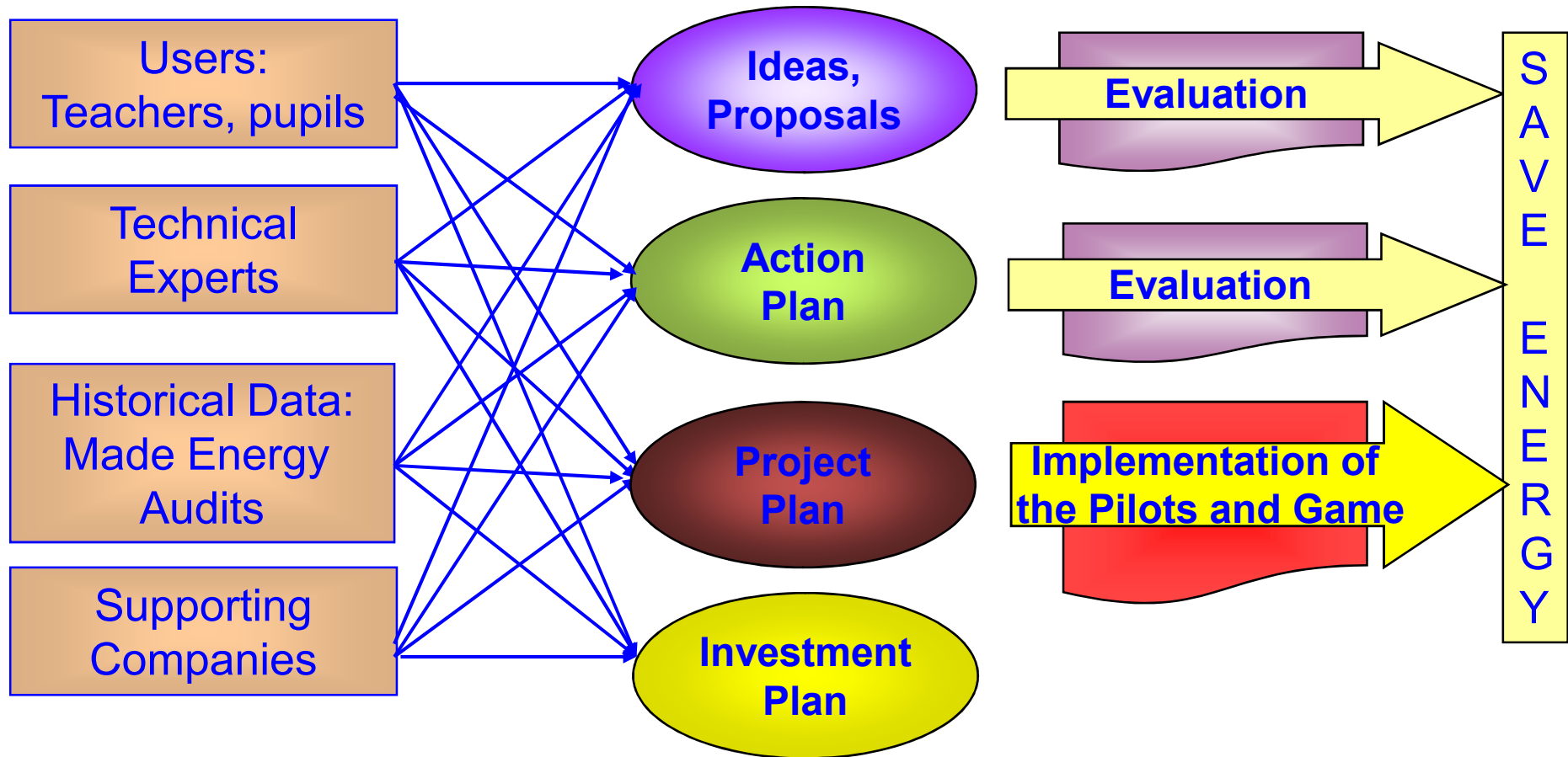


Save Energy –Living Lab based User participation and commitment



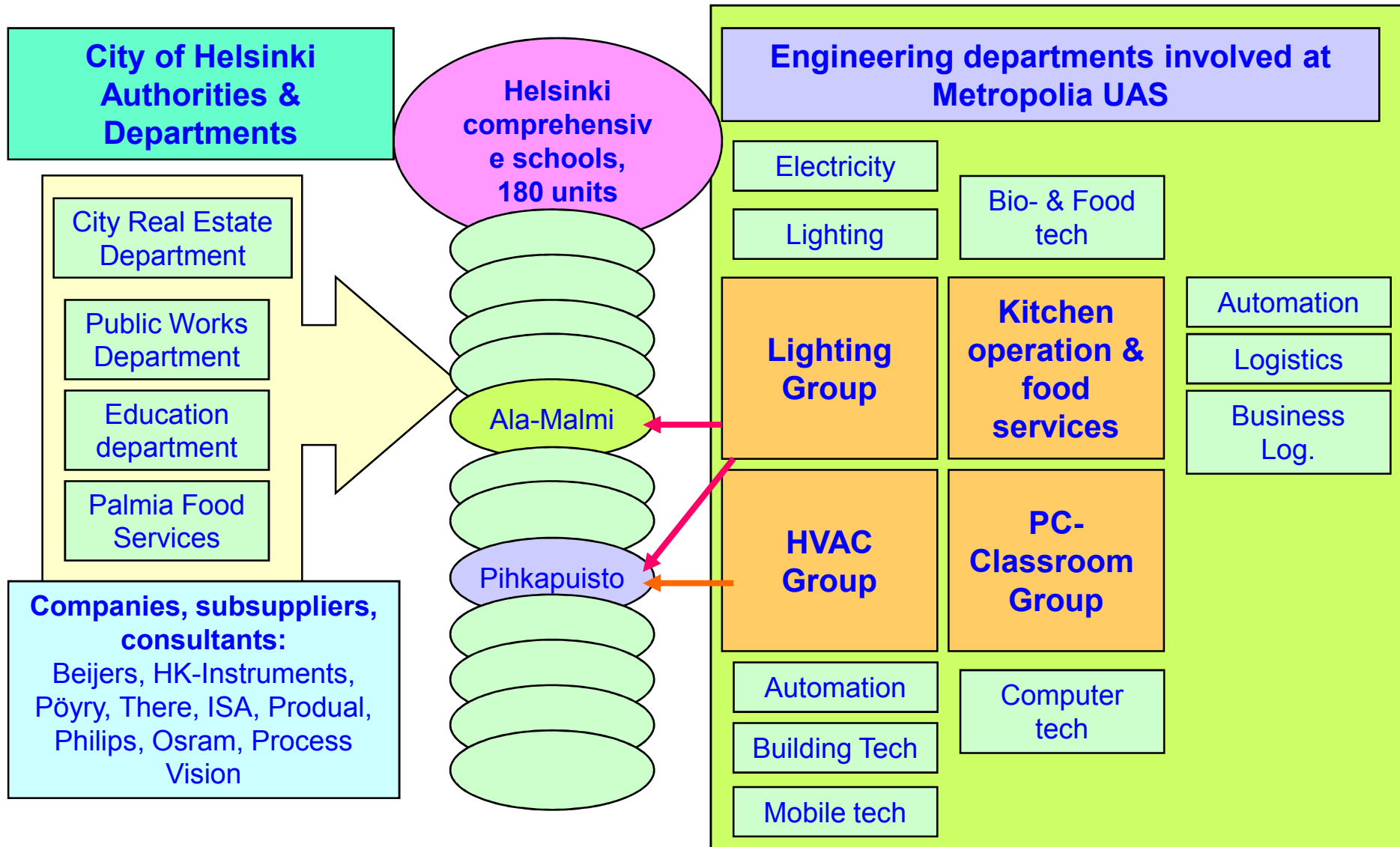


Helsinki Pilot: Collaboration and Co-operation towards Implementation





Development of Helsinki Pilot Applications

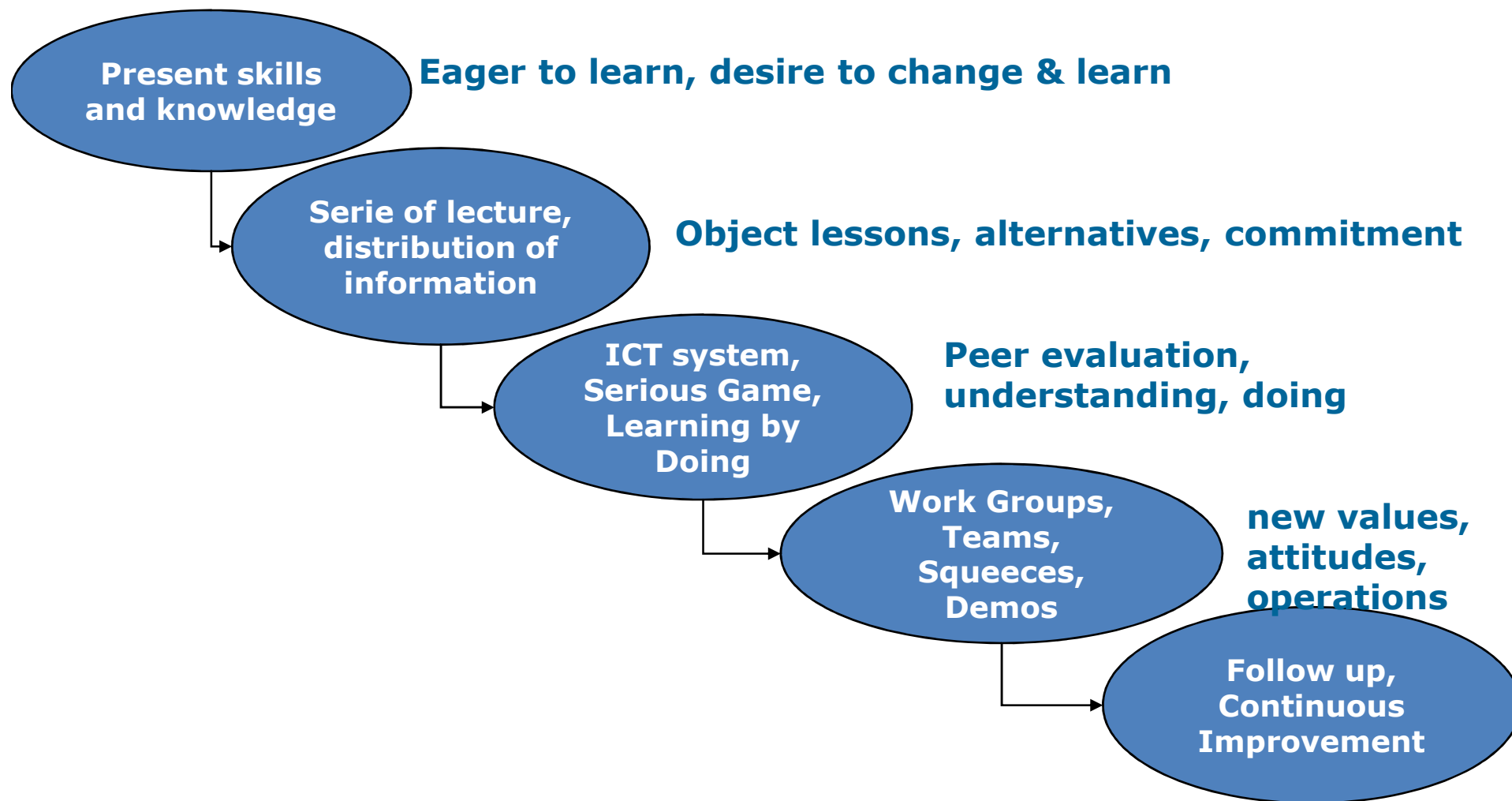




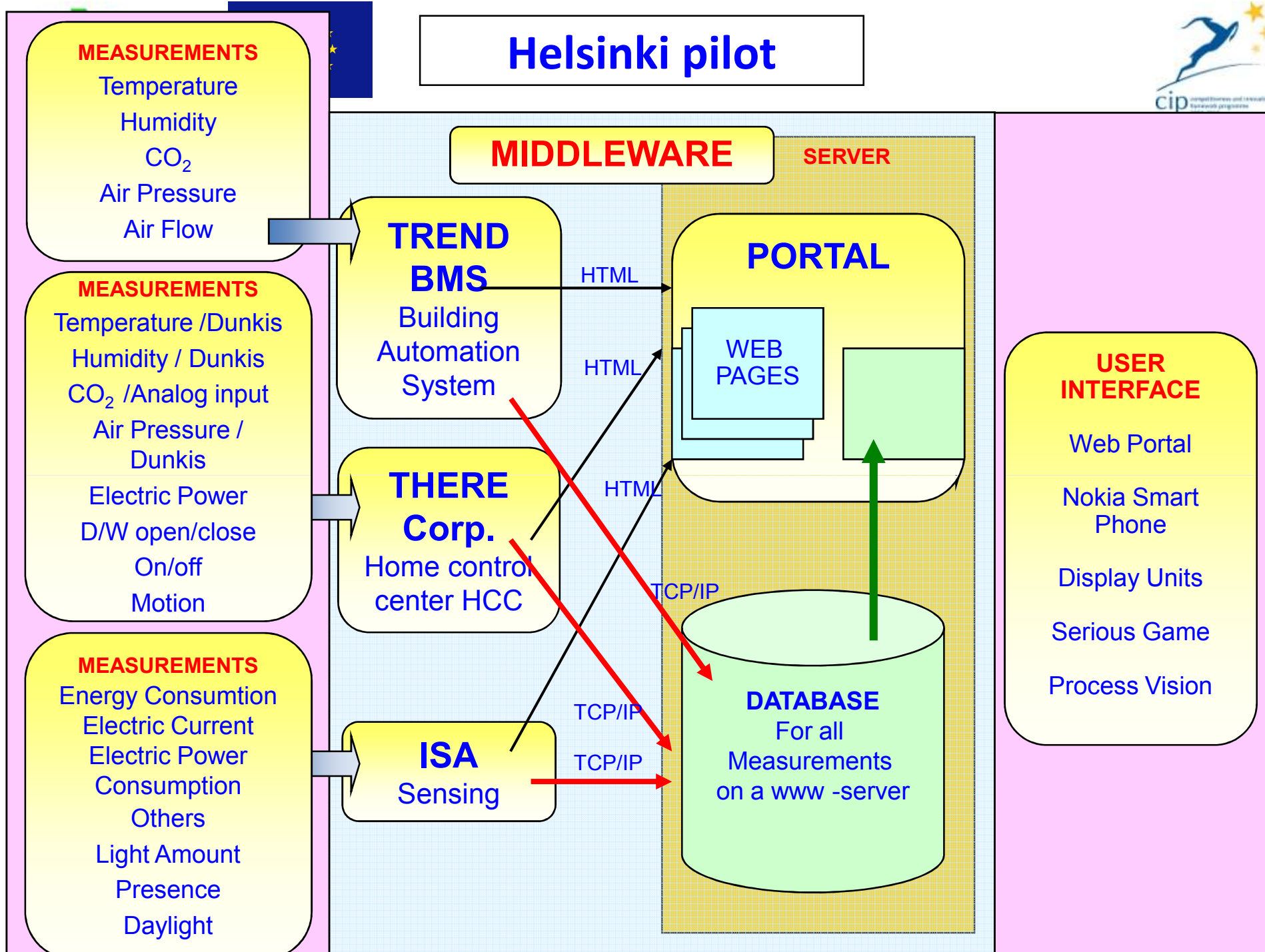
Save Energy

Change of Behavior and Operation

Interest to change, being aware

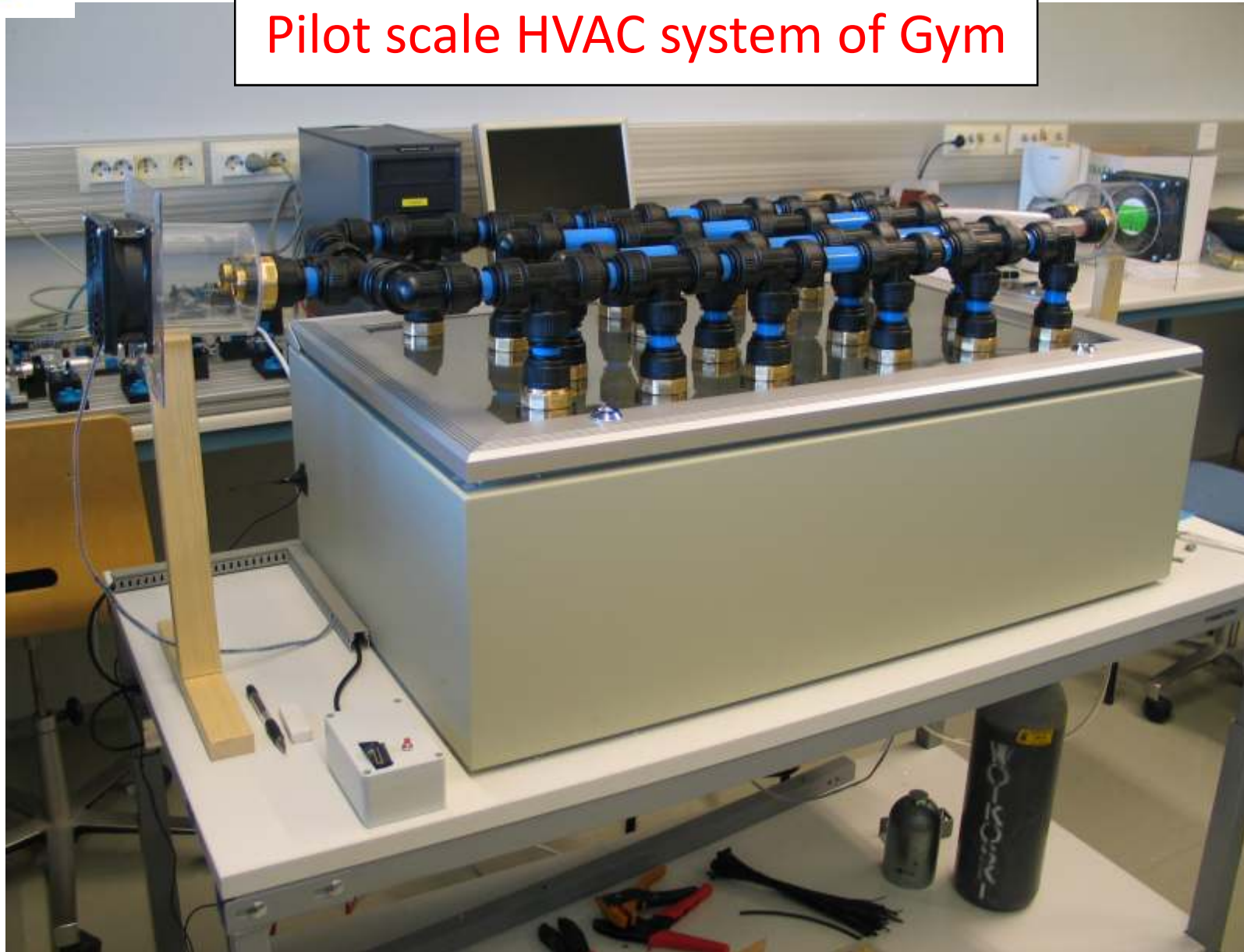


Helsinki pilot





Pilot scale HVAC system of Gym





Pilot scale HVAC system of Gym





SAVE ENERGY –Action Plan at pilot schools 2009-2010:

These items have been proposed to schools to be

- Discussed
- Evaluated
- Chosen
- Committed

Save Energy Lecture series

Squeece

Team work

Board of pupils

Final Squeece & Conference

- One hour Lecture, presentation and discussion as open forum for pupils, teachers, parents
- Once per month, simply and interestingly
- Save Energy squeeeces will be arranged as web-squeece competition every second month for all volunteered comprehensive schools in Helsinki
- Several teams (3 ... 5 pupils) will be organized at pilot schools on different age groups
- F.ex. Web2.0-team, pilot-team, Save teams (such as electricity, lighting, heating, Air conditioning, water, Climate change, Serious Game design & test)
- Board is discussing, commenting, supervising and reporting of all the activities on Save Energy at school and at homes, and designing and implementing the Final Squeece Conference of Save Energy on May 2009
- Final Conference (incl. the final Squeece) for earlier squeece winners will be arranged at Metropolia UAS together with supporting industries and BAFF (Building Automation for Future)- seminar



Save Energy -Pilot applications at schools

Pilot Schools

Pupils and teachers together with the city specialists have discussed, evaluated and focused the lighting problems and test places

Pupils and teachers at Pihkapuisto together with the city specialists have suggested the GYM HVAC system to be developed and modernized as more flexible

Kitchen operations and the logistic chain of food services have chosen as a key development area to save energy

Other items

Lighting Group

Gym HVAC Group

Kitchen Operation Group (Food Service & Logistics)

Others

Metropolia UAS

Students of final year electrical engineering have evaluated, modelled, designed and proposed new energy saving lighting experiments for schools

Students of final year automation engineering have designed, built, developed, tested the laboratory pilot scale (1:26) GYM HVAC with intelligent control system

Group of students (Biotechnology, Food technology and Logistics) have evaluated, designed, modernized and tested the kitchen operations and services

Other groups



M.Sc. Final Year works 2009 - 2010

➤ Learning methodology used::

- Collaborative, thinking together,
- participating,
- researching,
- reflective and
- problem based learning

➤ Used to support manifold learning societies

Final Target:
Learning new energy savings and Behavioral change

4. Living Lab methodology used on energy saving as a learning society

3. The effect of children's learning on the habit and attitude of energy saving in the families

2. Web2.0, social media and serious game used to support learning of saving energy

1. Relationship and attitude of the users (staff & pupils & families) on saving energy, the present habits

SE OC NO DE JA FE MA AP MA JU JU AU SE OC NO DE
2009 2010 2011



Kitchen operation, food services and logistics

Analyzed and designed by Metropolia student groups:



- Material flows
- Filling machines
- Using electrical equipment
- Timing of food preparation, services, cleaning
- Dining; distribution, logistical chain, timing

- Material handling
- Owens way to operation
- Frigerators, service tables, warming
- Washing machine
- Water usage, temperature
- Waste treatment
- Cleaning & teading
- Standards, regulations, safety

- Raw materials, handling, tools
- Preparation, services, after care (cleaning)
- Logistics, circulation, timing
- Best practices
- Quality, standards, regulations

- Efficient use of equipment
- Saving Energy
- Better service logistics
- Better quality, customer satisfaction



Activities for Users

5. Save Energy conference for pupils including Final Squeece competition
4. Serie of Squeeces, active participation
3. Teams & work groups at schools
2. Instructive displays of ICT
1. Lecture serie of Saving Energy

Final Target:
Learning & understanding,
behavioural change

Evaluation of Learning and behaviour by M.Sc. Final year works

4. Living Lab methodology as learning base for users
3. The effect of the learning of the children on their family's energy saving habits
2. Mobile Serious Game, ICT-pilots and web2.0 tools supporting collaborative learning of users
1. The present way of energy save operation and behaviour of the users

Applications at Pilot Schools in Helsinki



Application	Role of teachers	Role of pupils	Role of other persons	Problem	Technical Solution
Lights at Entrance Hall	Manual control of lighting	Follow up of energy consumption and lighting	Operation and maintenance	20 units a' 150 W lamps are continuously on	smart solution for lighting system (new lamp groups, sensor based system, new lamp technology), users learn by displays
Gym HVAC	Designing the use of Gym with HVAC	Follow up of energy consumption and HVAC	HVAC control according to the users in gym	HVAC system functions poorly, under-capable system	New and modern sensor based control EC-motor system for HVAC, users learn by displays
Classrooms PC classes (several)	Manual control of lighting and power supply	Follow up of energy consumption and lighting	Operation and maintenance	Unnecessary use of lighting and power, poor quality of air	Reduced unnecessary usage by intelligent sensor based systems, users learn by displays
Corridors	Manual or sensor based control of lighting	Manual control if needed	Operation and maintenance	Unnecessary use of lighting	Reduce the unnecessary use of lighting by sensors
Energy Saving at Kitchen	Operational development and logistic plan	Participation in design and evaluation	Energy economical development of the kitchen	Uneconomical use of kitchen	Evaluation and design of the developments of the logistics and food service



Helsinki Pilot: Time Schedule:

	Year 1												Year 2						
	Months 1 - 12												Months 13 - 18						
	2009												2010						
Tasks:	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09
1. Livin Lab User design and disc	█	█	█				█	█	█		█		█		█				█
2. Project Design & Plan	█	█	█	█															
3. Technical Design & Measur.	█	█	█	█										█					
4. Energy & HVAC audits		█	█	█	█	█								█					
5. Development.of application sw				█	█	█	█												
6. Wireless & Mobile control appl					█	█	█												
7. Installation & Tests							█	█	█										
8. User Training & Document.								█	█	█	█								
9. Public Information Displays							█	█	█										
10. Follow up & User motivation							█		█		█			█	█				█



Activities for users:

User Group/ Activity	Pupils 7 – 12 y	Pupils 12 - 16	Janitor	Teachers
Serie of lecture			Yes	Yes
Workshop/seminar		Yes		
Green Board of pupils		Yes		
Squeece	Yes	Yes	Yes	Yes
Questionnaires	Yes	Yes	Yes	Yes
Theme day, week	Yes	Yes		
Follow up of energy consumtion at home	Yes	Yes		
Work groups, teams	Yes	Yes		
Learning by doing activities, Displays	Yes	Yes	Yes	Yes
Final Squeece competition	Yes	Yes		
Conference of pupils		Yes		

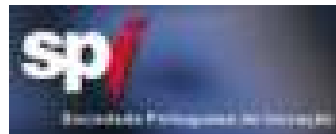
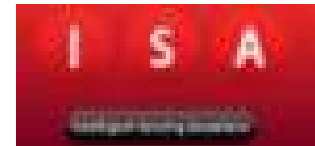


Links:

- www.sateenkaarentekijat.fi
- www.teachers4energy.eu
- www.motiva.fi/tokat
- www.motiva.fi/matkallasuomessa
- www.motiva.fi/opetusmateriaalit
- www.energiansaastoviikko.fi

Links:

- www.sateenkaarentekijat.fi
- <http://www.rathenow.de/static/eprojekt/index.htm>
- <http://www.curbain.be/fee/>
- <http://www.dip-badajoz.es/dsostenible/eae/index.php>
- <http://www.arenergia.it/>
- <http://www.mema.ie/>
- <http://www.kids4energy.net>



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Thank you!

