DELIVERABLE

Project Acronym:	**APOLLON**
Grant Agreement number:	**250516**
Project Title:	**Advanced Pilots of Living Labs Operating in Networks**

D.3.3 Experiment design transfer technology and protocol

Revision: Final Version

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Project co-funded by the European Commission within the ICT Policy Support Programme		
Dissemination Level		
P	Public	X
C	Confidential, only for members of the consortium and the Commission Services	

Statement of originality:

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

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1. Introduction

As stated in the Description of Work Document (DoW) and in Deliverable 3.1 of this Work Package ("Requirements"), Work Package 3 within Apollon clusters four Living Labs that focus on energy efficient solutions that will be transferred and piloted from one Living Lab to another (receiving) Living Lab.

Task 3.2 deals with the actual preparation of the deployment and set-up of the experiments in the receiving Living Labs (Amsterdam Living Lab, Aalto Living Lab, Portugal Energy Living Lab, Botnia Living Lab). Task 3.3 comprises the actual cross-border piloting of the experiments, after which Task 3.4 covers the evaluation and recommendation activities.

This document provides the common approach for the cross boarder activities, including research, data gathering and analysis activities that will take place in Work Package 3.

For the SME's involved in the cross border experiments (Home Automation Europe, Process Vision, There Corporation, KYAB, DIY KYOTO, Sensinode, JROMA, ARQUIlED, ISA) the Requirements Identification (Apollon Deliverable 3.1) and Use case analysis and common Living Lab Approach (Apollon Deliverable 3.2) establishes the transferring Living Labs, in case of technology transfer cross boarder activities, as the supervisors to monitor de overall work (coordination) while the local (receiving) Living Labs are responsible for the local deployment and execution of the pilot.

Ideally the coordination of the local Living Labs will be guided by the transferring Living Labs but this will require a close cooperation and open dialogue between all the involved partners.

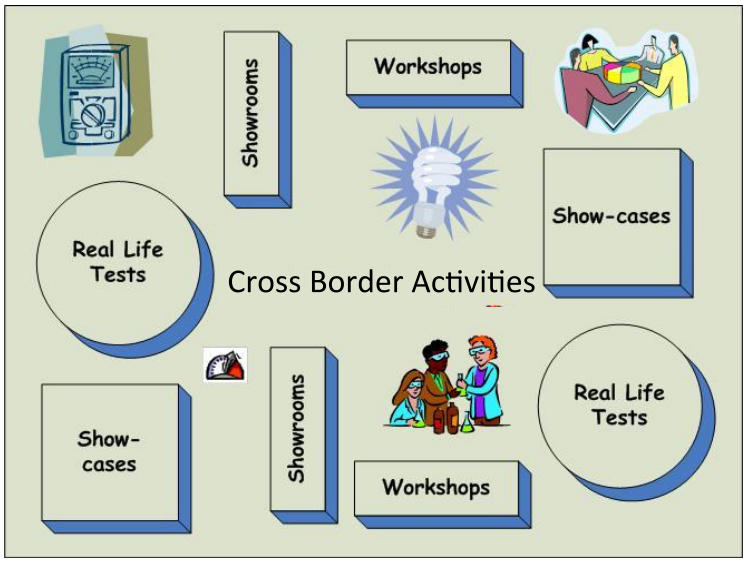
The research set-up that will be applied in the Living Labs is a people-centered approach in which we will not only focus on the deployment of the service, but also investigate how various users experience the energy efficiency solutions in their daily lives.

This common approach for the activities in Work Package 3 will be in line and accordance with the guidance and instructions provided by Task 1.2 of Work Package 1 (Apollon Methodology Framework) and specifically by Apollon Deliverable 1.1 (Catalogue of state-of-the-art concepts, existing tools and lessons learned fro cross-border living labs networks) and Apollon Deliverable 1.2 (Research framework and investigation strategy).

In addition to the common Living Lab approach towards the piloting measurements and analysis, this document also includes the basic structure of cross boarder Living Lab activities (including networking activities) in the area of energy efficiency that will be conducted by the participants in Work Package 3.

2. Cross border activities

In the cross border energy efficiency activities four Living Labs (from Luleå, Helsinki, Amsterdam and Lisbon) are participating. The cross border activities will consist of several cases all having the purpose to test and evaluate new technology for energy saving and change of behaviour in terms of consumption of energy, at the same time as the cases strive to share experiences, methods and tools among the four living labs. Hence, the cases will take the form of e.g. workshops, showcases, showrooms and real life tests. See the figure below which illustrates the different cross border activities.



The activities will focus on different aspects, but together they will contribute to the creation of a common benchmarking framework including a service model for clients, business model for sustainability as well as a reference model to share date, knowledge, experience and competencies. The cross border activities will also test the impact of real time date on the consumers as well as foster SME innovation commitment and support its scalability in the European market place.

The activities involved in the energy efficiency pilot have the main focus of cross-border transfer of both technology and knowledge. For this we have distinguished the following different type of cross border activities:

– Business matching & partnerships

– Technology testing
– Knowledge transfer.

The involvement of the SMEs in these cross border activities is one of the main objectives of the Apollon project. The challenge is to identify and show the benefits that the cross-border activities have to offer to the SME's. Being private companies the goal, in the end of the day, is to make business and have profit. Thus, the best benefit offer is help them achieve more profit by the establishment of partnerships and the creation of synergies between themselves.

Another target of these activities is the end-user. Each technology transfer pilot has its own specific target users but they are using common methodologies what allows for generalising the findings to other Living Labs.

3. Common framework

In order to establish a common language and terminology and an easy and effective communication with the various partners in the various experiments we apply a common framework to the experiments, based upon the work of Work Package 1 (Apollon Deliverable 1.2).

As part of a common research framework for each of the identified cross border activities in Work Package 3 we apply the structure as described below.

Cross border activity: <name>

Apollon Key account: <person name(s), organisation name>

Apollon Partners involved: Living Labs; SME's; Industry: <partner names with responsible persons>

Associated partners involved: <partner names with responsible persons>

Time frame: <start, end time, per cycle if multiple iterations>

Overall purpose of the activity <describe the overall objective>

Objectives of each of the involved partners: <Living Lab; SME; Industry; Supporting partner>

The activity in short: <describe the main activities>

User involvement: <describe the involved users and involvement activities>

Technology involved: <describe what technology is used and how it is used>

Measurements, data collection & analysis: <what data needs to be collected, how and by whom, how often, etc, what tools are needed, outcome parameters to report upon>

Preparations needed: <organisation, technology & legal wise>

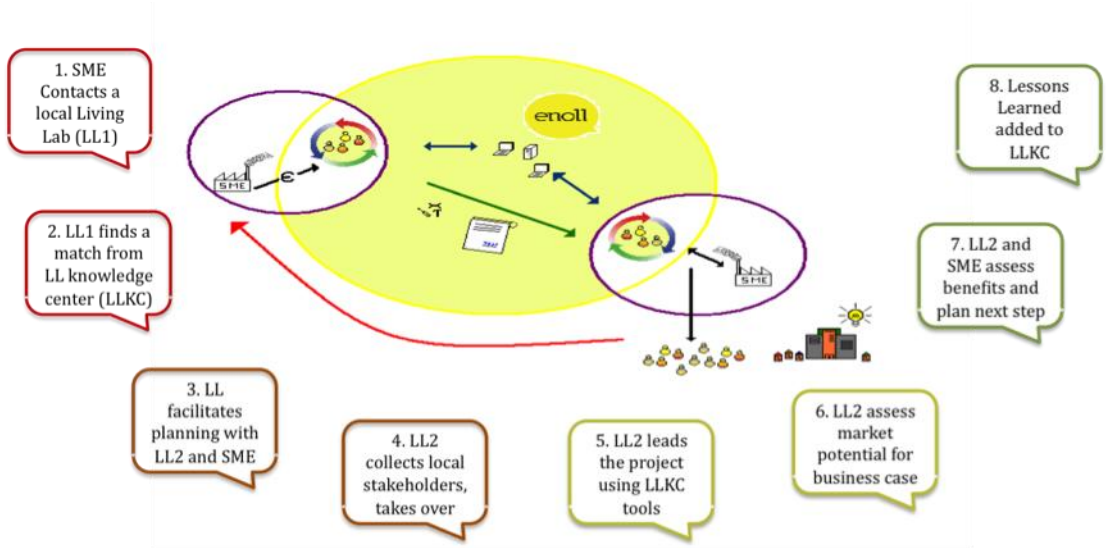
Expectations for success: <describe the intended outcomes>

The cross-border dimension: <describe the specific cross border elements>

In the context of the technology transfer experiments Work Package 1 (Apollon Deliverable 1.2) provides a model for guidance by answering the questions in each of the following classes. For the evaluation of the cross border technology transfer pilots we adapt the table to each of the experiments accordingly.

Activities/Outputs	Build	Evaluate	Justify	Generalize
Constructs	What are the variables that you study?	What are the elements that you measure?	How do you decide best practices across the experiments?	How do you filter pilot specific elements out?
Model	What are the basic assumptions, causalities and outcomes that you perceive?	What measures do you use to evaluate the validity of the assumptions?	What are the success criteria that you use?	How do you assess the wider applicability of the model?
Method	What is the process for validating the assumptions?	How do you evaluate and adjust the validation process?	How do you justify the use of selected methods?	How do you ensure the scalability and wider applicability of the methods?
Installation	Who are the stakeholders at your experiment?	How do you evaluate added value for each stakeholder?	How do you justify the selected collaboration model?	How do you compile recommendations for sustainability

In addition for each of the cross border technology transfer pilots we describe the flow of engagement between the parties involved, adapting the basic scenario of Work Package 1 (Apollon Deliverable 1.2) illustrated below and will describe the roles of the involved of the SMEs, Living Labs, industry partners and supporting partners.


1. SME Contacts a local Living Lab (LL1)
2. LL1 finds a match from LL knowledge center (LLKC)
3. LL facilitates planning with LL2 and SME
4. LL2 collects local stakeholders, takes over
5. LL2 leads the project using LLKC tools
6. LL2 assess market potential for business case
7. LL2 and SME assess benefits and plan next step
8. Lessons Learned added to LLKC
enoll
SME
SME

4. Cross border Activities: Business partnerships

In this section we list the cross border activities that have the aim to establish direct business partnerships and clustering of SMEs. Although the other cross border activities involve engagement of businesses, they will be driven by technology testing (see section 5) and knowledge transfer (see section 6).

For Apollon it is important that the expectations of the Living Lab pilots also have sufficient attention on the business aspect, in terms of creating business i.e. realizing the SME's and companies motivations, as well as benchmarking and business Intelligence.

Discussions already took place between different SMEs aiming for cooperation strategies, i.e. between ISA and Plugwise.

4.1 Business partnership ISA – Plugwise

Apollon Key account: Maria Benquerença

Apollon Partners involved: ISA

Associated partners involved: Plugwise

Time frame: ended, failed due to technological problems and difficulties in the integration process.

The activity in short: the partnership had its main focus on the integration of both solutions in order to have a closed product for the market.

User involvement: Users were to test the integrated solution in terms of usability and propose new features and improvements.

Expectations for success: closed and complete solution to achieve new and different markets.

The cross-border dimension: the partnership involved one Portuguese and one Dutch companies that would go to their natural markets as well as to third countries.

Three SME clustering activities are taking place:

- Finland
- Portugal
- Amsterdam Metropolitan Area

4.2 Clustering SME´s Finland

First National network of Living Labs took place in 2007 when Dimes was formed to co-ordinate it and Mr. Niitamo became a chair of it from CKIR/Helsinki School of Economics. Regional and thematic clusters were defined late 2007. The formation of ICT for Energy efficiency as thematic area for Living Labs in Finland was identified in 2008 and first meetings were held with interested parties and SMEs in early 2009.

Due to the changes of national policy and European recommendation on focusing energy efficiency to private citizen, households and micro production of local energy followed with emergent enabling technologies in smart metering brought new opportunities for smaller companies to become parties of new emergent value creating ecosystems of distributed energy management and local production. Very quickly small local pilots were developed and user involvement and user driven innovation and development became a vehicle for interesting lead market trials for utilizing ICT technology and radio transmission efficiently in measuring and controlling energy use. Living Labs became a methodology to push this development.

Few TEKES and EU projects helped in developing piloting in these emerging Energy Living labs. Process Vision received funding from TEKES to develop Generis platform for ‘smart’ or ‘mini’ grid solutions in 2009 and commercial product the Enterprise solution was launched in 2010. This solution is piloted in

Helsinki-Aalto Living Lab and first commercial implementations took place in some 20 households during 2010. Memorandum of Understanding to further develop Smart meter and grid based service were signed with DigiEcocity for the use of piloting this in a Chinese Living Lab, see the box below for more information on DigiEcocity.

DigiEcoCity is a model for an ideal city combining the principles of sustainable development, the innovations of which are made possible by the digital revolution and the urban functions necessary for providing a framework of good everyday life in a gardenlike environment. DigiEcoCity combines living, working, public and private services, culture and leisure. Its scale and details respond to local needs. DigiEcoCity is a human and ecological alternative to concentrated metropolises.

DigiEcoCity combines three fundamental concepts:

1. *DIGI concepts cover digitally integrated highly interactive information systems providing access to community services like health care, learning and trade, highly-automated transport, logistics and building systems, and information systems to city management and service production.*
2. *ECO concepts cover ecologically sustainable reactive solutions providing energy efficiency at both the building and community level, utilizing renewable energies and waste as a source of energy and recycled materials and security of water supply and clean water environment for recreation, working and living.*
3. *CITY concepts cover localized proactive urban solutions enabling efficient logistics, new combinations of working and living, increases in functional diversity making the urban structure more vital and resistant against the impacts of the changing social and macro-economic conditions.*

DigiEcoCity derives from the early Living Lab work done in Finland (Arabianranta and Suurpelto/Espoo). DigiEcoCity provides a demonstration platform for innovative companies and individuals to develop sustainable services ad products. The development work is based on bilateral agreement with the Finnish Ministry (TEM) and Chinese Ministry (MOST). Concepting started 2009 and first city development projects signed and first city will be built between 2010-2012. MoU

has been signed with Future Learning Finland which is developing Living Lab environments for Learning solutions and with Process Vision.

In 2009 there was agreement with the Snowpolis Living Lab to develop an annual ENoLL conference on "Energy Efficient Living Labbing". The first one was held in 2009 and third will be held in march 2011 in collaboration with the "Apollon tour" to Luleå. The 2010 September cross-border Apollon Living Lab tour was held in Luleå, Oulu and Vuokatti/Snowpolis, see Section 6.1.

With these initiatives we have currently 5 energy efficient Living Lab collaborating in Finland; Porvoo Living Lab in Skaffskär, Vuokatti Living Lab on energy efficient sportfacility development, Oulu/Kempele Livinglab and two in Helsinki region; Save energy /Helsinki Schools for Energy Efficiency and Helsinki-Aalto Living Lab developed under Apollon in Lautasaari. There are several user centric plans on Smart meter/grid based under way where Living Lab methodologies would bring added value.

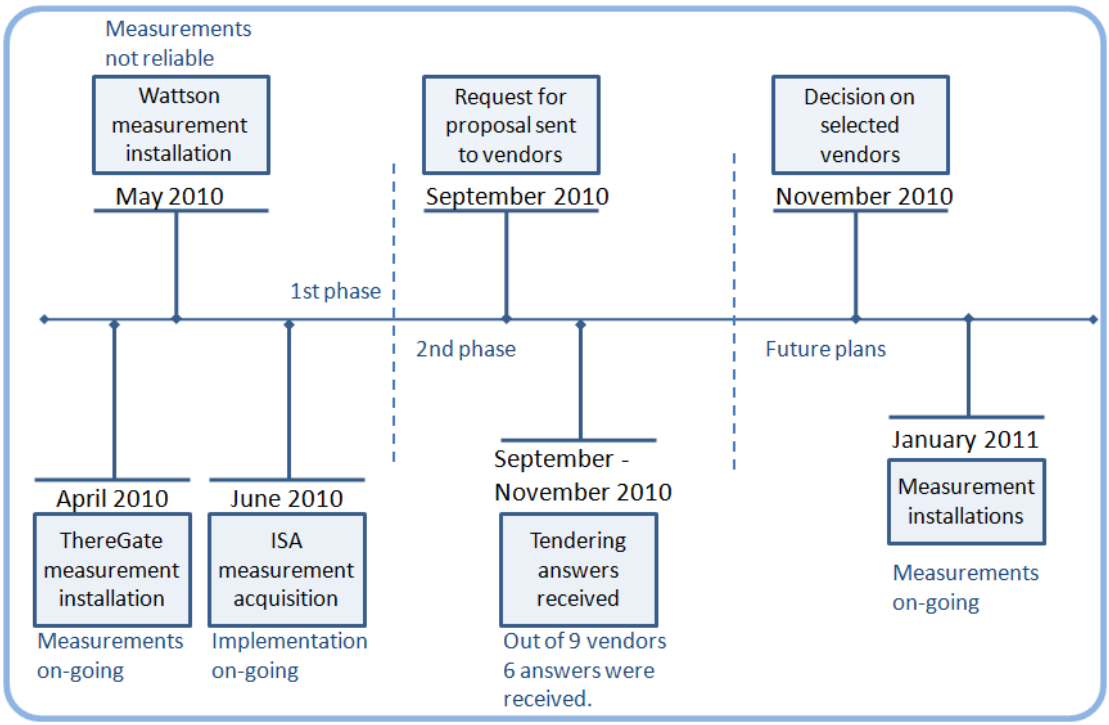
Process Vision implemented a tender process in Apollon project

In preparation for the Helsinki Aalto Living Lab a tendering process has been carried out in regard of the Living Lab measuring implementation. In the first phase measurements were started with five smart metering solutions. First a solution was tested from a Nokia spin-off company called ThereCorporation. ThereCorporation's Meter device system was installed in April 2010 and the measuring is still on-going as their metering technology proved successful. Also a Wattson metering system from a British company called DIY Kyoto was installed, but however the pilot showed that the solution was not compatible to the electrical system of the piloting building. Three device systems from ISA was purchased in June 2010, the co-operation is still ongoing.

From the first phase of the Helsinki Living Lab was a conclusion was made that metering solutions were not quite on the maturity level wanted to conduct the piloting in an effective way, therefore the larger scale tendering phase was postponed to be decided in the second phase. In the second phase a request for

proposal was sent to nine metering instrument vendors. Received tendering answers showed that postponing this phase was the right decision as technology had developed in the short time as well as the pricing had clarified. In the proposal the specifics of the metering solutions were enquired as well as up-scaling possibilities and pricing.

Six answers were received to the proposal and based on those, three vendors were chosen. To decentralize the solutions, partners with different data communication solutions were selected, three with radio, one with KNX-based and one system with M-Bus based system. One of the short listed candidates was an Apollon affiliate Kyab. The chosen devices will be installed in January 2011 and the Living Lab measurement will start in full scale. Also plans for the Living Lab to be extended to the private homes of company employees have been specified but not yet implemented. Timeframe of implementation process in the first period in Helsinki Aalto Living Lab can be seen below in picture 1.



The following SMEs are part of Living Labbing pilots in Finland;Process Vision, Wireless Mesh Networks, Porvoo Oske, There Corporation, Ouman, Porvoon Energy,EON Finland, Sensonode and bigger players such as: NSN, Fortum, Helsinki Eergy. Cleantech Finland created a network of some 60 Finnish

companies interested in smart grid based services and Finnish Energy SHOK has a Smart Grid based company cluster of some 20 companies. Living Labs have been introduced to these company clusters.

4.3 Clustering SME´s Portugal

In Portugal, Alfamicro has promoted the clustering of SMEs in different sectors, namely in the energy efficiency domain. The clustering process, although not always linear, begins with the awareness of SMEs followed by the identification of common objectives in business and markets. This leads to the collaborative-creation of a strategy to address the new challenges and consequent planning for implementation. From here, the environment for a permanent collaboration is created through the conception of Living Labs.

Below are some examples of Living Labs in the energy efficiency domain, created in Portugal through this methodology.

Lighting Living Lab

The Lighting Living Lab contributes to the implementation of the European Sustainable Energies Policy. The increasing knowledge and understanding of the impacts of the human activities on the natural and human environments at the local and global levels induced a high number of questions/problems, proportional to the complexity of these interactions. For instance, not only do we contribute to the global warming effect, through the emission of CO2, but we are also highly dependent on non-renewable resources, like oil. This represents two sides of the same problem: energy.

Artificial lighting is one of the main uses of energy (one fifth of all energy consumed), and where more can be done through the research and development of new lighting sources (e.g. LED, OLED) and the integration with ICT solutions. The globalization process led to an increasingly competitive market, which motivated this sector to conduct research on new market opportunities, based on new products and services oriented towards the user. This constitutes the problem/opportunity to be addressed by the Lighting Living Lab.

The Lighting Living Lab mission is to promote innovation and the development of research in new technologies and applications in the field of lighting, focused on the concepts of Smart Lighting and Eco-friendly Lighting, and supported by the ICT sector, giving birth to new services/systems/products and business opportunities.

The user-driven approach is necessary to change the current paradigm of the lighting usage: to pass from lighting seen as a mere utility, to lighting seen as a mean to achieve objectives like, for instance, enhance the sense of comfort and enable further personalization of environments. This implies behavioural changes which only the Living Lab user driven methodology can achieve.

The Lighting Living Lab is based on, but by no means closed to, the Portuguese municipality of Águeda, justified by a high concentration of luminaire manufacturers in this area, representing the majority of this cluster nationwide. It will play an important role nationwide, given the involvement of a diversity of stakeholders, which although "scattered" throughout the Aveiro region, act as important players at national and European levels.

Intelligent Sensing and Smart Services Living Lab

The Intelligent Sensing and Smart Services Living Lab (ISaLL) domain is the Intelligent Sensing Anywhere applied to Energy Efficiency, Well Being and Health. In the energy efficiency domain, the information and communication technologies (ICT) are widely reckoned to play a pivotal role in the transition to energy-efficient buildings. From building management systems monitoring and controlling most of the operational aspects of energy consumption in buildings to smart real-time information systems that enables individuals to receive relevant data and act upon their energy consumption patterns, new services, products, processes and behaviours are changing the present building design and management paradigms. To support this entire paradigm shift, technological innovation must be supported by major behavioural transformation at all levels of society towards better production and use of energy.

Some of ISaLL's main actors in the energy efficiency domain are the following:

- ISA – Intelligent Sensing Anywhere
- EDP Inovação (Utility RDI)
- UC – Universidade de Coimbra (University)
- UA – Universidade de Aveiro (University)
- Lightning Living Lab Águeda
- Ecospace (Energy efficiency certification, green building, micro generation and solar panels)
- Visabeira Group (Telecommunications, construction, industry, tourism and services)
- PT Inovação (Telecommunications and RDI)
- CCDRC – Comissão de Coordenação e Desenvolvimento Regional do Centro
- CMC - Câmara Municipal de Coimbra (Coimbra Municipality)
- CMP - Câmara Municipal de Penela (Penela Municipality)
- CEC/CCIC - Business Angels Centre
- IPN – Instituto Pedro Nunes / iParque
- TICE.PT (Competitinevess and technology pole for ICT)
- TMN (Mobile operator - Digital trails and Micro-payments)

The ISaLL offers a large range of products that can meet all the requirements of the Energy Efficiency and Smart Grid markets. The ISaLL stakeholders have been and are involved in pilot and large scale projects, in Portugal, Europe and in the global market such as Brazil. Some of these projects are already being developed with ENoLL partnerships, being supported by ICT, CIP, Energy and other EC funded Programmes.

Sustainable Construction Living Lab

Sustainable Construction encompasses all the best practices that improve the energy environmental performance of the built environment taking into

consideration local climate and cultural conditions. However, due to the complexity of this sector and to the established, ill adjusted, mainstream practices, the shift towards good practices requires strong commitment, effective networking, continuous investment in innovation and systematic monitoring of the improved energy environmental performance.

Various opportunities arise from the bringing together relevant actors, including:

- Communication events function as a platform for dialogue between relevant actors in the construction sector with the aim of mainstreaming of good practices and encouraging entrepreneurship within sustainable construction solutions;
- Creation of a cross sector platform for incubation of ideas and user driven innovation of products;
- Creation of a cross sector platform of producers of cross sector building products with the objective of coordinating efforts to achieve national and local tax incentives for sustainable construction solutions;
- Engagement in political lobby activities in order to promote the mainstreaming of good practices.

The main purposes of the Sustainable Construction Living Lab are to:

- mainstream sustainable construction;
- promote a more user-driven development of the construction sector by connecting the consumer with business and with government in various forums;
- improve the effectiveness and continuity of the implemented changes, by involving all Stakeholders early on in the decision-making processes associated with improving the sustainability of the built environment;
- facilitate the integration of innovation into the business-as-usual practices in an open and informed way.

The Sustainable Construction Living Lab brings together the relevant Stakeholders of the construction sector so as to promote co-creation and therefore co-ownership of innovative solutions in the area.

4.4 Clustering SME´s via Amsterdam

In the Amsterdam, collaboration and clustering between SME's w.r.t to energy efficiency is an important activity. Under the umbrella of the Amsterdam Smart City many activities are coordinated to stimulate the collaboration of SME's together with Industry. The Amsterdam Smart City is an independent partner for climate and energy projects. The organization gathers companies, authorities and citizens in Amsterdam to use energy in a smart way and test new technologies. In this way Amsterdam Smart City will contribute towards the fulfillment of the objectives of the New Amsterdam Climate. Amsterdam Smart City is an initiative of the Amsterdam Innovation Motor (AIM) and Liander, in close collaboration with the city of Amsterdam. Since the foundation in 2009, 14 projects have been started in the field of sustainable working, living, mobility and public space.

The current partners of Amsterdam Smart City are: Accenture, Dienst infrastructuur Verkeer en vervoer, FarWest, Favela Fabric, Havenbedrijf Amsterdam, JC Deceaux, Klimaatbureau Amsterdam, Philips, Plugwise, Rabobank, Stadsdeel Centrum, Stadsdeel Geuzenveld-Slotermeer, TNO, Utrechtsestraat Association, Van Gansewinkel, Nuon, Nyenrode Business University, Joulz, ONZO, Home Automation Europe, Zonspot, IBM, University of Amsterdam, Amsterdamse Innovation Motor, IM, ROC of Amsterdam, Haven of Amsterdam, Cisco, Vodafone, Nudge, Nemo, IRS+, Wij zijn koel.nl, DGBC Lab, DE Groene Bocht, Green Business Club, Ymere, De Balie, De Key, Cofely, The new motion, C30, Nieuw Amsterdams Klimaat, Ziut, SMSL, Sport fondsen Amsterdam Oost, Green Energy Options, Heatsavr, Favela Fabric, Millieu Centraal, Read on, Cisco.

A successful way within Amsterdam Smart City to build up a flourishing SME community is via the use of Dialogues Café. The Dialogue Café is based on the

radical but simple idea that people have many things in common and given the opportunity, they will explore their common interests, sparking collaborations and stimulating ideas that address the major issues of today. These kinds of conversations and collaborations can lead to new ways of thinking and doing: they can empower individuals and communities, break down prejudice and misconceptions and promote greater understanding and co-operation across cultures. Cafés have long served as breeding grounds for great debates and grand designs. Dialogue Café builds on this by combining the social potential of cafés to the power of video conferencing, exponentially expanding our collective ability to problem-solve and innovate as a global community.

Dialogue Café uses state of the art video conferencing technology to enable face-to-face conversations between diverse groups of people from around the world so that they can share experiences, learn from each other and work together to make the world a better place. Dialogue Café is a platform for innovation and creativity – enabling organisations and individuals to forge new links, consolidate existing ones and create new collaborations and projects. Dialogue Café is for individuals and organizations with a social, educational or cultural mission – such as foundations, civil society organizations, community groups, universities, schools, social enterprises, co-operatives, public sector bodies and agencies.

Some of the recently started projects are:

- Smart Schools: children learn about energy: Various primary schools in Amsterdam will work with an online portal and a specially developed education programme, so children learn how to use energy economically. The project is initiated by grid operator Liander and will be tested at ten primary schools in Amsterdam.
- Residents of Amsterdam-North owner windmill park: “Our energy” is a cooperation that works on sustainable and low cost energy in Amsterdam-North, where the members are owners as well, and completely profit from the gains. Together with the inhabitants of Amsterdam-North and the district

of Waterland, the windmills will be placed around the area to generate sustainable energy under own management.

- Sustainable monuments: The canals and historic buildings tell us a part of the rich history of Amsterdam. In their different functions, the monumental buildings attract a lot of visitors each day. In this project, different technologies and working methods are tested to find out what works best to realise sustainability at the canals and change behaviour of the visitors.
- Energy Management Haarlem: Residents of houses are playing a leading role by testing innovative and energy saving products. Also Haarlem, where Liander provides smart plugs for 250 households to test them. Users gain insight in their energy usage and are able to save energy in this way. The test is part of an analysis of Liander to look at potential savings by different energy management systems.
- ZonSpots in Amsterdam: Working in the open air at a square in the neighbourhood: soon this will be a reality in Amsterdam. The new ZonSpots will make this possible by using solar energy at inspiring places around the capital city of the Netherlands. This will show every citizen of Amsterdam that solar energy is easily accessible. Additionally working outdoors is very healthy and inspiring.
- Zuidas Solar: Within one year the companies situated at the Zuidas want to install 3,000 solar panels on their rooftops. This is the ambitious but achievable target of NextEnergy, an initiative started by several professionals from the LinkedIn group Sustainable Energy. A real challenge that on the 31st of December will transform the Zuidas into a progressive and sustainable business centre. Project bureau Zuidas and the Green Business Club have embraced this idea.
- Online monitoring of energy use in municipal buildings: Measuring energy by using an online energy motor can increase the awareness and directly show the results of the energy savings. After a pilot with five buildings in 2012, this successful project will be implemented in 2011 on a larger scale. The energy portal is a multifunctional intranet site and is also used as a knowledge bank

and a means of communication for the tenants of municipal buildings. Consequently the project contributes to the municipal goal to be a carbon dioxide neutral organization by 2015.

- Charging the electric car at home and at the office: Grid operator Liander and The New Motion are testing a smart charger to efficiently charge electric cars at home and at the office. The 'Moet je WATT' box (WATT do you want box) is first being tested in Amsterdam in combination with a smart meter. Because these applications can communicate with each other, the charging process of the car can be regulated automatically. This makes it possible to charge the car and use electrical appliances simultaneously, without overloading the electrical circuit. Moreover companies can automatically charge several cars in a row. The standard plug of all the future electric cars can be connected to the 'Moet je WATT' box.
- Swimming pools become sustainable: By showing municipal swimming pools sustainable initiatives, public spaces can learn how to use their energy more wisely. Amsterdam Smart City introduces several sustainable initiatives and technologies, such as the liquid swimming pool covering of HeatSavr, but also LED lightning. Both initiatives can save energy very easily.

5. Cross border Activities: Technology testing

5.1 Technology testing: HAE → Luleå energy/ Botnia LL

Apollon Key account: Daan Velthausz

Apollon Partners involved: Home Automation Europe, Botnia Living Lab, Lulea energy, Liander

Associated partners involved: Kyab

Time frame: fall 2011 start of the pilot in Lulea. Next steps will be made during the meeting in March 2011 in Lulea, and plan for further roll-out for next fall as the winter period is the most valuable to conduct the pilot. Preparation of the pilot will take several months until installation and start of test in October 2011.

Overall purpose: Home Automation Europe wants to test and validate the Quby device in real environments. Home Automation Europe wants to observe the human behaviour through the use of the Quby smart display solution in Lulea in real households and learn from the differences in both social interaction with different climate conditions (than Amsterdam) as well as technical differences in e.g. grid standards and product. In addition, less formal investigation of consumer behaviour have conducted and resulted in much faster feedback loops which enhances the evolvement of interface design.

The activity in short: installing he Quby device and additional necessary equipment in a number of households in Lulea and objectively measuring and monitoring the users behaviour change. A baseline measurement will be conducted as well to be able to compare the change in behaviour.

The Botnia Living Labs helps with contacts and practical matters, but the business part of this is a Home Automation - KYAB - Luleå Energi discussion. The Botnia Living will help to facilitate this.

User involvement: users need to be involved from within their private context, preferably by testing the product in their own home, or alternatively in a residential setting which they are familiar to. Lulea Energy will select the users.

Technology involved: Home Automation Europe has develop the Quby, a next generation advanced interactive touch screen device, aimed at stimulating consumers to understand their energy consumption patterns, and act upon it, as it regulates the energy usage (i.e. central heating) as well, see the illustration below (and www.quby.eu for more information). Sweden uses different products and standards in their electrical grid. Products will need to be adapted to suit local conditions.

Expectations for success: Home Automation Europe is looking for user-feedback, both on the interface and on the physical installation and actual (daily) usage of the product. As well as too learn from the differences between Amsterdam and Lulea experiments w.r.t. energy companies, technical products, standards, climate conditions, and human behaviour & culture, and learn the commonalities. For the Amsterdam Living Lab and Botnia Living Lab it is interesting to see how a local SME is engaging in the different International living Labs to test and validate their technology and how the Living Lab should facilitate future SME's that want to validate their technology Internationally.

The cross-border dimension: validating the smart display solution that is tested in Amsterdam also in Lulea.

5.2 Technology Testing: HAE + ISA → Helsinki LL

Apollon Key account: Ivo de la Rive Box

Apollon Partners involved: AIM, Home Automation Europe, ISA, ProcessVision, Aalto CKIR, Aalto Living Lab

Associated partners involved: Kyab

Time frame: in the fall of 2011 the start of the pilot in Helsinki. Next steps will be made and plan for next fall as the winter period is the most valuable to conduct the pilot. Preparation of the pilot will take several months until installation and start of test in October 2011.

Overall purpose: to test and validate the combining the solutions from two SME's (Home Automation Europe and ISA) from two different countries (Netherlands and Portugal) as a joint offering in a third country in a Living Lab, i.e. the Helsinki Living Lab in Finland.

User involvement: users need to be involved from within their private context, preferably by testing the product in their own home, or alternatively in a residential setting which they are familiar to. Helsinki Living Lab will select the users.

Technology involved: combination of the Home Automation's Quby, ISA's and Kyab's solution.

The cross-border dimension: joint effort of two SME's (HAE, ISA) from two different countries (NL/Portugal) to their combined offering in a third country/Living Lab (Helsinki/Finland).

5.3 Technology testing & benchmarking: Smart Office

Apollon Key account: Daan Velthausz, Ivo de La Rive

Apollon Partners involved: AIM, Home Automation Europe, Logica, Liander, ProcessVision

Time frame: benchmarking started in 2010

Overall purpose: measure the energy usage in offices and compare the results in different cities (Amsterdam, Helsinki)

Technology involved: depends on the office building, e.g. in Home Automation Europe's Office, use of smart meters (Liander), data collection (ProcessVision), business Logica to control /reduce the energy consumption (Logica).

The cross-border dimension: comparison of the results between the trials in Helsinki (ProcessVison's office) and the Amsterdam Offices, i.e. Home Automation Europe, Liander and the ITO tower (Amsterdam Smart City)

ProcessVision in Finland is monitoring its energy usage in its head offices in Helsinki. It is offering its data for learning purposes to other parties in Apollon.

However, in this activity we will try to find parallels with others office-building in Amsterdam, (Home Automation Europe in Amsterdam) and evaluate possible improvements in energy efficiency coming from Logica research in Sweden and other European projects.

Installation: To start with ProcessVision will inform Home Automation Europe of the details in which it is measuring in its office, and we will try to find comparable spaces (server room, general office space, management rooms etc). Furthermore the granularity of samples will be specified (e.g. every 15 minutes). In Amsterdam, Home Automation Europe and Liander will investigate how best to do the metering in the office, preferably using at least one 'smart meter' of the type currently being rolled out in the Netherlands with it specified P1-port for consumer data feedback. Home Automation Europe will then install the metering solution in its office, trying to match some of the spaces used in Finland. ProcessVision and Home Automation Europe will investigate a connection between the ProcessVision Database and the Quby display.

Data collection: Home Automation Europe will collect its data in a database and send it to Process Vision in the agreed granularity. An interface needs to be agreed for this.

Analysis: Parties, amongst which Logica and Liander, can use the energy data to analyse possible cost-efficient ways to reduce consumption in the office environment.

Follow up: Home Automation Europe will play the energy-reduction game with itself, within the possibilities of its (growing) business, and use its own monitoring device for direct feedback. Whereas more employees will automatically use more computers, phones etc, Home Automation Europe will invest in energy-efficient devices in order to try to reduce its overall consumption. Other parties may suggest or even try solutions and participate in the search for reductions.

5.3.1 Cross border benchmarking results: Liander office (Amsterdam)

In 2010, Liander applied and tested the wireless micro-level electric energy management system (EMS) Plugwise in a Liander office building that houses 250 people. This largest scale test to-date included 855 tl-lights and 405 appliances. The aim was to gain insight into the implementation, operation and maintenance of micro-level EMS as well as into the energy usage and the energy saving potential.

A one-month reference measurement with the EMS covered 30% of the total energy usage of the Liander office building. One-third of lighting was switched manually. The remaining lights remained controlled by an existing building management EMS.

During two one-month 'switching periods,' the EMS was applied to switch off appliances and one-third of lighting outside office hours. A substantial amount of energy has been saved: 1516 kWh per month or 13% of the total measured energy usage. Thereof, 3%-point corresponds to one-third of energy savings on lighting as compared to manual switching. For appliances alone, excluding lighting, the energy savings amount to 20% of the measured energy use of appliances. Because of the existing lighting EMS, lighting has not achieved net energy savings, but the existing EMS was measured to provide 18% efficiency compared to manual light switching. Computers were not included in the energy saving scheme. However, they represent another 700 kWh monthly energy savings potential, which in large part could be achieved through behavioural change.

It is concluded that in general:

- if energy management measures for lighting exist in the building management system, 20% energy savings can be achieved on appliances.
- if lighting is not previously equipped with an EMS, its energy use can be curbed by approximately 18%, depending on usage pattern and opening hours.

Users (employees) were not significantly affected by the EMS. Although a substantial amount of energy can be saved using a micro-level energy management system, this is not yet in line with the current expenses. Increasing the number of appliances per smart plug and focusing on those appliances on which the highest savings can be achieved, will make the EMS more cost-effective, leading to a payback period of less than 5 years.

More details & results will be provided in Deliverable 3.4

5.4 Technology testing: ISA → Process vision, energy data management

Apollon Key account: Maria Benquerença

Apollon Partners involved: ISA, ProcessVision; Living Labs: Leiden, Amsterdam, Lissabon, Helsinki, Luleå,; SME's: ISA (N. Martins), Process Vision (V-P Niitamo, R. van Oirsouw), Home Automation Europe (Ivo de la Rive Box), Industry: Logica (Willem Altena), Liander (Otto Hettinga)

Time frame: continuous

Overall purpose of the activity: to collect, analyse and present energy consumption data at multiple levels and at multiple locations for increased efficiency of energy use and to influence behaviour in energy use

Objectives of each of the involved partners: Living Lab: research in the above; SME : facilitation of the above; Industry: to gain insight for future directions in the above.

The activity in short: collection, storage and presentation of data on energy consumption at various levels and at multiple locations across Europe.

User involvement: Receivers of analysed data for potential consumption behaviour change.

Technology involved: proprietary technologies of the SME's, supplemented with scientific insights from the labs.

Measurements, data collection & analysis: see above, interval measurement energy consumption data at short intervals and at detailed levels. For tools see above technologies, ultimate outcome is insight into parameters that can ultimately influence energy consumption behaviour.

Preparations needed: collection and storage of data, analysis and presentation

The ISA / Process vision case shows the importance of having a business case made explicit. This business model aspect is missing in the research model of WP1 is the Business Model aspect. This should be added, e.g. the insights in each others markets.

Expectations for success: insight into parameters that can ultimately influence energy consumption behaviour.

The cross-border dimension: takes place in Scandinavia, Netherlands and the Iberian peninsula, data to be collected and accessed in a central location in Finland.

5.5 Technology testing: ISA → KYAB/ Botnia LL

Apollon Key account: Maria Benquerenca

Apollon Partners involved: ISA, Botnia Living Lab, Intelligent Sensing and Smart Services LL

Associated partners involved: Kyab

Time frame: ended, failed to provide a win-win situation for both companies: ISA and Kyab.

Overall purpose of the activity: to establish a commercial partnership and an integrated solution for the monitoring and control of energy consumption in buildings (including electricity and district heating).

Objectives of each of the involved partners: facilitation of an integrated solution for the Swedish and Portuguese markets as well as to third party countries where the SMEs could enter in partnership.

The activity in short: Monitor and manage the consumption of electricity and district heating with an integrated solution.

User involvement: Receivers of analysed data for potential consumption behaviour change.

Technology involved: Proprietary technologies of the SME's.

The cross-border dimension: Takes place in Scandinavia and the Iberian peninsula.

6. Cross border Activities: Knowledge Transfer

6.1 Roadshows

Discussions are taking place between different Apollon Living Labs to cooperate closer and to identify common activities to stimulate SME's involvement in the energy efficiency domain. For that three road-shows took place, viz:

- Portugal (17 June and 1 July, 2010)
- Sweden – Finland (14-15 September 2010)
- Amsterdam (9 December 2010)

6.1.1 Roadshow Portugal

Apollon Key account: Maria Benquerenca

Apollon Partners involved: ISA, Lisboa E-Nova, Alfamicro

Associated partners involved: Metropolia University

Time frame: Two workshops took place, one in the 17th of June and other in the 1st of July.

Overall purpose: To raise awareness and find solutions for the problem of the efficiency in the use of natural resources.

The experiment in short: The first workshop was focused in the subject of Energy Efficiency in schools and involved schools, teachers, decision makers and

technology companies. The second workshop had a border focus on resources use efficiency considering energy efficiency in buildings but also the efficiency in the use and management of water.

User involvement: The users could attend the workshops and contribute for the definition of solutions; also the case studies presented had the user as a main focus.

Expectations /specification of success: high attendance and activities or projects generated by the roadshow;

The cross-border dimension: knowledge dissemination and sharing of experiences from different countries (Finland and Portugal) to follow the best practices in the creation of solutions.

6.1.2 Roadshow Sweden-Finland

Apollon Key account: Annika Sällström, CDT

Apollon Partners involved: Living Labs: Botnia Living Lab, Aalto Living Lab

SME's: Process Vision, Luleå Energi.

Associated partners involved: Kyab, Luleå Kommun, Tieto Enator, Porvoo energy, OUMAN, NSN, Oulun Energia, CIE

Time frame: 14-15 September 2010

Overall purpose of the activity: To share new insights around the topic of Future Smart Grid technologies and services. In addition the workshop is also a meeting-point for Smart Grid actors to elaborate on cross-border collaboration.

The activity in short: The 2 day workshop is organized as a tour starting in Luleå, Sweden and continuing to Oulu in Finland. In each meeting point different presentations are made by participants and good examples are shared in real-life settings. In addition there is room for round table discussions among participants to create future collaboration and business opportunities.

User involvement: None directly but indirectly by sharing of user experience.

Technology involved: Partners taking part in the workshop share knowledge of their existing technologies.

Apollon assessment indicators (KPI):

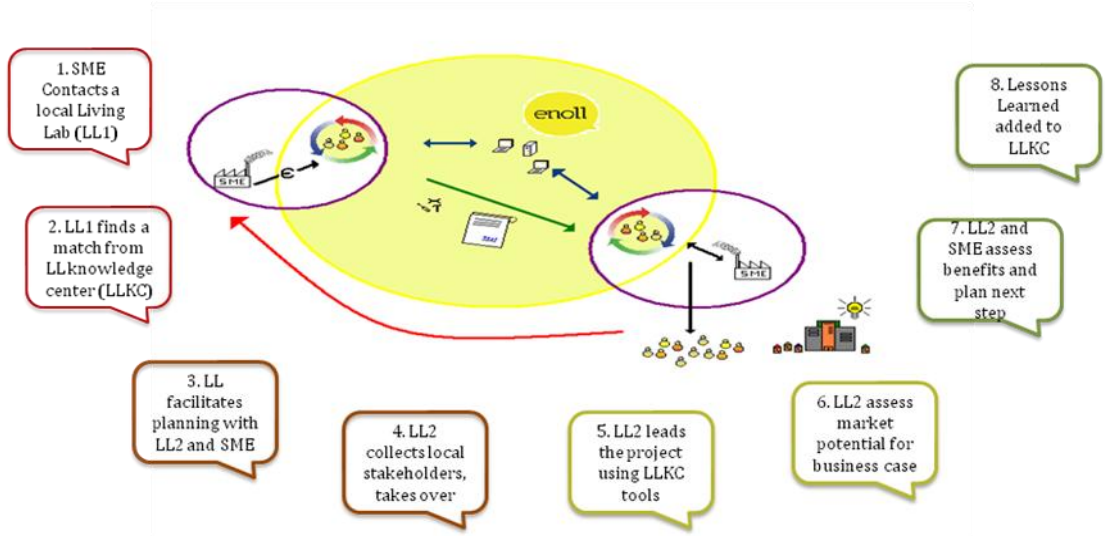
- Transfer of technology – (signed agreements, letter of intent etc)
- Relations established between different actors (signed agreements, letter of intent etc)
- Collaboration initiatives (new proposals etc).

Expectations for success:

- new insights among other players on the future energy market and future Smart Grid technologies and services.
- future business opportunities among different foreseen Smart Grid actors

The cross-border dimension: knowledge sharing, preparation for technology transfer.

The flow of engagement between the parties involved, based upon the figure below.



1. ProcessVision contacted Aalto Living Lab.
2. Aalto Living Lab contacts Botnia Living Lab.
3. Aalto and Botnia make plans and invites SMEs to shared workshop and presentations, discussions and knowledge sharing and transfer.
4. Botnia Living Lab and Luleå Energi acts as host and make final plan and invitations.
5. Workshops / roadshow takes place at Luleå Energi the first day and in Oulu the second day.
6. Plan for evaluation in progress (T3.4)
7. More meetings and roadshows will take place with other partners and Living Labs (e.g. Amsterdam).
8. Plan for evaluation still in progress. (T3.4)

6.1.3 Roadshow Amsterdam

Apollon Key account: Daan Velthausz Apollon Partners involved: Logica, AIM, Liander, ProcessVision, Home Automation Europe, CDT, Lulea Energy, LisboEnova

Associated partners involved: Amsterdam Smart City and involved SME's

Time frame: 9 December 2010

Overall purpose: To share new insights around the topic smart energy and energy saving technologies and services and to see collaboration opportunities.

The activity in short: presentations and demonstrations were given at different locations in Amsterdam, e.g. the groene bocht (electric driving, see picture below), Logica's sparc centre. The Appolon partners also joined the Amsterdam Smart City Partner event (at ABNAMRO's headquarter, where all the current Amsterdam Smart City projects (18 projects) where presented and all partners and stakeholders where present (150 people).

User involvement: not directly but indirectly via sharing of user experience.

Technology involved: demonstrations of available prototypes and products.

Expectations /specification of success: collaboration between Apollon partners, or Apollon living lab partners and the SME's involved in the Amsterdam Smart City Program.

Interest has been gained by Lulea Energy for the Plugwise products. Possibly a trial will emerge with Plugwise products in Sweden in a number of households and/or offices.

LisboEnova has gained interest in a novel product Heatsavr developed by LeadLease to save energy for swimming pools by smart management and new products. Between 15 and 30% of energy can be saved by using the Heatsavr. Possibly the product will be tested/trialed in Portugal soon.

The cross-border dimension: knowledge dissemination and networking, future collaboration and transfer of technologies.

6.2 Cross Border Activities: Living Lab Engagement: EU-Brazil

Discussions are taking place between different Living Labs to a close cooperation and common activities, also between different continents.

Apollon Key account: Alvaro Oliveira

The Apollon cross-border activities in the domain of Energy Efficiency have been implemented in the context of the EU-Brazil cooperation for Living Labs. This activity has been developed with a bottom-up approach involving the main stakeholders of Living Labs – universities, research institutes, enterprises, funding organizations, public administration:

- Information dissemination and awareness. Fostering the interest to the ENoLL Community membership.
- Dissemination Workshops in several Brazilian cities.
- Workshops to support the definition of the Living Lab concept: partnership creation, strategic objectives, Federal and State policies opportunities, etc.
- Mentoring aiming at the preparation of the Living Lab eco-systems. Workshops, thematic and institutional meetings.

– Meetings with the main stakeholders at academic, research, enterprise, federal and state governments, municipalities, associations and NGO's, etc.

And simultaneously a top-down approach at federal, state and regional levels:

– Documents of strategy to the DG Info of the European Commission demonstrating the strategic role of Brazil as a partner for the EU.

– Scientific publications and conference presentations, namely at the Innovation Conference in 2008 and 2009 organised by CKIR in Helsinki.

– Discussion panels in conferences (e-Challenges, ICE, European Commission events, etc.) dedicated to present and discuss the EU-Brazil cooperation in the domain of innovation focused in Living Labs.

– Promote awareness and motivate Brazilian State governments to the Living Labs methodology.

– Promote awareness and motivate Brazilian Federal Government to the Living Labs methodology.

– Steering Committee of the European Commission for the scientific and technological cooperation negotiation.

– Preparation of the EU-Brazil Conference for the Innovation and Living Labs.

This environment allowed us to identify the Energy Efficiency (Smart Metering) and the more general Smart Grid as two strong areas of interest in Brazil: looking for the European scientific and technological partnerships in order to implement in Brazil pilot projects of different dimensions which can support policy recommendations adapted to the Brazilian environment and opening the opportunity for commercial agreements to implement large scale Energy Efficient applications.

The first opportunity was identified by the Living Lab of Vitória, Espírito Santo, where the electricity production and distribution is operated by ESCELSA (6 million costumers) a company belonging to EDP-Brazil that is a subsidiary of EDP-Portugal.

The driver of this initiative was our understanding that the Living Lab environment can reinforce the level of trust between cross-border stakeholders, thus accelerating the knowledge and the technology transfer activities. However, no Energy Living Labs existed in Brazil when we started in 2009. This led us to follow the bottom-up approach summarized above: a first workshop was held at ESCELSA headquarters in Vitória, Espírito Santo, which was simultaneously participated (video-conference) by Bandeirantes, another EDP subsidiary in São Paulo (also about 6 million consumers). This action led to a strong interest of EDP-Brazil in the Living Lab Methodology to address the user behaviour transformation in Energy Efficiency. The concept for the Living Labs was created and adequate pilot projects and partnerships were identified. EDP-Brazil fostered the creation of the Living Labs and at the end assumed the coordination of both in São Paulo and Vitória. They submitted a proposal for Living Lab Certification to the 4th Wave of ENoLL, being now a member of the network.

The dynamics of the Living Lab creation was used to involve the APOLLON SMEs, either directly as it was the case of ISA (Portugal) and Process Vision (Finland) and indirectly through Alfamicro. This activity led to the following results:

- Market evaluation for the European SMEs.
- Pilot projects with the involvement of European SMEs.
- ISA Sul America created by ISA, based in São Paulo.
- An APOLLON supporting pilot being established in Vitória.
- A lighting project involving new clean technology established with the collaboration of EDP Living Lab and the Amazonia Living Lab in Manaus. This is a project addressing the energy sustainability of Amazonia. The orchestration of the partnerships took place in the APOLLON Living Lab cross-border initiative in Brazil.

The enthusiasm and the business potential of Brazil for the Energy Efficiency knowledge and technology led ISA in Portugal to invite other SMEs in order to create a Living Lab embracing the complete value chain of the Energy Efficiency domain. The partnerships in this domain led to an initial number of 30 partners

that created ISaLL (Intelligent Sensing and Smart Services Living Lab), as shown below.

Partnerships in this Living Lab can supply any Energy Efficiency solution. As a matter of interest, EDP Portugal is also a member of ISaLL. The collaboration between the Portuguese and the Brazilian Living Labs is creating and developing business opportunities that would never materialized if the Living Lab ecosystems and the collaboration between them were not established.

However the main business driver of this collaboration has been the knowledge and experience brought by the Portuguese Living Labs in terms of using ICT to achieve user behaviour transformation. This knowledge has been acquired mainly in the context of SAVE ENERGY pilot projects (a CIP project) and Apollon.

Several initiatives are progressing in Brazil in this domain of Energy Efficiency. 2011 will offer a tremendous opportunity for the European companies, namely ISaLL, considering that the Federal Energy Efficiency Policy, currently under

public evaluation, will be approved at the beginning of the year, opening a large number of wide scale implementations.

Companies like ISA are well placed to take advantage of this opportunity and they have been preparing for that, namely being involved with their experience, in the public consultation process. A conference to be jointly organized with EDP Brazil, to be held in São Paulo (2011), will further extend to the European SMEs the market opportunity of the major Energy players in Brazil.

6.3 User behaviour changes methodology: Living Lab → Living Lab

Apollon Key account: Anna Ståhlbröst LTU

Apollon Partners involved: Botnia LL, Amsterdam LL, Lisboa LL, Helsinki LL and relevant SMEs, Liander

Time frame: December 2010 – March 2011

Overall purpose: To establish an Apollon methodology for user-behavioural changes measurement / inventory of the best practices and lessons learned the first results of the behaviour change possibilities with respect to energy savings across different countries.

The experiment in short: This experiment will exchange best-practice from local pilots on user-behavioural changes mechanisms and measurements. Partners will document and share their experiences in measuring behavioural changes among end-users when experimenting with new ICT solutions from energy saving.

A short summary of the suggested process:

1. a Wiki for sharing knowledge on experiences of methods for behavioural changes. A template will be provided to make sure all report experiences in the same format.
2. a Local pilot experiment will be used as an expert knowledge exchange case to jointly try different approaches and methods. This case will also be discussed and analysed jointly in the Wiki as well as in a workshop.

3. Workshop 2011-03-16 in Luleå on the CDT Energy Day in the House of Culture. In this workshop the four living labs are viewed as users of the methodology created from the results of knowledge sharing in the wiki. Other living labs will also come to the workshop in which a harmonized model form energy consumption changes is created. The workshop ends with the creation of an unified model agreement to be used in future cases and experiments for studying user changes of energy consumption across time and between Living Labs.

Users involvement: None directly with end-users but indirectly within the local assessments. Living Labs are the users involved when it comes to the methodology.

Technology involved: For exchanging methodology from local experiments for measuring and follow up on behavioural changes a wiki will be used. In the local experiment relevant technologies will be used depending on which experiment is used.

Expectations /specification of success: an enhanced methodology for measuring behavioural changes that is assessed in some of the other cross-border cases.

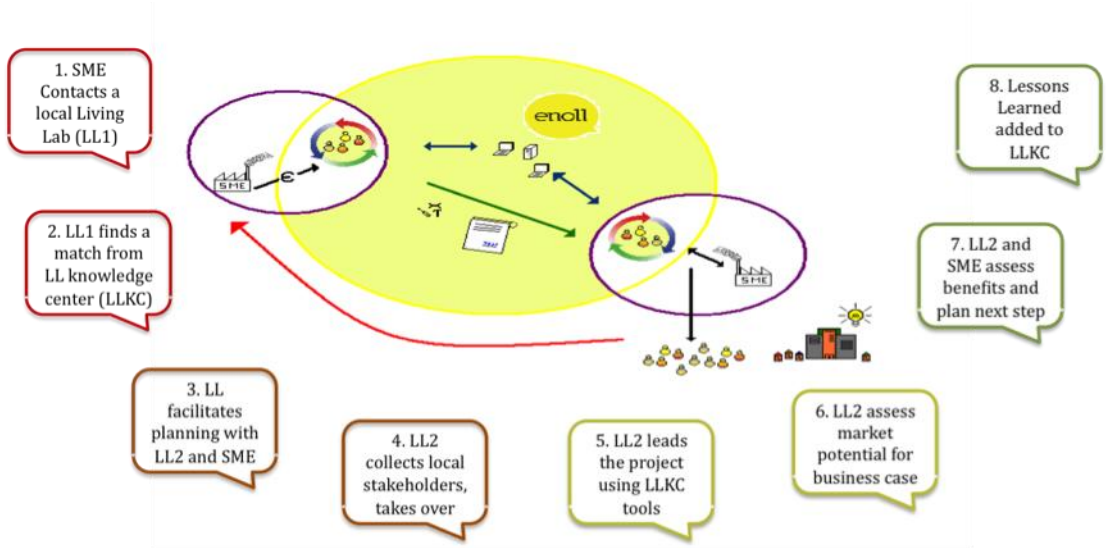
The cross-border dimension:

– knowledge sharing and

– unified methodology by exchanging local experiences

Apollon assessment indicators (KPI): a signed agreement on using the new improved method.

The flow of engagement between the parties involved, based upon the figure below.



1. Lliander contacted Amsterdam Living Lab.
2. Amsterdam Living Lab contacts Botnia Living Lab.
3. Amsterdam and Botnia make plans and invites all four Living labs to shared discussions and knowledge sharing, test of methods in local experiments, workshop and presentations, discussions and knowledge sharing and transfer.
4. Botnia Living Lab acts as host and make final plan and invitations.
5. knowledge sharing takes place in a wiki and Workshop takes place in Luleå at CDT Energi Day on March 16 2011.
6. Plan for evaluation in progress (Task 3.4)
7. The shared method is used in future experiments.
8. Plan for evaluation still in progress. (Task 3.4)

6.4 Motivation, awareness and behavioural change

Apollon Key account: Michiel van Werven Apollon Partners involved: Liander, Logica, AIM, CDT, Lulea Energy, Botnia Living Lab, Lisboa Living Lab, Helsinki Living Lab

Associated partners involved: the ENoLL living lab members active in the energy efficiency thematic network, like Manchester Living Lab.

Time frame: October 2010 – July 2011

Overall purpose: is to learn from Living Lab experiences in the area of influencing motivation, awareness and behavioural change of consumers:

- How can consumers be motivated to change their behaviour (e.g. concerning energy consumption) in a lasting way?
- How can consumers be motivated to actively participate in (pilot) projects (e.g. in the field of energy saving)?

The experiment in short: We want to distil and share insights that are gained in the Living Lab projects within Apollon, concerning motivation, awareness and behavioural change of consumers. In order to get these insights, we will perform interviews with people from relevant Living Lab projects. During our project, we will share preliminary results in a Workshop, in order to enrich the gained insights with ideas and experiences from our WP3 partners. The final insights will be collected and shared in a report, in which we will also include Liander's experiences in the field of motivation, awareness and behavioural change of consumers.

The things we aim for:

- Understand the learning experiences of other Living Labs.
- Analyse whether the identified success and failure factors also apply to Amsterdam Smart City (ASC) and the Dutch situation in general.
- Make recommendations (do's and don'ts) in the field of marketing, customer communication & motivation, awareness and behavioural change.
- Share the collected insights with the Apollon project members
- Actively implement the recommendations in ongoing and future projects.

User involvement: We want to involve as much relevant projects from other Living Labs as possible.

Technology involved: Primary focus is on sharing knowledge on insights in the field of motivation, awareness and behavioural change of consumers. There is no concrete technology involved.

Expectations / specification of success: We aim for an in-dept overview of insights/recommendations in the field of motivating consumers, creating awareness and changing the behaviour of consumers.

The cross-border dimension: We use the experience of several Living Lab projects around Europe. Liander is interested in the Living Labs within ENoLL that have experience with energy efficiency and user involvement. The Thematic Domain of ENoLL should be able to provide the list including contacts.

6.5 Energy portal for energy saving

Apollon Key account: Daan Velthausz, Willem Altena

Apollon Partners involved: Logica, AIM, Liander.

Time frame: To be prepared

Overall purpose: transfer and adjust the OM tool and gained insides to other countries and regions, i.e. from Sweden to Netherlands.

The experiment in short: discussions have been started to transfer the OMt towards other regions, e.g. Liander has shown interest to experiment with this in their experiments with their webportal.

Logica has experimented in Sweden with the Online Monitoring tool (OMt) to see whether this solution contributes to reduces households to reduce their energy consumption. Two major utilities in southern Sweden– Vaxjö Energi AB (VEAB) and Lunds Energi–have successfully introduced OMt to more than half a million of their customers combined. And the numbers registering for the service are growing fast.

The logical Online Monitoring tool (OMt), a user-friendly, web-based tool that provides customers of electricity and other utilities with detailed information about their usage. Studies show this kind of knowledge leads to changes in behavior and lower consumption. It also provides utilities with the opportunity

to burnish their green credentials while growing their market share. By offering OMt, whether based on some kind of a fee structure or free of charge, utilities can differentiate themselves from their competitors and position themselves as "green" corporate citizens. And herein lies the real possibilities of OMt. While it may reduce consumption by individual households, and therefore your sales, it can more than compensate for potential revenue reduction by helping you take market share from your competitors through the your superior service and the good will created by a greener image.

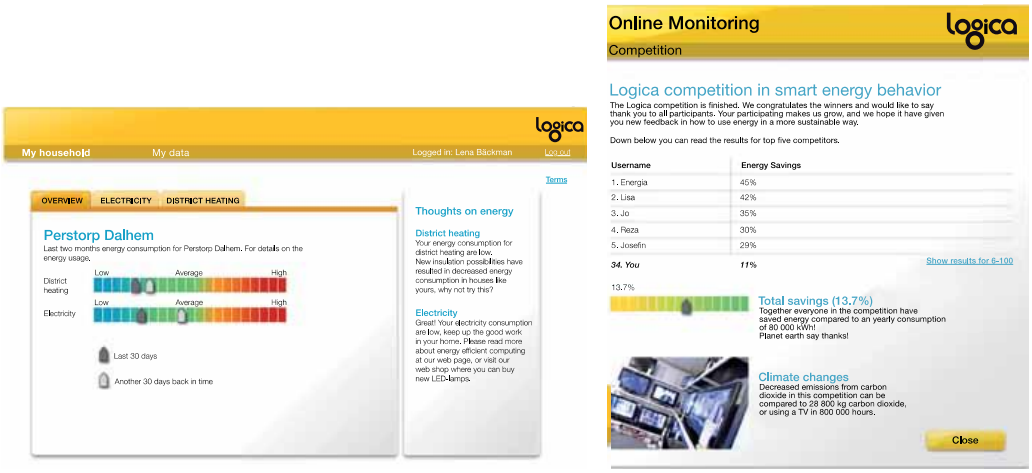
OMt is an ideal platform for the smart home or business. It provides them with every conceivable type of energy usage information, from how much they consume per square meter, to changes in consumption hour by hour. (this, of course, depends on whether their utility actually collects hourly data.) It is a simple step to link the tool with a mobile phone or other personal mobile device.

How it works? Considering its far-reaching potential, logica's OMt is a simple device. When logging on, homeowners or apartment dwellers can review their consumption and compare their month- to-month consumption, or even hour-by- hour, depending on the level of data the utility makes available. This information is conveyed with easy-to comprehend, color- coded visuals that show changed consumption patterns at a glance.

Users start by registering the size or their apartment, house or property. Subsequent logons will not only show their consumption in the ways mentioned above, but also provide cost breakdowns, outside temperature readings and other parameters in a highly accessible way.

OMt makes it possible for people to sign up for energy-reducing competitions in their homes and see the results updated and presented in the OMt every day, a unique way for utilities to give feedback to their customers. Customers can sign up for a competition as a household, or participate in a team with others. In competitions lasting as little as a week, participants have shown significant energy savings—up to 30% on a regular basis. The OMt results, which can show individual or group results, show carbon dioxide emissions as well as energy

savings. It's a fun and exciting way for people to become motivated to change their energy-consuming behavior.



Expectations /specification of success: usage of OMt in other regiosn and environments, integrated in local solutions, e.g. webportal of Liander.

The cross-border dimension: lessons learned of large scale portal use in Sweden, to be included in portal designs (and even trialled and implemented) in different countries/cities, i.e. Amsterdam.

6.6 Energy saving minigames

Apollon Key account: João Raposo

Apollon Partners involved: Alfamicro, Aalto-CKIR, ISA, Lisboa E-Nova, LTU-CDT, MCC

Associated partners involved: Save Energy consortium

Time frame: On-going

Overall purpose: Save Energy aims to transform the energy consumption behaviour of public building users – focusing on civil servants, citizens and policy makers – by applying existing ICT-based solutions, specifically energy management systems, real-time information about consumption in a user-friendly way and serious games (mini-games), thereby empowering citizens to take decisions that lead to energy savings. The Save Energy mini-games (Green My Place) play a pivotal role in aligning the different stakeholders' expectations,

thus contributing to a collective mindset that facilitates cooperation. The virtual environment evolves according to the usage scenarios that are defined by; best practices, experts and the pilot users.

The Save Energy mini-games aim to produce positive change in habits of energy use, not only within 5 pilot buildings but also in general, so the serious game has two key goals:

– To educate people in the ways in which energy can be saved, via simple actions that anyone can conduct.

– To increase interest in the pilot scheme buildings.

However, a third goal is also important:

– To be an inherently enjoyable game for a sufficiently diverse audience

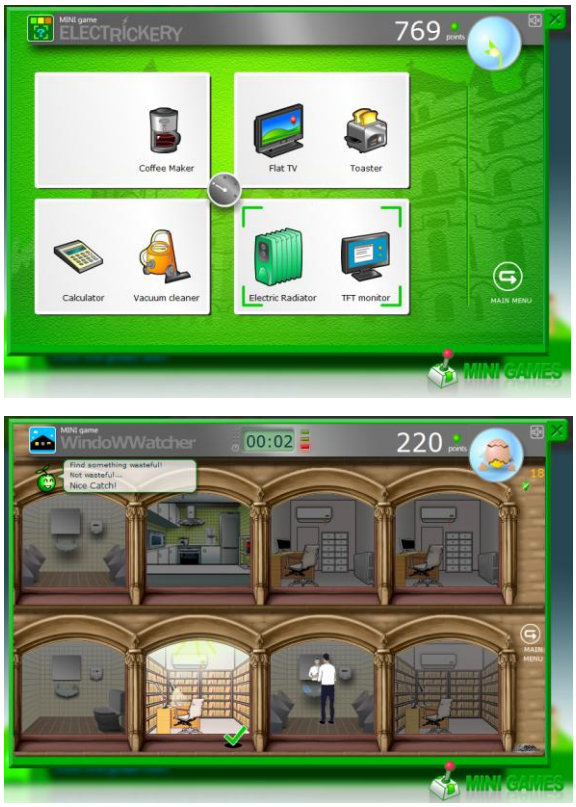


Figure - Save Energy mini-games (www.greenmyplace.net).

The experiment in short: The game play logic derives from the development of the usage scenarios and contemplates different levels of gaming and targeting

audiences, while sharing the common goal of providing players an educational context on energy efficiency. The game playing is stimulated by appropriate communication and marketing activities that sustain the engagement of the users. The use of Web 2.0 tools allows multiplying the traditional results obtained by classical multiplayer games.

The Save Energy Serious Game aims to create a fun and engaging game experience, while shaping the player's behaviour towards energy saving issues. The main focus of game play is to maintain awareness for the user of both energy efficiency issues in general, and their own level of energy consumption in particular.

Behavioural change will be achieved by maintaining the presence of the game in the player's consciousness for as long as possible, without impeding their daily routine. Thus the aiming is for a slow burn experience and the model will be a massively social online game. This will take the form of short duration educational "energy challenge" mini-games embedded in the on-going social "Euro Team" meta-game. The game has a target audience (in priority order):

– Pilot building users: citizen, public servant, policy maker
– Non-users directly linked to pilot, e.g. school parents, families
– General public in pilot building local area

In demographic terms, this audience is composed of arbitrary mass market (or "Casual") players i.e. the widest conceivable audience. In terms of meeting educational goals, this audience is preferred to a more narrowly constrained videogame audience, such as would respond to a simulation experience.

Expectations /specification of success: At the highest level, the objective is to lower energy consumption through behavioural change. Within the meta-game, objectives are ranked by timeline:

– In the short term, 1 week period, complete one or two available tasks and maintain energy saving gains. Within mini-games/weekly releases, objectives will be to learn a single concept through play.

– In the medium term, 1 month period, build on the 1 week achievements to grow a community around the pilot buildings.

– In the long term, 1 year period, compete with other pilots to become the leading case study for energy savings in Europe.

The cross-border dimension: SAVE ENERGY brought together 15 partners, including public authorities, public agencies, universities, research institutes, SMEs and corporations to implement 5 Energy Efficiency Pilots, located at Helsinki (Public Schools), Lisbon (City Technical Services), Leiden (City Administrative Services), Luleå (Cultural Services) and Manchester (Art Gallery).

Figure- Green My Place - Pilots page (www.greenmyplace.net)

The idea of a "competition" between Pilots on energy savings, based on social mini-games consolidates, support and promote the cross-border exchange of experiences and best-practices on how to save energy trough behavioural change.

7. Cross Border Activity Preparations

For each cross boarder activity we want to use similar process, i.e. to prepare the deployment, research approach and data collection, sharing and analysis. In this manner we are able to compare and aggregate the results.

Although different cross boarder activities might have specific dependencies, but the approach should be comparable at an overarching way, e.g. all Cross Border Activities should be evaluated using the same template. This makes it possible to compare them on the meta-level which our two cross-border Pilots (knowledge and technology transfer pilots) can be summarized and analysed on the metalevel.

7.1 Common approach

Deployment plan

In order to run the experiments, the deployment of the set-up of the boarder activities (i.e. technology transfer experiments) will be structured using a standard sequenced, viz.:

- Technical training session: a technical representative from <SME/organisation> will impart a one-day training session at <receiving organization> premises so that the technology team at <receiving organization> can learn how to maintain, deploy, troubleshoot and manage the remote installation of the system in <receiving Living Lab> [date]
- Functional testing and validation of the latest version of the service. Takes place at the local (i.e. transferring) Living Lab, but will include participation and input from the remote (i.e. receiving) Living Lab. [date]
- Localization work: staged in two phases: Translations to be performed by the local and remote Living Lab respectively. All screen texts, system messages and information will be translated. [date]

- Technical validation: the <receiving organization> team will first test the system in its own premises but under a realistic environment (e.g. simulated environment) [date]
- Selection of participants in the remote experiment according to local regulations and the profiles that <SME> has expressed interest in [date]
- Field-trial: <receiving living lab> will perform an initial deployment of the system to test the whole framework in the field but under controlled conditions (small group of people to whom the <receiving living lab> team has more direct access) [date]
- Final deployment for piloting. This is the actual deployment with the selected users that will be participating in the experiment during the piloting phase (T3.3). This involves the physical deployment of the devices and sensors in the users homes, set-up of the communications lines, systems configuration and user training. [dates]

Research, data collection & analysis

For each cross border activity the main research goal is to explore one or more of the following:

- The contextual difference between the local and remote Living Lab
- User experience
- The remote ecosystem and business opportunities: upfront and afterwards with the evaluation for the more practical insights.
- Gain knowledge of the energy efficiency market in other countries; culture, finance, competition. Mainly upfront information, only the cultural questions are able to ask in the evaluation. The other things are not end user related.
- The way cultural differences can modify the use of the same base technology. Does the “export” affect the evolution of the system in ways not detected in the originating pilot? Via the evaluation we’ll see a difference in results. Mainly by asking what function they like, don’t like and what would they like to change.

- What is the added research value provided by the operation in a network of living labs from different places with a common living lab methodology? That's to be seen in the end result of this project?

Ideally the transferring Living Labs will be appointed as the main supervisors to monitor the overall research work. They coordinate both the local and remote activities. Single points of contact are defined for each living lab, thus forming the user research taskforce.

Each cross border activity should describe the research questions and approach to de deployed during the piloting stage (Task 3.3) as well as the data to be collected and analysed.

7.2 Example: Luleå's user behaviour changes methodology

As part of this Cross-border Activity each living lab will use local cases. Here we will describe the case designed for Luleå.

Test of three (or four) technologies for measurement and visualization of energy consumption in private homes. Luleå Energy will in collaboration with Botnia Living Lab set up a test of three different technologies. The three technologies are both local, national and international, hence the test is viewed as a cross-border test. The three technologies planned to be tested are: from KYAB, the Saber which measures electricity, heating and hot water; from Home Automation Europe, the Quby which measures electricity and heating and finally from Exibea, the ELIQ which measures electricity will be installed in 30-40 private homes in Luleå. The homes will have both direct electricity or district heating as sources for heating. The test is planned to run for approx 12 month. Luleå Energy is in charge of setting up the test and installing technology in homes. The register of Luleå Energy customers will be used to find families to perform the test. Botnia Living lab will assist with methods for recruiting, evaluating and interpreting users and results. The idea is to affect half the group with stimulus and the other half should not be affected. At the end of the test. Results will be summarized ans shared among Apollon partners. During the test partners will

participate in the three workshops as a way to create and evaluate the methodology.

- Technical training session: a technical representative from the different SMEs will impart training session at Luleå Energy premises so that the technology team at Luleå Energy can learn how to maintain, deploy, troubleshoot and manage the remote installation of the system in Botnia Living Lab. [Jan-Feb 2011]
- Functional testing and validation of the latest version of the service. Takes place at the local (i.e. transferring) Living Lab, but will include participation and input from the remote (i.e. receiving) Living Lab. [running during the test]
- Localization work: staged in two phases: Translations to be performed by the local and remote Living Lab respectively. All screen texts, system messages and information will be translated. [Q1]
- Technical validation: the Luleå Energy team will first test the system in its own premises but under a realistic environment (e.g. simulated environment) [Q1]
- Selection of participants in the remote experiment according to local regulations and the profiles that Luleå Energy has expressed interest in. [Q1]
- Field-trial: Botnia Living Lab will perform an initial deployment of the system to test the whole framework in the field but under controlled conditions (small group of people to whom the Botnia Living Lab team has more direct access). [running the whole year]
- Final deployment for piloting. This is the actual deployment with the selected users that will be participating in the experiment during the piloting phase (T3.3). This involves the physical deployment of the devices and sensors in the users homes, set-up of the communications lines, systems configuration and user training. [Q2-Q1]

Research, Data collection & Sharing

Specifically, for the User behaviour changes methodology case the main research goal is:

to establish an Apollon methodology for user-behavioural changes measurement / inventory of the best practices and lessons learned the first results of the behaviour change possibilities with respect to energy savings across different countries.

This experiment will exchange best-practice from local and cross-border pilots on user-behavioural changes mechanisms and measurements. Partners will document and share their experiences in measuring behavioural changes among end-users when experimenting with new ICT solutions from energy saving.

W.r.t. the research questions and approach to de deployed during the piloting stage (Task 3.3), we intend to use the method that each Living Lab will collect data in their local pilots. The lessons learned in all cases will be shared and discussed in the three workshops during the year. Templates should be provided for this.