GREENSOUL

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PU	Public	**X**
PP	Restricted to other programme participants (including the Commission Services)	
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Abstract

This deliverable contains a list of the best practices and lessons learnt during the project compiled from the experiences and contributions of the project partners.

Changes History

VERSION	DATE	DESCRIPTION
1	31/10/2019	First Draft

REVIEWERS' FEEDBACK	PAGES MODIFIED	DESCRIPTION OF CHANGES
Spelling: On page 5 "Figure 1 shows a tag cloud of the keywords" On page 6 "recall that they are working and minimal attention thief is a "requirement", On page 13 "29 best practices were filled by 7 partners of the GreenSoul project"	Along the document	The document has been reviewed by native speakers
The executive summary should be shortened	5	The executive summary has been shortened
Please re-write the "Use of different technical solutions "subsection of section 3 so that it is easier for a non-technical audience to understand	14-15	The section has been shortened and simplified to improve their understanding for non-technical audience.

Executive Summary

This document details the different best practices and lessons learnt from the GreenSoul project. Developers of the GreenSoul Things, technical staff as well as the pilot leaders were asked to complete a form in which they provide a description of the different problems detected. Moreover, they were asked to provide advice and recommendations in order to prevent the problem from appearing or minimizing its consequences.

In total 29 best practices were recorded from the different project partners covering all the stages and components. Figure 1 shows a tag cloud of the keywords reported in the best practices.

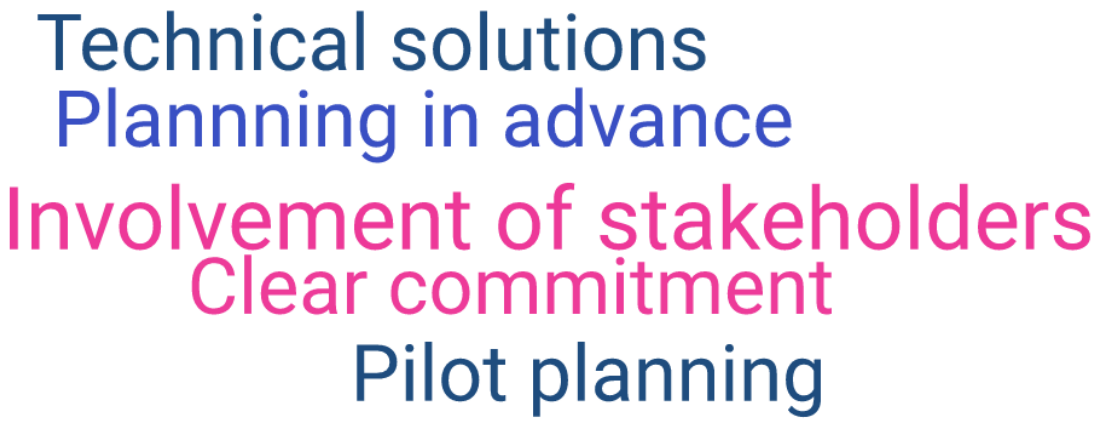

Figure 1. Best practices found in the corpus of interviews and questionnaires done with IT staff, managers, and GreenSoul-ed things designers.

The main learnings have been:

- Involvement of right stakeholders at the right time
- Careful planning of the interventions
- Have a clear commitment from the different stakeholders
- Use of different technical solutions
- Make the pilots uniform
- Create good documentation from the start
- Ensure that the technical staff of the partners are present in the architectural discussions
- Propose a different pilot planning reducing the number of pilots, their length, size and their complexity

1. Introduction

Learning from the failures and successes of others that have been exposed to identical or similar situations is one of the most important attitudes towards achieving successful actions. To this end, this deliverable contains a list of the Best Practices and Lesson Learnt gathered by the GreenSoul consortium when putting into practice a large scale intervention on energy efficiency inbuildings of public use. The objective is to help others in the same or very similar situation to increase the probability of success of their interventions.

2. Methodology

In order to collect the best practices and lessons learnt in GreenSoul, we have carried out a survey among the project partners. Section 2.1 presents a description of the profile of each of the stakeholders consulted. This inquiry was performed through an online questionnaire that was sent to all the stakeholders. Section 2.2 contains a description of the questionnaire form, while Annex A describes its actual implementation. Since the questionnaire includes two textuals questions, a coding task was carried out. The results of this action are presented in Section 3 together with a statistical analysis of the answers. Finally, Annex B contains the RAW information collected (including the coding scheme devised).

2.1. Description of the stakeholder consulted

2.1.1 Pilot Leaders

The following sections describe the profiles of the persons that answered the questionnaire in representation of the pilots.

2.1.1.1 ALLIA

Head of Project Management and Efficiency. EU Programme and projects manager at Allia with over 10 years experience is administering EU funding grants. In charge of overseeing EU stakeholder relationships, ensuring project compliance, and co-ordinating expertises related to deliverables such as IT and facility support services.

2.1.1.2 MPH

Head of the Information & Communications Technology Department (ICT) at the Municipality of Pilea-Hortiatis from 2011 untiltoday and a graduate of the Department of Electrical and Computer Engineering with an M.Sc. in Electrical Engineering from Northeastern University, Boston, USA. He has worked for 5 years as a Project Manager and a Consulting Engineer in a Technical Company responsible for time planning, timetable control, financial attendance, planning and supervision of electromechanical (mainly telecommunications) installations, and generally the management of construction projects. From 2002 to 2010 he worked in the Division of Technical Services at the Municipality of Pilea responsible for planning and supervision of electromechanical (mainly telecommunications) projects.

2.1.1.3 SEVILLE

R&D Area Manager. Telecommunications Engineer with more than 8 years of experience in R&D and specialist in funding acquisition for innovative products and services. His main role is coordination tasks for projects and the R&D team and also participating in the strategic decisions of the product's evolution (R&D roadmap) in order to align the developments with the achievement of new proposals.

R&D Project manager, Dr. in Environment and Society, specialist in the field of environmental impacts, data analysis and system modelling. More than 8 years of experience in R&D projects, working as EU R&D project manager, developing new proposals and managing projects mainly in the fields of ICTs, energy and environment.

2.1.1.4 UDEUSTO

Research associate with 15 years of experience in R&D tasks. His main role is the definition and deployment of research projects in the field of the smart grid. For the collection of the Best Practices and lessons learned, the financial manager of the building and the rest of the research staff of the project were also contacted.

2.1.1.5 WEIZ

Managing director and head of energy agency. Head of the innovation Centre WEIZ since 1999, with over 20 years of experience in EU funded projects. His main role is to manage the building concerning the energy issues and coordination EU projects.

2.1.2 GreenSoul Things developers

The following sections describes the profiles of the persons that answered the questionnaire in representation of the developers of the GreenSoul things.

2.1.2.1 CERTH

Computer Scientist with a PhD in Computer Sciences and related studies with more than 10 years of experience in the development of software related to IoT and decision support systems used in building automation and energy efficiency systems.

Electrical and Computer Engineers with more than 5 years of experience in the development of software and hardware related to IoT, decision support systems, embedded programming, edge computing and PCB design, used in distributed networks, building automation and energy efficiency systems.

2.1.2.2 UDEUSTO

Telecommunication and Software Engineers with a PhD in Computer Science and related studies with more than 10 years of experience in the development of software and hardware related to IoT system used in distributed networks and energy efficiency systems.

2.1.2.3 WSC

Telecommunications Engineer and Master in Automatics, Robotics and Telematics, in charge of Technological Innovation within the Product Development Department of Wellness TechGroup. More than 11 years in the areas of IP network (fixed and wireless) design and deployment, data traffic engineering, radio coverage analysis, systems security, IT systems administration and virtualization, etc. The experience in the industry is complemented with active involvement in the academic community, collaborating in the Telecamics Department of the University of Sevilla.

Computing Engineer with a strong background in data acquisition and data processing from electrical energy networks and the development of software for embedded devices. More than 8 years of experience in the implementation of R&D and commercial projects in the fields of IoT and Smart Cities, in the development of both the devices and the system (backend and frontend).

2.1.2.4 CERES

Commercial manager with 10 years mobile IT project development experience.

Competition, IT, Telecoms lawyer with 10 years Data-Privacy experience

Mobile application developer with BA degree in Mathematics from university of Sophia, Bulgaria and M.A. from Oxford University.

2.2. Description of the template

The template used to collect the information is composed of 7 questions. A description of each is provided next:

- **Title of the best practice**: just the name of the best practice or lesson learned.
- **Stakeholder**: identification of the stakeholder completing the best practice or lesson learn.
- **Role**: there are stakeholders that have multiple roles in the project. In this field, each stakeholder filled it in with the role they played in this best practice. Possible values are: *pilot leader* or *developer.*
- **Pilot**: the pilot where the best practice or lesson learnt was inferred from. Possible values are: *ALLIA, ECOLUTION, MPH, SEVILLA, UDEUSTO, WEIZ* and *ALL.*
- **GreenSoul thing**: GreenSoul Thing that is affected by the best practice or lesson learnt. Potential values are: {*IC, SP, SL, GIM, APP, UMD, WeSave* and *ALL*}.
- **Phase**: the experimental phase when the best practice or lesson learnt should be applied. Potential values are: *preparatory actions, development, deployment, maintenance* or *phase out*.
- **Problem detected**: short description of the problem detected that leads to the lesson learnt or the best practice.

- **Description of the best practice or lesson learnt**: short description of the action carried out.
- **End results**: short description of the result of applying the best practice or the lesson learnt.

3. Best practices & Lessons Learned

29 best practices were filled by 7 partners of the GreenSoul project. WSC, UDEUSTO and CERTH have contributed with more than 75% of the best practices (see Figure 2).

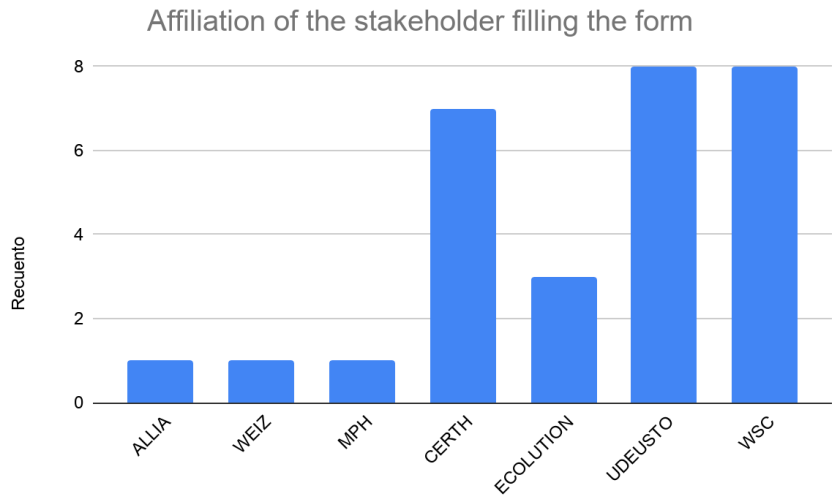

Figure 2. Distribution of best practices by the partner that provide it.

The distribution of answers between pilot leaders and developers was quite even: less than 60-40% (see Figure 3).

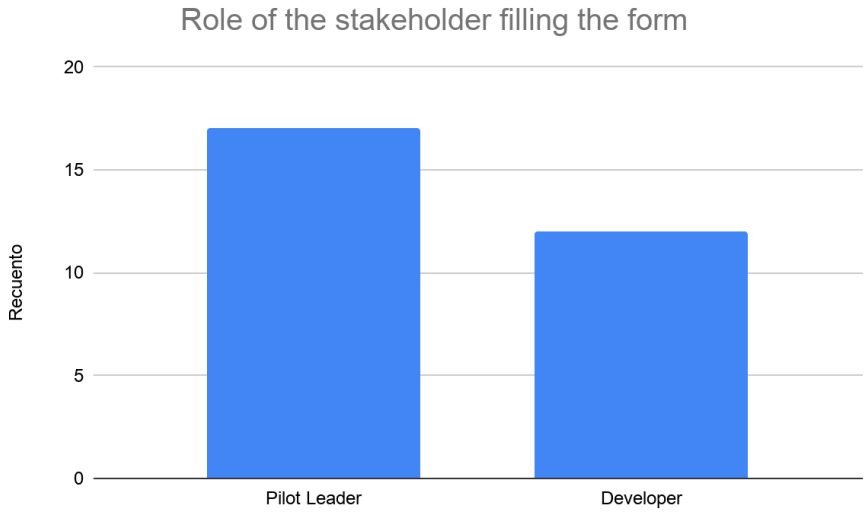

Figure 3. Distribution of best practices by the role of the writer.

Best practices that only affect particular pilots have been filled in by all pilots but the majority of them (42%) affect all of them (see Figure 4).

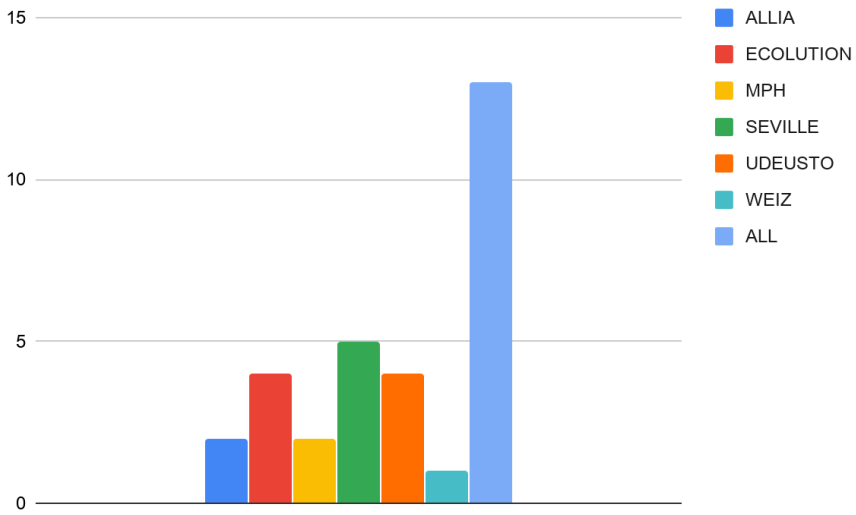

Figure 4. Distribution of best practices by the pilot that affect.

As before, best practices that affect only a particular component of the GreenSoul system have been presented (see Figure 5). Nevertheless, the majority of the information provided affects the overall GreenSoul system (37%).

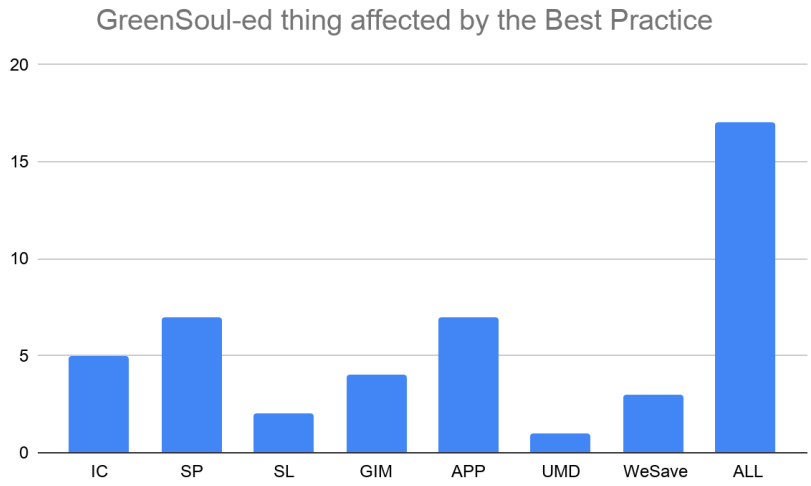

Figure 5. Distribution of best practices by the component of the GreenSoul System affected.

These results combined suggest that partners consider that the problems and best practices have been **global** and not **particular** to any pilot.

Best practices for all phases have also been filled in but deployment and maintenance seem to be the critical points (61%) while the phase out the less problematic (see Figure 6). This is, most probably, due to the fact that the project has not reached the phase out yet and the problems and best practices have not arisen.

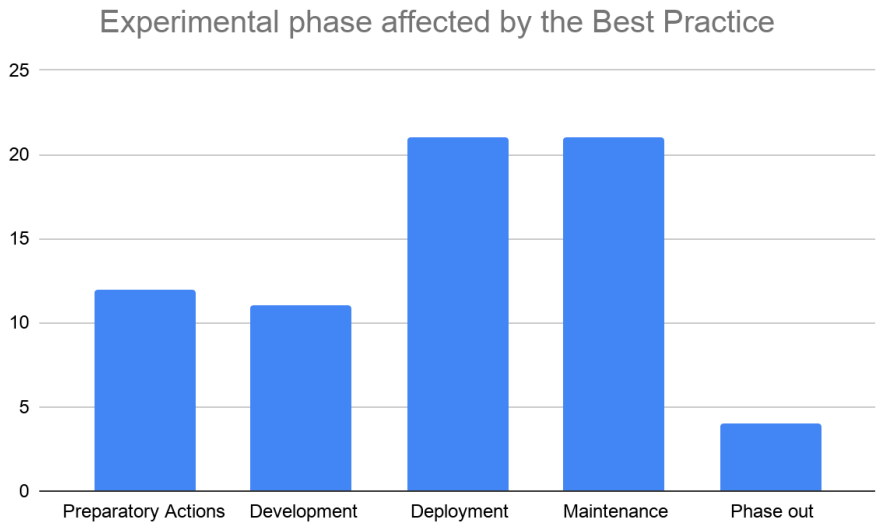

Figure 6. Distribution of best practices by the phase where it appears.

The description of the problems detected were coded and the following categories of answers were found:

- **Technical problems during the installation or deployment**: several components do not work as expected. Integration of the APP with the GIM and connectivity problems of different components were cited several times.
- **Recruitment and user participation**: obtaining and maintaining the engagement of end users was also a recurrent problem found.
- **Institutional problems and other legal problems (i.e. GDPR)**: several different problems were found in the different pilots with the managers (in several cases changes in the decision chain were applied which left the project without a clear point of contact at the pilot). The entry into force of the GDPR was also a main source of problems.
- **Delays for technical reasons or lack of commitment**: several aspects suffer delays in the project. Some technical components were delayed due to the unexpected complexity. The installation of others was delayed due to difficulties with external problems.
- **Planning problems**: the delays combined with the modification on the first pilot plan are quite interlinked. Nevertheless, other planning problems were identified: the components of the implementation and maintenance teams, the number of small interventions needed to be carried out, the complexity of the different architectures, etc.

The distribution of best practices on the different categories of problems was quite even (between 14-30%). Nevertheless, the technical problems and the delays are the most typical comments (see Figure 7).

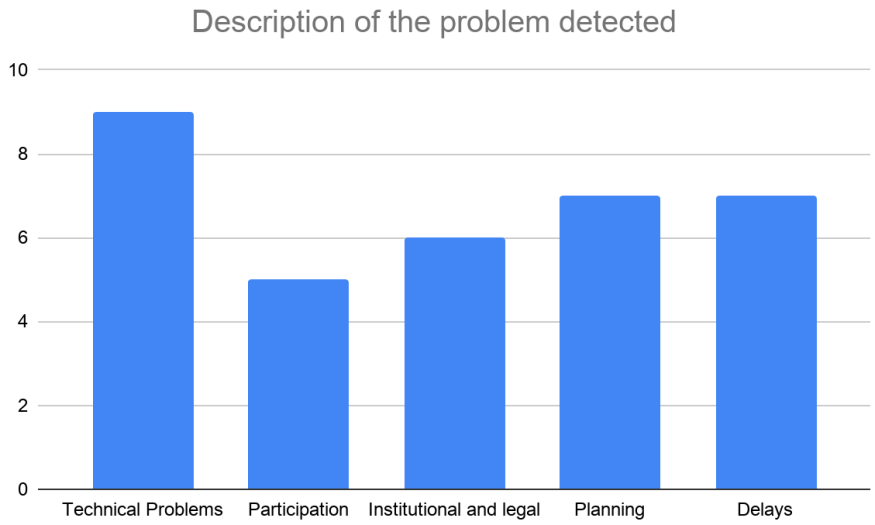

Figure 7. Distribution of best practices by category of problem detected.

With respect to the solutions to overcome the problems, the following categories were found:

- **Involvement of right stakeholders at the right time**: several best practices suggest that different stakeholders have to be involved at the right time to maximize the engagement. Normally, early in the project but not too early as their motivation and involvement could decrease as time passes. In essence, the design-insight would be to involve them whenever project partners have very clear what they want to deploy, a rough idea of the roadmap and the effects they want to observe. In particular, managers, IT staff and end users mentioned such need. In the case of GreenSoul pilot plan, DEUSTO and WSC partners agree that the different changes undertaken in the plan during the project execution did not help in this regard. On the one side, managers sometimes struggled to explain in an assembly to participants, the different interventions as delays in the deployment occurred due to unexpected technical issues. On the other side, some pilots lacked the support of the managers (either their engagement was low because they were not physically present at the building - e.g. Clarion, UK - or there was no pilot manager - e.g. Seville, Spain).
- **Careful planning of the interventions**: one of the biggest problems addressed during the project was the delay in the delivery of several hardware components and issues encountered during the deployment phase which did not allow to keep with the initial schedule of the interventions. Different best practices refer to these problems and suggest different planning or better organization among the involved parties (managers, pilot leaders, technical staff, IT staff, and users) that could have mitigated or reduced some of the issues. Our general lesson learnt is that for research-based projects, it is better to either have the pilots already equipped with ambient and energy sensors or consider to not undertake a large pilot installation by just focussing in small zones of the buildings. Another lesson learnt in this regard, is to fully understand from the very beginning the actions that have to be taken in the pilots as they directly affect not only

employees (recall that they are working and minimal attention thief is a requirement), but also technical and IT staff with usually is not part of the pilot personnel (usually third parties or subcontracting companies).

- **Have a clear commitment from the different stakeholders**: several stakeholders (including partners of the consortium) have not shown a clear commitment and have delayed several stages of the project. Ensure the proper commitment of these people by including them as partners, or provide the project coordinator with instruments to solve these issues were cited as potential solutions.
- **Use of different technical solutions**: During the project, the definition of the solution architecture resulted into a difficult and lengthy process, as we wanted to ensure a modular and versatile solution, well fitting all scenarios. Examples of these discussion were:
    - APP: develop for for the majority (Android) or to all (Android + iPhone)?
    - Back-end: what communication technologies and security profile to access the platform should we use?
    - Architecture: should we use a centralized control and storage architecture or a distributed one?
    - Integration: should we integrate with the previous legacy infrastructure or deploy an isolated but plug and play solution?

  In essence, working with different teams, addressing different technical challenges, or treating with different cultures when having to solve issues, it is something that was already foreseen in the project proposal and the ways to mitigate them. But, we realized that this usually takes more time to solve than what is written in the DoA. The best practices in this regard are:

    - **Try to make the pilots uniform**: this simplifies the technical deployment and eases the maintenance due to economy of scale.
    - **Create good documentation from the start**: do not take for granted that having good internal communication is enough. Teams change and produced artefacts must be well documented to be understood by third parties.
    - **Ensure that the technical staff of the partners are present in the architectural discussions**: this way problems and misunderstandings could be quickly detected and solved in initial stages.
- **Propose a different pilot planning**: several aspects of the pilot planning were identified as problematic:
    - **the number of pilots**: in some occasions we found that there were too many to maintain overall when there was not a technical partner close to the building to sustain the issues and doing the maintenance;
    - **their size**: we found that some pilots were too small to really extract conclusive data from them - only having one or two people interacting with the coasters or

having a poster in their office did not help much to obtain relevant and impactful insights;

- **complexity**: we did not have a uniform building architecture across pilots. Thus, some of them were open spaces and some of them office-based workplaces. Dividing the buildings in zones, isolating the treatments to not have contamination effect or devising the planning was hard as no homogeneity occurred. This hindered the paired tests, as there are many hidden factors that occurs in one pilot and not in others,
- **length of the interventions**: here we found an interesting paradox; the literature on behaviour change interventions suggests that there are little pieces of research that provide long-term actions to demonstrate real behaviour change and that we need to put more emphasis on that in the research agenda. However, we did the pilot plan with this idea in mind but we witnessed that providing a long-term intervention did not change the behaviour of the users as much from the initial months of the feedback compared to the final stages of the intervention. Conversely, we found more engagement at the beginning and a decrement of interest as time and months went by. Of course, we took into account the novelty effect[1], but after this initial period passed, we still found cues of engagement that were decreasing with time. The design-insight for future research would be, either to plan the interventions tightening them to one-two months or providing more features and incentives within the experimental phase to maintain the engagement and avoid energy-efficient behaviour relapse.

The distribution of best practices in the different categories (Figure 8) is even more evenly distributed as the previous case (between 13-24%). In fact, the improvement of the pilot plan and the use of different technical solution seem like less prone to be considered as the most important aspects of a solution with respect to the involvement, planning and commitment of the partners.

[1] Mutsuddi, A. U., & Connelly, K. (2012, May). Text messages for encouraging physical activity Are they effective after the novelty effect wears off? In *2012 6th International Conference on Pervasive Computing Technologies for Healthcare (PervasiveHealth) and Workshops* (pp. 33-40). IEEE.

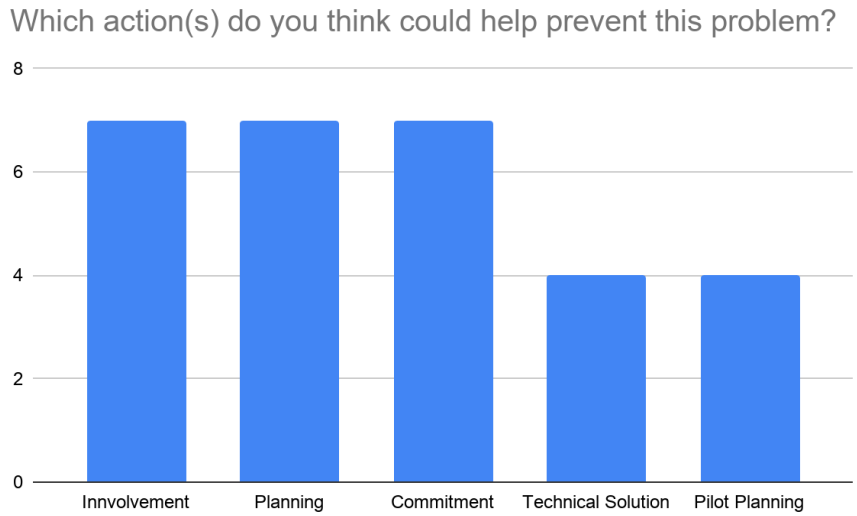

Figure 8. Distribution of best practices by the phase where it appears.

Annexes

A. Best Practices Form

The purpose of the following questionnaire is to collect a) all the problems detected by the stakeholders during the experimental phase of the project, and b) possible solutions that could have avoided the appearance or minimized the effect of these problems.

*Mandatory

1. Description of the problem detected (i.e., administrative difficulties concerning the installation of physical equipment on the premises) *

2. Which action(s) do you think could help prevent this problem? (i.e., involve building managers from the start) *

3. Role of the stakeholder filling the form *
   Select only one.
   - ○ Pilot Leader
   - ○ Developer of GreenSoul treatment/instrument

4. Affiliation of the stakeholder filling the form *
   Select only one.
   - ○ WSC
   - ○ UDEUSTO
   - ○ CERTH
   - ○ CLEANTECH
   - ○ CERES
   - ○ ALLIA
   - ○ 4ER

- WEIZ
- MPH
- ECOLUTION

5. Pilot affected by the problem *
   Select all needed.

   - ALLIA
   - ECOLUTION
   - MPH
   - SEVILLE
   - UDEUSTO
   - WEIZ
   - ALL

6. GreenSoul-ed thing affected by the problem *
   Select all needed.

   - Interactive Coaster (IC)
   - Smart Plugs (SP)
   - Smart Lighting System (SL)
   - Greensoul Information Model (GIM)
   - GreenSoul APP
   - Universal Measuring Device (UMD)
   - WeSave
   - ALL
   - Otro:

7. Experimental phase affected by the problem *
   Select all needed.

   - Preparatory Actions
   - Development
   - Deployment
   - Maintenance
   - Phase out
   - Otro:

B. RAW data

Marca temporal	Description of the problem detected (i.e., administrative difficulties concerning the installation of physical equipment on the premises)	Technical Problems	Participation	Institutional and legal	Planning	Delays	Which action(s) do you think could help prevent this problem? (i.e., involve building managers from the start)	Involvement of stakeholders at the right momment	Plannning in advance	Clear commitment	Different technical solution	Different pilot planning	Role of the stakeholder filling the form	Affiliation of the stakeholder filling the form	Pilot affected by the problem	ALLIA	ECOLUTION	MPH	SEVILLE	UDEUSTO	WEIZ	ALL	GreenSoul-ed thing affected by the Best Practice	IC	SP	SL	GIM	APP	UMD	WeSave	ALL	Experimental phase affected by the Best Practice	Preparatory Actions	Development	Deployment	Maintenance	Phase out
27/09/2019 14:54:31	Connection dropping out between Plugs, BMS and GIM	1					Not sure						Pilot Leader	ALLIA	ALLIA	1							Smart Plugs (SP)		1							Deployment, Maintenance			1	1	
30/09/2019 10:29:05	difficulties with the implementation of the dimmer, connection to the system, some problems with some plugs - not always sending data.	1					involve technicians from the beginning in the project!	1					Pilot Leader	WEIZ	WEIZ						1		Smart Plugs (SP), Smart Lighting System (SL)		1	1						Maintenance				1	
3/10/2019 21:48:04	A problem we faced during the execution of the project was the fact that we could not find enough users to install and use the mobile app. Some of the user were hesitating to use their personal mobile and others did not have compatible mobile phones.		1				An action that could have prevented this would be to provide mobile phones to the users just for the project				1		Pilot Leader	MPH	MPH			1					GreenSoul APP					1				Deployment					
4/10/2019 10:08:37	The installation had to be performed by the technical group of the pilot and not external ones. This created significant delays as it was difficult to find availability.	1					Building Managers should have a specific timeline of the installation as early as possible and book the technicians before hand. Additionally, it would be optimal if there was a reserve plan for maintenance		1				Developer	CERTH	MPH			1					ALL								1	Deployment, Maintenance			1	1	
4/10/2019 10:11:02	Delays in the implementation of critical components (e.g. mobile app)	1				1	As per all technical components all requirements should be defined as early as possible, and the responsible partner should foresee the necessary timeframe to deliver not only initial plans but also update requirements as this is almost certain during the pilot phase of an R&D project.		1				Developer	CERTH	ALL						1		GreenSoul APP					1				Development, Deployment, Maintenance		1	1	1	
4/10/2019 10:12:23	Delay in pilot deployment / delay in phases deployment				1	1	Better planning and pilot partners commitment on the agreed plan.		1	1			Developer	CERTH	ALL						1		ALL								1	Preparatory Actions, Development, Deployment	1	1	1		
4/10/2019 10:15:17	Delays in resolving issues in pilots given the fact that technical support is acquired as a service from third party companies and not from the pilot partner, or even the fact that the pilot isn't directly under the auspice of the pilot partner				1	1	There should be very clear and strict agreements between the pilots, the infrastructure and companies supporting pilot execution from deployment and maintenance, to actual use of provided technologies			1			Developer	CERTH	ALLIA, ECOLUTION, SEVILLE	1		1		1			ALL								1	Preparatory Actions, Development, Deployment, Maintenance	1	1	1	1	
4/10/2019 10:23:57	Difficulty in using the GIM API	1					A swagger should have been delivered along with the API to facilitate integration				1		Developer	CERTH	ALL						1		Greensoul Information Model (GIM)				1					Development, Deployment, Maintenance		1	1	1	
4/10/2019 10:35:13	Not uniform deployment in all pilots in terms of equipment and data				1		It would be best to agree and follow a uniform pilot deployment in order to facilitate deployment					1	Developer	CERTH	ALL						1		ALL								1	Development, Deployment, Maintenance		1	1	1	
4/10/2019 10:40:19	Limited active participation from pilot end-users		1				Pilot partners should appoint a pilot responsible person that will actively monitor all systems as well as end-users behaviour			1			Developer	CERTH	ALL						1		Interactive Coaster (IC), Smart Plugs (SP), Smart Lighting System (SL), GreenSoul APP, WeSave	1	1	1		1			1	Deployment, Maintenance, Phase out			1	1	1
4/10/2019 16:17:19	Manager of the building was not so happy to have interactive coasters on the desks as the internal policy says to clean all the desks every day before going home, not living anything at all other than the work equipment			1			Maybe having something smaller installed or something installed on pc monitor				1		Pilot Leader	ECOLUTION	ECOLUTION		1						Interactive Coaster (IC)	1								Preparatory Actions	1				
4/10/2019 16:22:26	We went on the pilot few times to complete different part of the installation and sometimes we had to turn off the electricity to complete what was planned to do.				1		Probably having a full list of action in advance could reduce the number of times we went on site and limit the disruptions on the pilot.		1				Pilot Leader	ECOLUTION	ECOLUTION		1						ALL								1	Preparatory Actions, Maintenance, Deployment	1	1	1		
10/10/2019 17:44:18	Unfortunately, in the last 3 years there have been a lot of changes, project started dealing with Affinity Sutton (landlord of the building at the beginning), then they merged with another House Association (Clarion), which is now the landlord of the building. We had to deal with different people in Clarion. The person was in contact with us inside the building changed and he handed over the project to another person that unfortunately left for reasons we do not know. Unfortunately, she did not handed-over the project to anyone else. We found out she left the company after a month and from there it has been difficult for us re-explain everything to Clarion especially on the connection to their network to let the GreenSoul technical partners to gather the data and subsequently send the feedback to the tenants of the pilot. Clarion was worried there could be issues with the new GDPR and how the information could be kept saved. We had a meeting between Clarion and some of the technical partners to understand how we could reassure them about the connection to their networks. We proposed an alternative to the IT team of Clarion to our initial proposal. The new proposal had to pass few steps inside Clarion organization before we could have the "green light" and being allowed to get the data. Unfortunately. we were running out of time and we decided to drop off the part of the project related to the individual treatments accordingly with what has been agreed with the other partners; and we started to consider the collective treatments only			1			It is really difficult to say, probably the length of the project did not help as there have been so many changes inside the pilot/organization that we had to deal with different people every time. Not all the people involved in the project inside the pilot were happy to approve something approved verbally by someone before them because in the end they would be responsible of giving the final approval.					1	Pilot Leader	ECOLUTION	ECOLUTION		1						Interactive Coaster (IC), Smart Plugs (SP), Greensoul Information Model (GIM), GreenSoul APP	1												1	
20/10/2019 18:54:10	Lack of separation of roles between the development, implementation and experimental subjects made the results sub-optimal (due to tiredness of the team, lack of specialization and cross-contamination).				1		Involve a bigger team with: clear separate roles and specialist on all task needed to carry on. This way, the team could focus on its particular task and maximize the impact of its knowledge. Obviously, this needs a bigger budget and the inclusion of coordination meeting among the teams that could be or not possible.			1			Pilot Leader	UDEUSTO	ALL						1		ALL								1	Preparatory Actions, Development, Deployment, Maintenance, Phase out	1	1	1	1	1
20/10/2019 19:06:25	Decrease of engagement of end users as time pass		1				The pilot was too long so a reduction of the piloting time could have helped. One or two month most probably would be enough as the users have gotten used to the treatments quite fast and their impact has diminished on the first month. This has most probably be motivated by the lack of "novelties" on the treatments. It was planned to introduce some modification on the treatments as time goes on (at least on the APP and ALL treatments) but the delays in the app render this possibility imposible.					1	Developer	UDEUSTO	UDEUSTO						1		ALL								1	Deployment, Maintenance			1	1	
20/10/2019 19:09:10	There was a restructuring that affect to half of the pilot (dismissals, re-colocations and changes of physical distribution of the pilot).				1		Moreover, even as several meeting to foster the participation on the pilot have been carried out, the interest of the end users have dimished. Involving the building mangers most probably would help on this point but given that these measures are taken even from upper layers of the hierarchy and are taken for other strategic reasons, most probably would not help at all. Moreover, the length of the pilot does not help either.	1					Pilot Leader	UDEUSTO	UDEUSTO						1		ALL								1	Maintenance				1	
21/10/2019 23:35:23	Too many small pilots in too many locations. The combination of several locations, with different setups with small amounts of subjects per pilot (due to the lack of size at the pilot but also of time or budget to create the amount of devices needed) make the pilot phase extremely difficult to carry on. Moreover, as the final number of subjects have been so low, it very difficult to extract statistically relevant information from the geographic distribution of the pilots, render useless have so many pilot distributed across Europe.				1		A reduced pilot with less subject and less pilot that cycle though all the treatments seems to would be best. Not only the physical deployment would have been easier but also the subjects would have had more changes along the pilot that would keep them engaged.					1	Developer	UDEUSTO	ALL							1	ALL								1	Deployment			1		
22/10/2019 0:30:42	The engagement of the subjects decrease over time faster than expected		1				Keep someone with enough motivation and responsibility to "push" energy efficiency at the pilots. This person could not only make an example but also perform engagement actions before and during the experimental phase.			1			Pilot Leader	UDEUSTO	UDEUSTO						1		ALL								1	Maintenance				1	
22/10/2019 0:32:30	Delays in solving technical problems	1				1	On the one hand, a person with technical background should be appointed in every pilot to solve the technical problems that arise. This could be the same person as the responsible to engage the subjects. On the other hand, a continuous monitoring system have to be deployed in all pilot to test that all devices are online and could be used as expected. Finally, provide immediate communication channels to notify the techvical responsible of the pilot about the problems. Consider also to deploy a ticketing system			1			Developer	UDEUSTO	ALL						1		ALL								1	Maintenance				1	
22/10/2019 0:38:42	Some components have not worked when deployed	1					Test all components on the premise with enough time to solve issues as the motivation of the users decrease if the interventions does not work as expected from the start of the pilot.		1				Developer	UDEUSTO	ALL						1		ALL								1	Development			1		
28/10/2019 13:43:58	Difficulties to involve building managers of pilots that are not part of the project as partners and also including a change in the building managers that signed the agreement with the project. A lack of motivation in the participation of the project with no financial support has led to delays in the deployment of the solution in the pilot.			1			Including every pilot as partner of the project from the beginning (i.e. signing the grant agreement) will ensure their participation and involvement in the project implementation.	1					Pilot Leader	WSC	SEVILLE				1				ALL								1	Preparatory Actions, Development, Deployment, Maintenance, Phase out	1	1	1	1	1
28/10/2019 13:52:10	The participation of third parties in the project difficult the running of the project on time. A specific relationship pilot-subcontractor that are not part of the project consortium (neither the pilot nor the subcontractor) risks to delay the implementation of the project with a little scope of action to the partners of the consortium.					1	Previous identification of this potential risky situation can help avoid delays. Agreements of actions (including procedures and Labour Risk plan) between the partner and the pilot that is not part of the consortium can also speed component deployments.	1					Pilot Leader	WSC	SEVILLE				1				Smart Plugs (SP), Universal Measuring Device (UMD), WeSave		1				1	1		Deployment, Maintenance			1	1	
28/10/2019 13:54:18	Problems facing the new GDPR approved during project implementation. The DPO of some pilots (i.e. Sevilla), asked for clarifications about the compliance of the GDPR, requesting certain regulatory exigences that were not included in the current regulation. After several meetings and providing documentation that supports GDPR compliance, the DPO finally approved the beginning of the pilot in their building.			1			Having a budget to deal with data protection in projects that involved personal data. This budget can be used to receive support from external consultancy with experience in personal data protection.	1					Pilot Leader	WSC	SEVILLE				1				Interactive Coaster (IC), Smart Plugs (SP), Greensoul Information Model (GIM), GreenSoul APP	1	1		1	1				Preparatory Actions, Deployment	1		1		
28/10/2019 13:57:17	The IT team of the building banned the use of their IT infrastructure to deploy the system, and a new different network including 4G gateways to connect Seville's subnets with the distant GIM machine was designed and installed.	1		1			Involving the pilot from the beginning as a part of the project consortium.	1					Pilot Leader	WSC	SEVILLE				1				ALL								1	Preparatory Actions, Deployment, Maintenance, Phase out	1		1	1	1
28/10/2019 14:00:26	Delays in the integration of the different components of the project.					1	Direct contact between the developers of the different solutions from the beginning of the project from the definition to the development		1				Developer	WSC	ALL						1		Interactive Coaster (IC), Smart Plugs (SP), Greensoul Information Model (GIM), GreenSoul APP, WeSave	1	1		1	1		1		Preparatory Actions, Development, Deployment	1	1	1		
28/10/2019 14:07:10	Problems with keeping user engagement.		1				More fluent contact with the pilot supervisor and the users with an improved plan for user engagement from the dissemination team.			1			Pilot Leader	WSC	ALL						1		ALL								1	Maintenance				1	
28/10/2019 14:10:31	Delays in the development of the mobile app					1	A better definition of the mobile app with more strict development plan with minimum functionalities and deadlines from the beginning of the projec				1		Pilot Leader	WSC	ALL						1		GreenSoul APP					1				Preparatory Actions, Development, Deployment, Maintenance	1	1	1	1	
28/10/2019 16:01:27	Excessive time from the deployment of some solutions until they are fully operational.	1					Having a dedicated time before the pilot starts to test all the different components on-site.		1				Pilot Leader	WSC	ALL						1		ALL								1	Preparatory Actions, Development, Deployment, Maintenance	1	1	1	1	
		9	5	6	7	7		7	7	7	4	4				2	4	2	5	4	1	13		5	7	2	4	7	1	3	17		12	11	21	21	4
		Technical Problems	Participation	Institutional and legal	Planning	Delays		Innvolvement	Planning	Commitment	Technical Solution	Pilot Planning				ALLIA	ECOLUTION	MPH	SEVILLE	UDEUSTO	WEIZ	ALL		IC	SP	SL	GIM	APP	UMD	WeSave	ALL		Preparatory Actions	Development	Deployment	Maintenance	Phase out