



D7.5 – Joint Pilots and Living Labs Evaluation Report WP7 – Living Labs

25 July 2019

REPORT, VERSION 2.1

Revision: Final

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Keywords: sustainability, urban living lab, energy monitor, household electricity consumption, awareness raising, community building, gamification, Responsible Research and Innovation (RRI), Brussels, Amsterdam, Bergen



EXECUTIVE SUMMARY

The PARticipatory platform for ENergy managementT (PARENT) project was a citizen-oriented research project with the aim to understand attitudes and behavior toward the topic of sustainable energy use. The PARENT project operated across three European cities, linking up Amsterdam, Bergen, and Brussels. We worked with local authorities and citizens to build communities that then collectively seek to reduce household electricity consumption through the use of an energy monitor, knowledge exchange and gamification (engagement) techniques. The pilots occurred over the course of two years, in order to gather data and analyze the impact of information dissemination as well as various community building activities.

The aim of this deliverable is to assess the inputs of each pilot, including similarities and differences amongst them, and the outputs of each pilot, such as data and analyses. This deliverable draws on the Pilot (Brussels D6.2, Bergen D6.4, Amsterdam D6.5), and Living Labs (D7.2-4) reports. Midway through the pilots, during the consortium meeting in Brussels (14 June 2018), we also conducted an exercise to identify common grounds.

The deliverable provides background to each of the pilots and should be read in the context of D1.4, which provided an overview of the legislative and technical issues concerning the energy markets in our three locations. It also describes in detail how the pilots were implemented, and includes information on the living lab methodologies applied in the different locations. The study provides a wealth of knowledge on the different approaches taken to the roll out of the living lab approaches, which were carried out in different ways in the different cities. Finally, the report compares the results of the select questions in the final survey across pilot cities. We have a closer look at how satisfied participants were with the project, the Smappee monitor and app, the project platform, which sustainability changes they made throughout the project, and whether they believe they reduced their energy consumption.

Version Log			
Issue Date	Rev No.	Author	Change
05-07-2019	1.0	Paige Bernecker	First draft
25-07-2019	2.0	Trisha Meyer	Second draft
30-07-2019	2.1	Jamal Shahin	Final draft

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List of Abbreviations

Abbreviation	Description
WP	Work Package
PV	Photovoltaic
EHPC	East Harbour Prosumer Community (Amsterdam)
Partner Abb.	Description
VUB-IES	Vrije Universiteit Brussel – Institute for European Studies
BLP	Blue Planet AC
UU	Universiteit Utrecht
RES	Resourcefully
SVT	University of Bergen, Centre for the Study of the Sciences and the Humanities

1 Introduction

The PARTicipatory platform for ENergy managementT (PARENT) project was a citizen-oriented research project with the aim to understand attitudes and behavior toward the topic of sustainable energy use. The PARENT project operated across three European cities, linking up Amsterdam, Bergen, and Brussels. We worked with local authorities and citizens to build communities that then collectively seek to reduce household electricity consumption through the use of an energy monitor, knowledge exchange and gamification (engagement) techniques. The pilots occurred over the course of two years, in order to gather data and analyze the impact of information dissemination as well as various community building activities.

Throughout the project, partners were regularly updated on pilot and Living Lab developments and experiences were shared for the benefit of the consortium. The aim of this deliverable, the Joint Pilots and Living Labs Evaluation Report (D7.5), is to assess the inputs of each pilot, including similarities and differences amongst them, and the outputs of each pilot, such as data and analyses. With this information we can identify lessons learned that transcend national boundaries. This deliverable draws on the Pilot (Brussels D6.2, Bergen D6.4, Amsterdam D6.5), and Living Labs (D7.2-4) reports. Midway through the pilots, during the consortium meeting in Brussels (14 June 2018), we also conducted an exercise to identify common grounds.

The structure of the report is as follows. Section 2 provides a brief description of each pilot location and notes how the local (political, research, societal) energy debate matters. Section 3 reports how the pilot was implemented in each city. Although each pilot shared common features (Smappee, platform, newsletter, workshops, Living Labs), the scale and emphasis of each pilot differed. Section 4 compares the results of the select questions in the final survey across pilot cities. We have a closer look at how satisfied participants were with the project, the Smappee monitor and app, the project platform, which sustainability changes they made throughout the project, and whether they believe they reduced their energy consumption.

2 Pilot characteristics

2.1 Brussels

The Brussels pilot involved not one, but two local communities: Forest is located close to the city center of Brussels, is densely populated and multi-cultural, and Watermael-Boitsfort lies on the outskirts of the city, adjacent to the forest to the south and east of Brussels. The pilot mainly targeted households as domestic electric consumers. Without pro-actively seeking to include households equipped with solar panels

(prosumers), they were interested and thus included in the pilot as well. The Brussels pilot sought to involve the local authorities and neighborhood councils as much as possible. The pilot was viewed as a joint initiative and their collaboration was crucial for the recruitment of participants and organization of the pilot workshops.

2.2 Bergen

The Bergen pilot covered the area of the municipality of Bergen. Located on the southern-west coast of Norway, it is the second biggest and most populated city of the country. The pilot mainly targeted households as domestic electric consumers. However, as the diffusion of private PVs recently started to increase, the pilot also involved the participation of several prosumer households. The pilot in Bergen involved a hybrid bottom-up and top-down approach for the engagement of local stakeholders.

2.3 Amsterdam

In the Amsterdam pilot, Resourcefully and the Copernicus Institute of Sustainable Development at Utrecht University focused on households with solar energy production facilities (prosumers) on the Borneo island and the East Harbour area of Amsterdam, who wished to install energy monitors to gain insights on their electricity consumption and photovoltaic (PV) production and to then be able to increase their energy autonomy. The pilot in Amsterdam grew by word-of-mouth within a community of houseboat owners docked on the Borneo island, and then later through local promotion in the East Harbour area.

2.4 Comparison

All pilot participants shared the aim to reduce their household energy consumption through energy monitoring and efficiency measures, but the underlying motive and existing local context differed. Equally the local project partner's expertise, recruitment techniques and research interest played an important role (e.g. in which participants to target and which topics to emphasize in newsletters/meetings). In Brussels participants were interested in gaining better insight into their daily consumption patterns to then reduce their energy consumption, but also by extension their electricity bill and their impact on the environment. In the Bergen context, the pilot was framed in a discourse of societal acceptability of technology. Many questions on the usability and acceptability of energy monitors were raised, influenced by the societal debate on smart meter roll-out. The pilot in Amsterdam focused on energy independence, a topic of interest to a local boat owning community and a priority within policy and research circles in the Netherlands. Contrary to Bergen and Amsterdam, there is little public debate on smart meters and

local energy independence (as both are topics myriad with institutional difficulty, although the team noticed a shift towards the end of the pilot).

3 Pilot implementation

3.1 Brussels

The Brussels pilot set out to engage inhabitants in Watermael-Boitsfort and Forest. The project team chose to study these two communes, as they were the communities with interested politicians, who were responsive in wanting to act as a local pilot partner. Recruitment of interested participants began in October 2016 with the first introductory sessions being held in the summer months in 2018. By the close of recruitment and implementation in March 2018, 136 households (representing over 400 individuals) had agreed to sign up to receive an energy monitor and gain access to our project platform; 88 households (representing 294 individuals) managed to install their Smappee; 18 households decided not to install the energy monitor, either for technical (14) or non-technical (4) reasons; and 29 households were non-responsive and did not install the energy monitor. The pilot ran from June 2017 to November 2018.

The Brussels pilot encouraged participants to install the Smappee energy monitors on their own, but this proved challenging in many cases. For instance, not all participants had an electrical plug within convenient distance of the fuse box and often the electrical wires were different colors and far more numerous than portrayed in the installation videos. The Brussels team created additional explanatory guides and videos and solicited the help of two electricians for those who preferred professional installation, but delays in installation were unavoidable.

The Brussels pilot sent tri-weekly newsletters to participants, for a total of 20 newsletters. This was the team's most regular form of interaction with participants. Newsletters contained updates on the PARENT project, a summary of participants' energy consumption in comparison with other households, tips and local events on energy reduction and sustainability. After successful installation of enough Smappees, comparison between participants was added to the newsletters.

The PARENT platform was a critical tool through which participants of the Brussels and Bergen pilots could compare their consumption data with households sharing similar characteristics. In a second version of the tool, participants could also accept sustainability challenges on the platform and potentially win prizes. While the comparison data focused primarily on information provision and community awareness, the challenges were a gamification technique aimed at nudging

participants to action. The platform was thus important for building community and providing a sense of competition/collaboration.

Finally, the Brussels project team organized quite a number of events: eight introduction sessions, three sets of workshops (eight sessions) and three Living Labs. The workshops were complementary to the Smappee, platform and newsletters, in that they provided offline moments to build the community. Participants appreciated being able to interact with the project team and others in a face-to-face manner and discuss how the community works to reduce household energy consumption. In addition to the workshops, three sessions of co-creative Living Labs were organized to receive input and feedback on the recruitment of participants, the design of the Smappee and PARENT platform, and to network with other energy-related initiatives.

3.2 Bergen

The Bergen pilot initially set out to recruit 25 participants. Upon request of the project coordinator and observing a high level of interest following the round of initial invitations, the Bergen team decided to admit additional participants. The Bergen pilot had a total of 57 registered participants. Some were lost during the installation process. By November 2017, there were 43 installed Smappees. The pilot ran from June 2017 to May 2019.

Although a few participants reported having no problems with the Smappees in the Bergen pilot, they were exceptions to the rule. Many needed help from an electrician to install the Smappee. During installation, people experienced problems with fuse boxes that were isolated from the rest of the house, with identifying the right cables (especially in older fuse boxes), and with the Wi-Fi connection. In use, the Smappee had problems recognizing the household applications, and participants had trouble 'teaching' it the differences between appliances. Other problems pertained to what appeared to be wrongful readings of energy consumption, when compared to the energy bill or to results from other, similar, energy monitors. These problems are similar to those identified in the Brussels and Amsterdam pilots.

The Bergen pilot made use of both the comparative and challenges components of the PARENT platform and issued 14 monthly newsletters between October 2017 and January 2019. A typical newsletter contained technical and project updates, tips on energy savings (taken from the Brussels PARENT newsletters) and pointers to upcoming events, especially preparing participants for focus groups.

The main role of the Bergen team within the PARENT project and the Bergen pilot was to elucidate aspects relating to social acceptability, public participation and

Responsible Research and Innovation (RRI). In so doing, the focus, was qualitative, and, in the Bergen pilot, the pilot workshops took the form of focus groups. The Bergen team held one introductory meeting, three sets of focus groups (pilot workshops) and three Living Labs. Each of the three rounds of focus groups focused on three interrelated themes: 1) technical aspects (device installation, energy management platform roll-out), 2) everyday energy practices, and 3) political economy issues, including privacy and data security.

3.3 Amsterdam

The recruitment and implementation of the Amsterdam pilot were divided over two time periods. The project was first launched on the Borneo Island, where the team met with potential participants (i.e. prosumers) and provided information about the pilot. Between March 2017 and October 2017, the project team recruited participants, installed Smappees, built community, and launched a prosumer platform. Due to limited prosumers on Borneo, participation was extended to households in the East Harbour of Amsterdam. The project was implemented in the East Harbour between November 2017 and May 2018. The Amsterdam pilot had a total of 30 participants, 27 of which were able to successfully install the Smappee and received digital personalized messages. The pilot ran from March 2017 to May 2019.

The Amsterdam pilot helped participants install the Smappee energy monitor in their households, though the project team did encounter technical and logistical problems. As a result of these problems, the team developed an installation protocol before arranging visits with participants.

The Amsterdam project team found the Smappee to have limited gamification elements in its application. In order to engage participants using gamification elements, the Amsterdam team developed the East Harbour Prosumers Community (EHPC) online platform (<https://prosumers.nl/>). This platform allows every participant to log in and visualize his/her individual energy-related performance and the performance of the whole community. Gamification elements include dashboards about individual versus community consumption, PV self-consumption/self-sufficiency, comparisons with average performance in the community (compared to households of a similar type), challenges, levels and rewards.

With support of the EHPC platform, the Amsterdam team was able to automatically send monthly newsletters about participant performance in terms of total monthly PV energy produced, total monthly electricity consumers, self-sufficiency ratio and a comparison with the average daily consumption in the community. The newsletters were used to keep participants informed, as the team found that some participants

used the platform less frequently than others. In addition to the monthly newsletters, bi-yearly messages were sent to participants which informed them on any project updates, platform developments, events, workshops, tips and advice.

Finally, the Amsterdam pilot held one introductory meeting and two Living Labs for participants. The introductory meeting (two sessions) informed participants about the Smappee, community building process, and project expectations. The first Living Lab (two sessions) allowed participants to discuss their experience with the pilot. The second Living Lab (two sessions) consisted of project updates, participant feedback, and launch of the web-based EHPC online platform.

3.4 Comparison

<i>Timeline</i>	
Brussels	June 2017 – November 2018 (18 months)
Bergen	June 2017 – May 2019 (24 months)
Amsterdam	March 2017 – May 2019 (26 months)

The time period of the pilots (from the introductory to final meetings) ranged from 18 months in Brussels to 26 months in Amsterdam. In all cases, the pilots proved to be more time intensive than originally anticipated. Especially the recruitment and installation phases of the pilots required additional effort. In practice this meant that participants gradually joined during the first half of the pilots, and that the installation of the Smappee in individual households overlapped with the community building aspects of the pilots (platform, newsletter, workshop, living labs).

<i>Participants</i>	<i>Number of participants</i>	<i>Number of installed Smappees</i>	<i>Prosumer</i>
Brussels	136	88	12
Bergen	57	43	4
Amsterdam	30	27	27

The scale of the pilots ranged from 136 participants in Brussels to 30 participants in Amsterdam. 158 Smappees were installed and active during the course of the pilots. While in the Amsterdam pilot all participants were prosumers, in the Bergen and Brussels approx. 10% of the participants owned solar panels.

<i>Tool/Activity</i>	<i>Smappee</i>	<i>Workshops & Living Labs*</i>	<i>Newsletters & messages</i>	<i>PARENT platform**</i>	<i>Facebook group</i>

Brussels	Yes	19	20	Yes	Yes
Bergen	Yes	8	14	Yes	Yes
Amsterdam	Yes	6	25	No	No

*Number of events held during the pilot, including introductory meetings, workshops and Living Labs.

**Amsterdam utilized an online platform; however, it was not the PARENT platform.

As is clear from the descriptions and the table above, the pilots shared many similar features. Every pilot installed the Smappee energy monitor, used a community-centric online energy management platform, sent newsletters, and organized workshops and Living Labs. The PARENT project sought to combine awareness raising, community building and gamification in order to reduce household electricity consumption. It is worth highlighting two differences related to measures over the course of the pilots.

First, the frequency and nature of the meetings varied between the Brussels (19), Amsterdam (6) and Bergen (8) pilots. Given that the Brussels pilot was spread over two communes in different parts of the city and sought to engage with 136 households, each meeting needed to be organized on multiple occasions and in multiple locations (and in multiple languages). Moreover, the early pilot workshops and living labs in Brussels had demonstrated a need for pointing citizens to the multitude of available resources in the city. As a consequence, the second workshop was co-organized with a citizen-oriented government organization focusing on energy reduction, called Homegrade, and networking was strongly emphasized in the subsequent Brussels Living Labs (and final conference).

Second, the Amsterdam pilot built their own online platform, which also contained comparative data and sustainability challenges. Thus the EHPC (Amsterdam) and PARENT (Bergen, Brussels) platforms share basic features. However while the first focused on gamification features for a technically advanced prosumer community, the latter has a simplified comparison layout and more extensive functionalities for engaging in challenges.

4 Pilot results

4.1 Overview

At the end of the pilot, participants were asked to complete a final survey on their experience with the project. The survey consisted of four sections, measuring general impressions of the project, satisfaction and use of the Smappee monitor and application, satisfaction and use of the PARENT platform, and sustainability changes

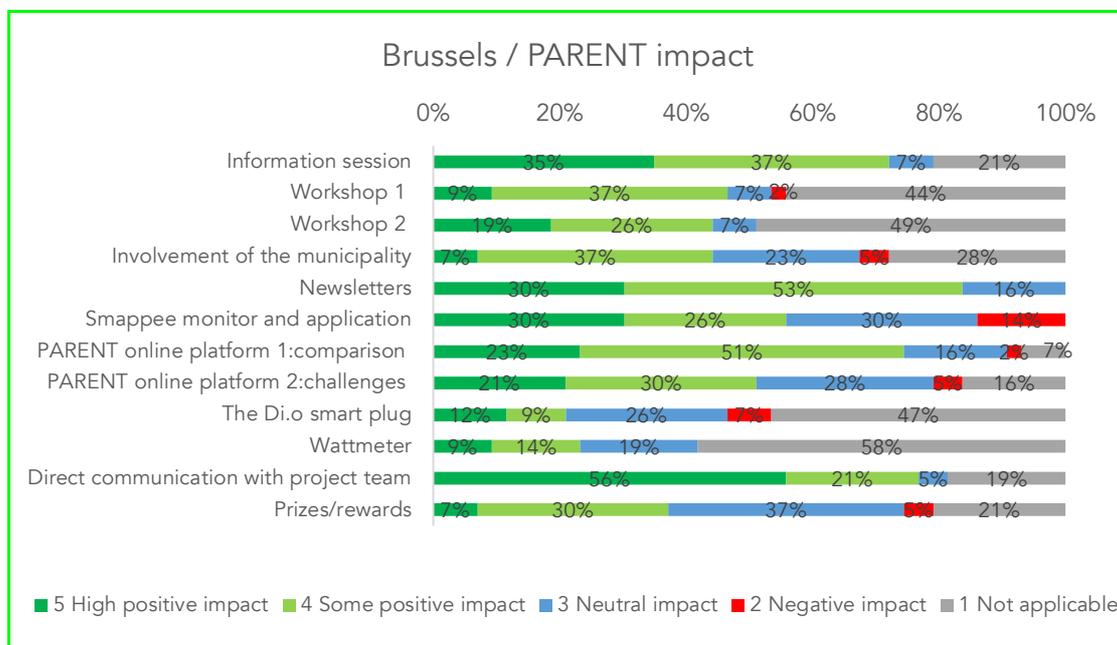
PARENT is an initiative of [JPI Urban Europe](#)

made during the project. This section compares the responses of participants in all three pilots to select questions in each of these sections (9 out of 27 questions). We gathered responses from 43 out of 88 participants with installed Smappees in Brussels; 12 out of 43 installed Smappees in Bergen; in Amsterdam 11 out of 27 participants with installed Smappees in Amsterdam.

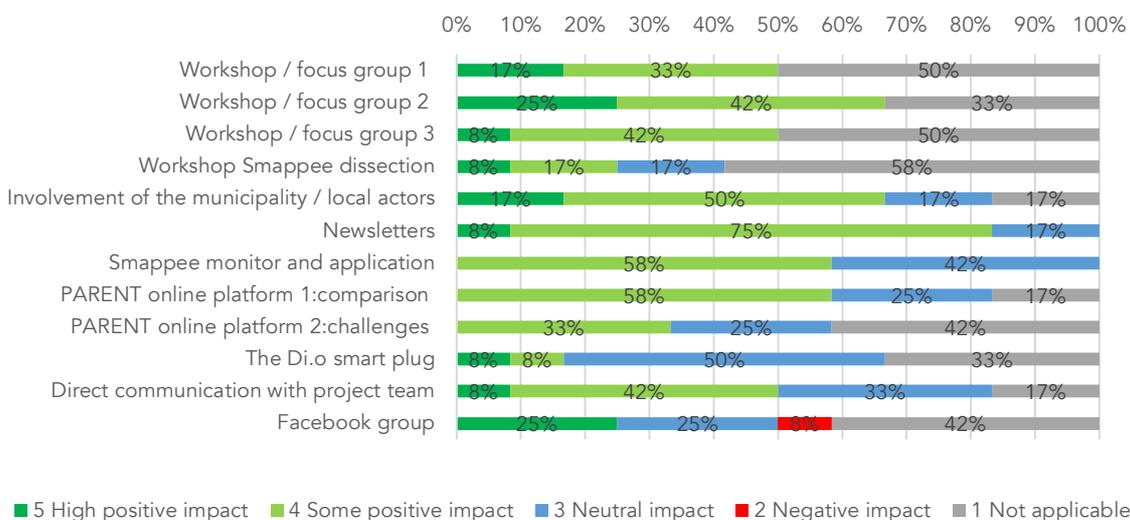
The following set of charts represents the results to the questions posed in the survey. The analysis of these data forms the Conclusions to this report.

4.2 General impressions of the PARENT project

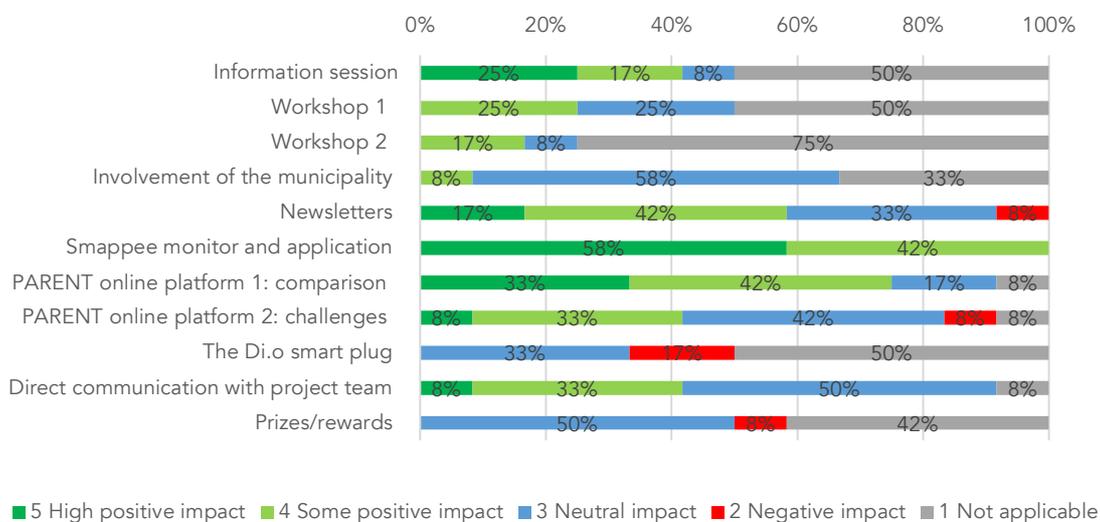
Please rate the importance of each PARENT measure in adopting a sustainable lifestyle.



Bergen / PARENT impact

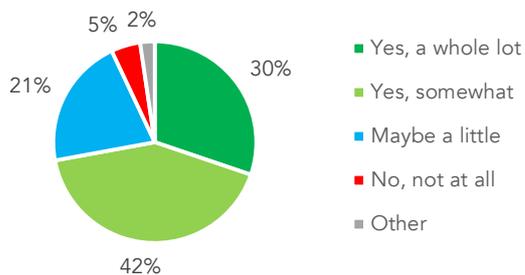


Amsterdam / PARENT impact

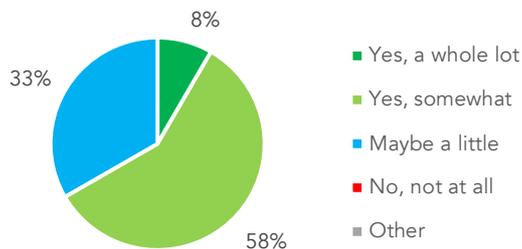


Do you feel like you learned something?

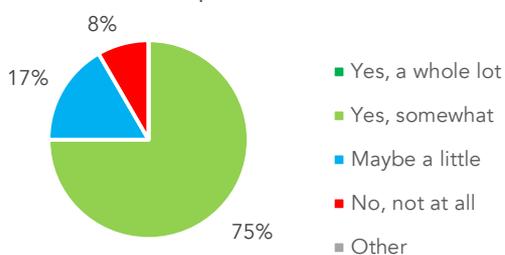
Brussels / Learning experience



Bergen / Learning experience



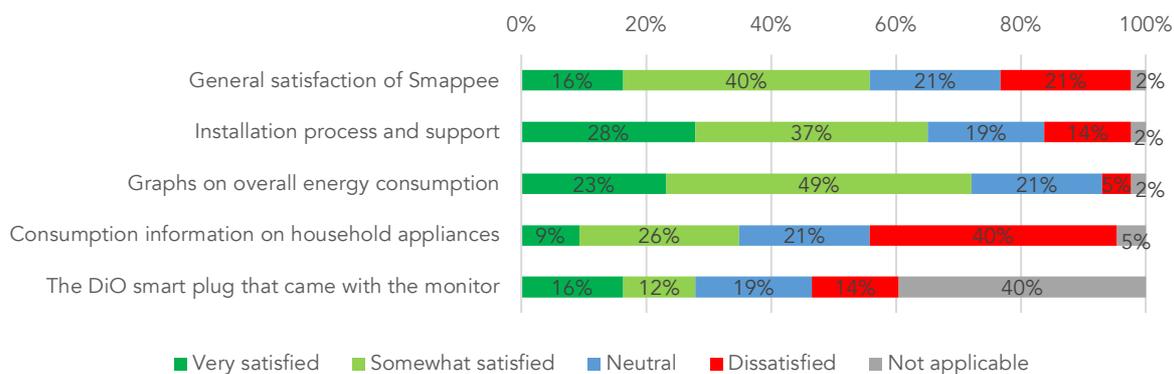
Amsterdam / Learning experience



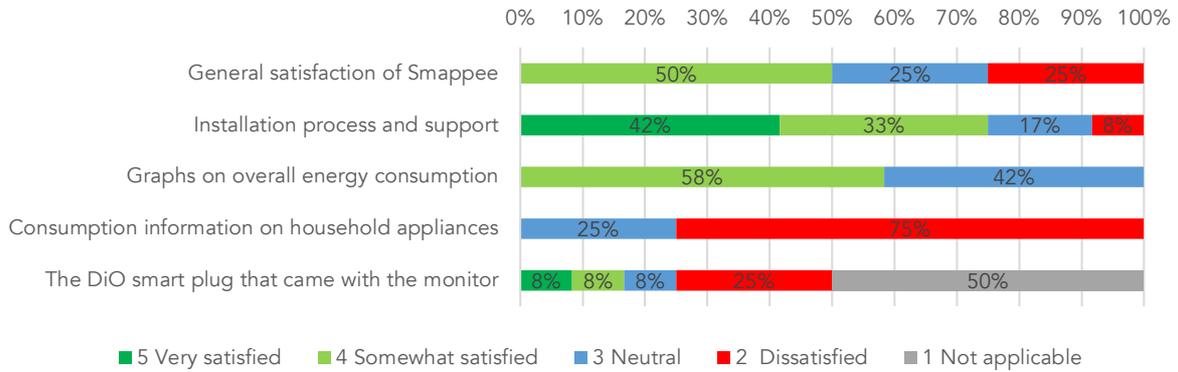
4.3 Use and satisfaction with Smappee monitor and application

How satisfied were you with the Smappee monitor and application?

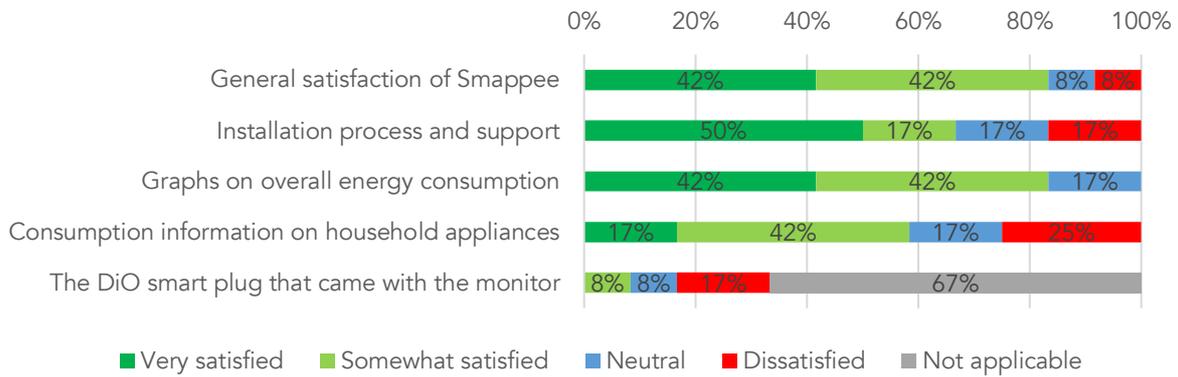
Brussels / Satisfaction with Smappee



Bergen / Satisfaction with Smappee

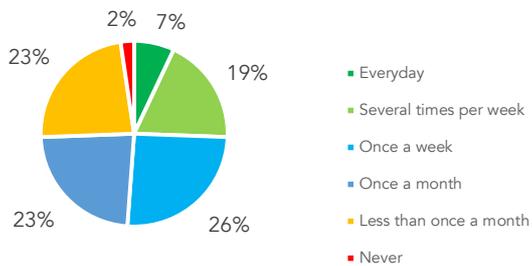


Amsterdam / Satisfaction with Smappee

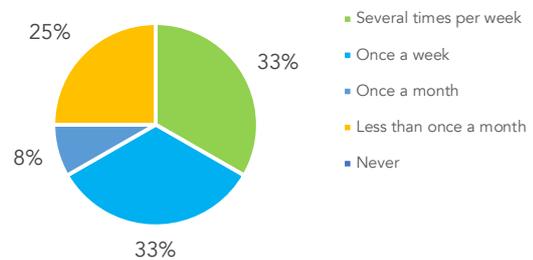


How often do you look at your Smappee application on your phone or computer on average?

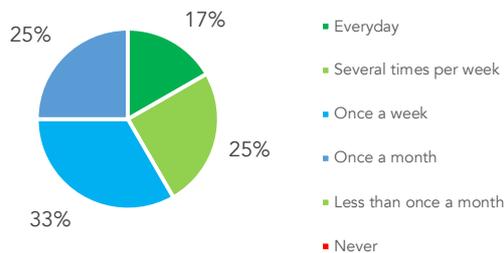
Brussels / Frequency of use of Smappee



Bergen / Frequency of use of Smappee



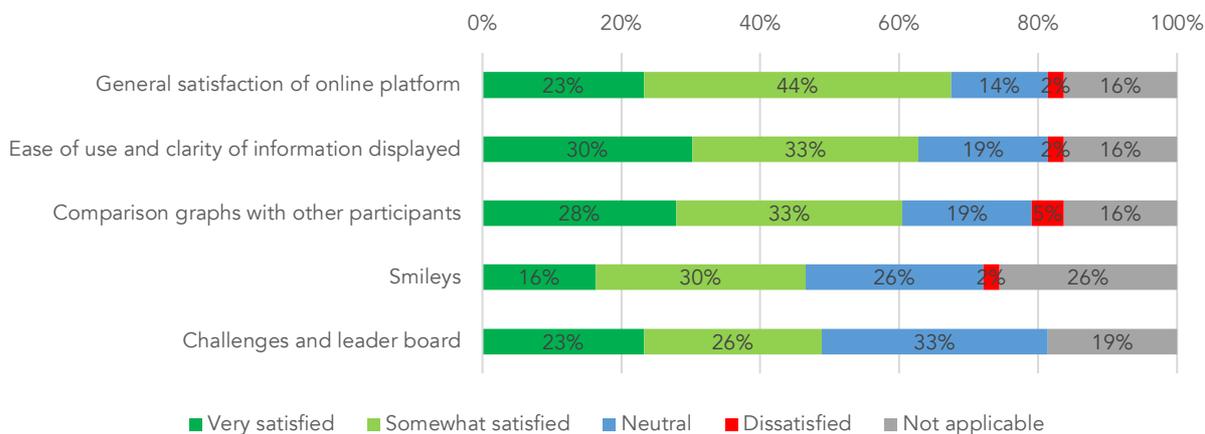
Amsterdam / Frequency of use of Smappee



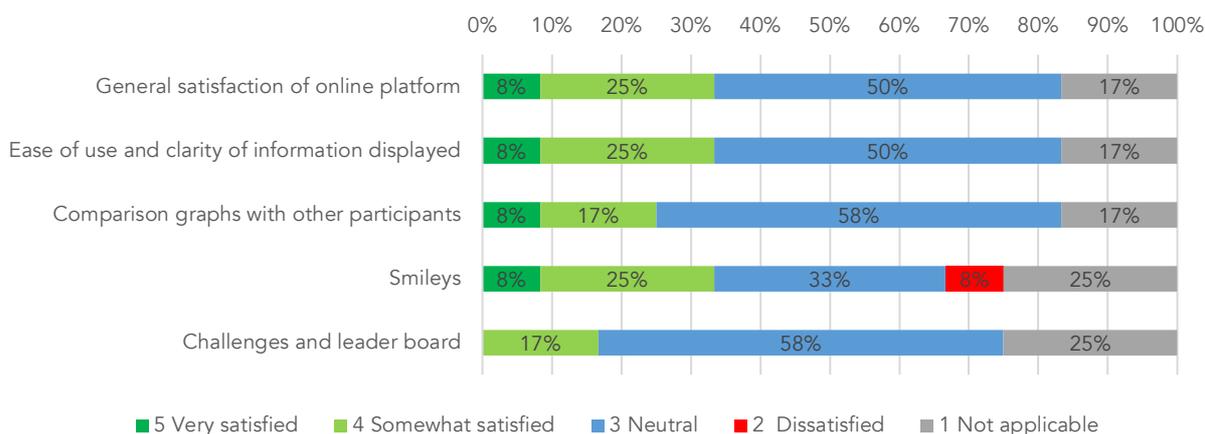
4.4 Use and satisfaction of the online platform

How satisfied were you with the PARENT/EHPC online platform?

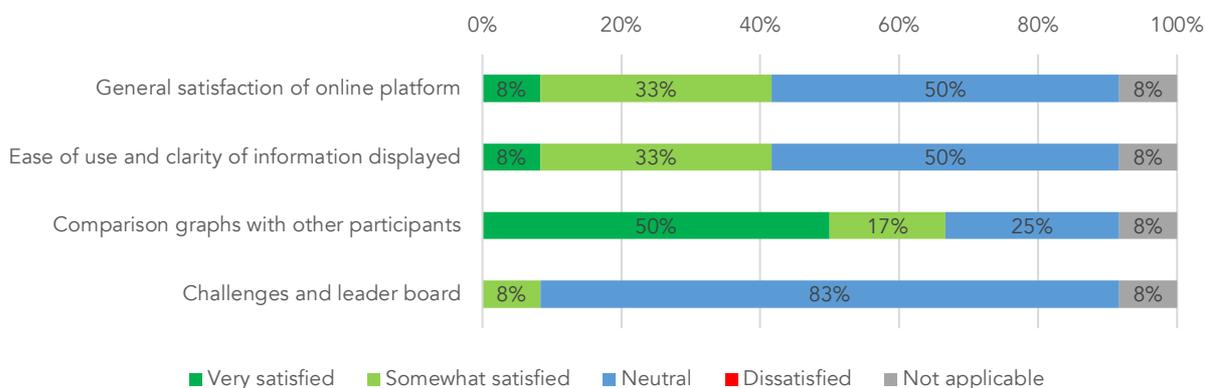
Brussels / Satisfaction with PARENT platform



Bergen / Satisfaction with PARENT platform

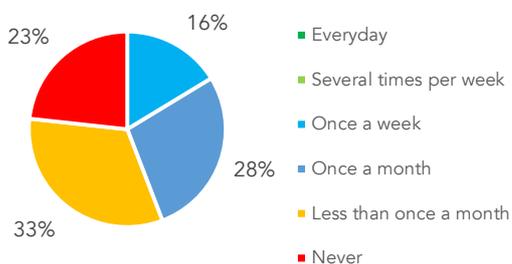


Amsterdam / Satisfaction with EPHC platform

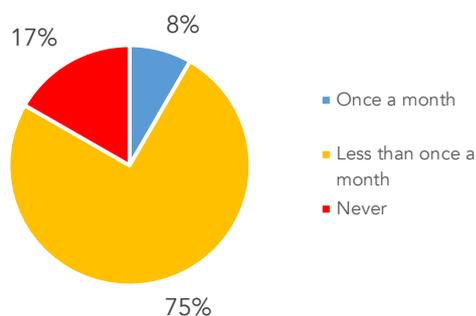


How often did you look at the PARENT/EPHC online platform on your phone or computer on average?

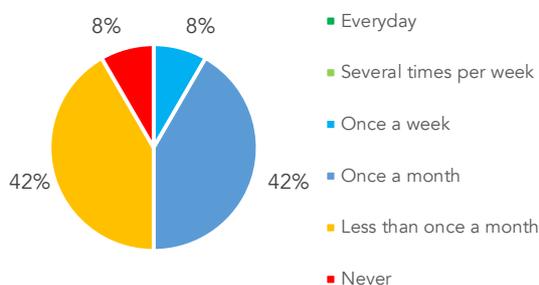
Brussels / Use of PARENT platform



Bergen / Use of PARENT platform

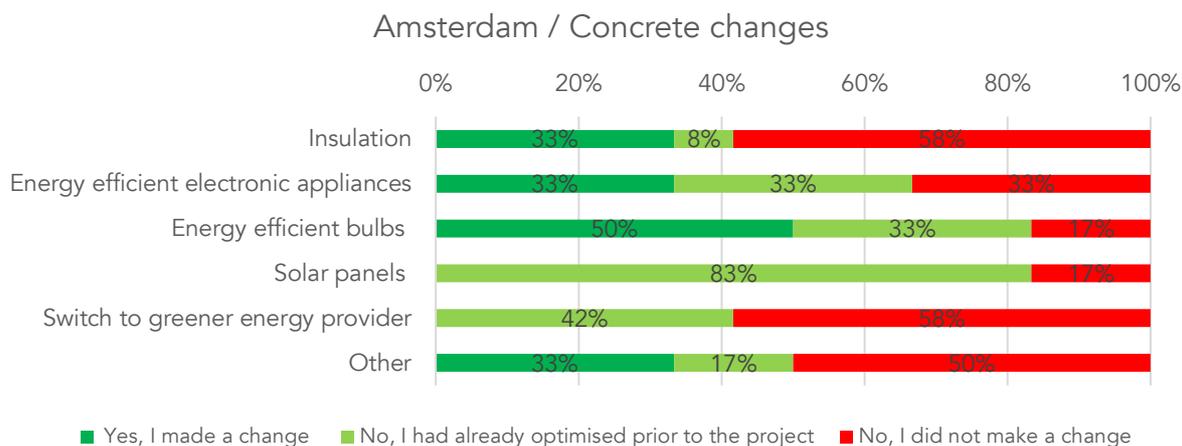
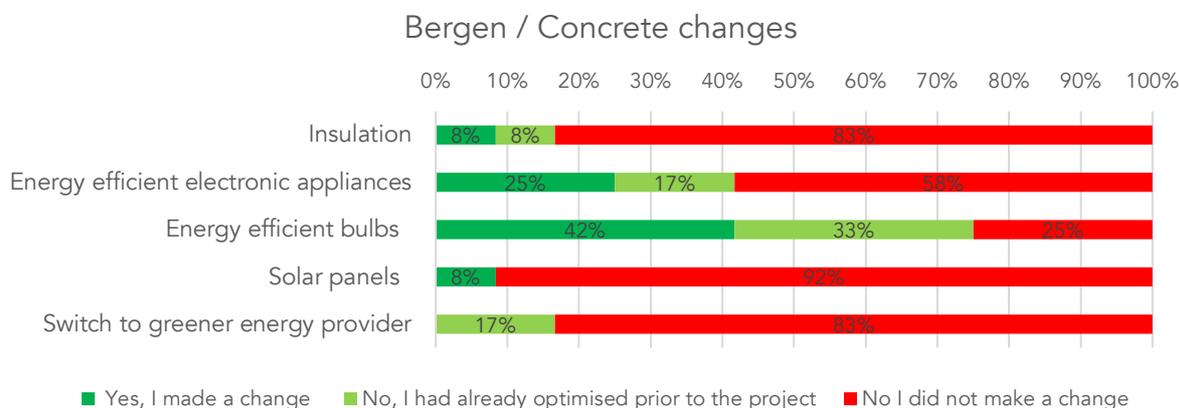
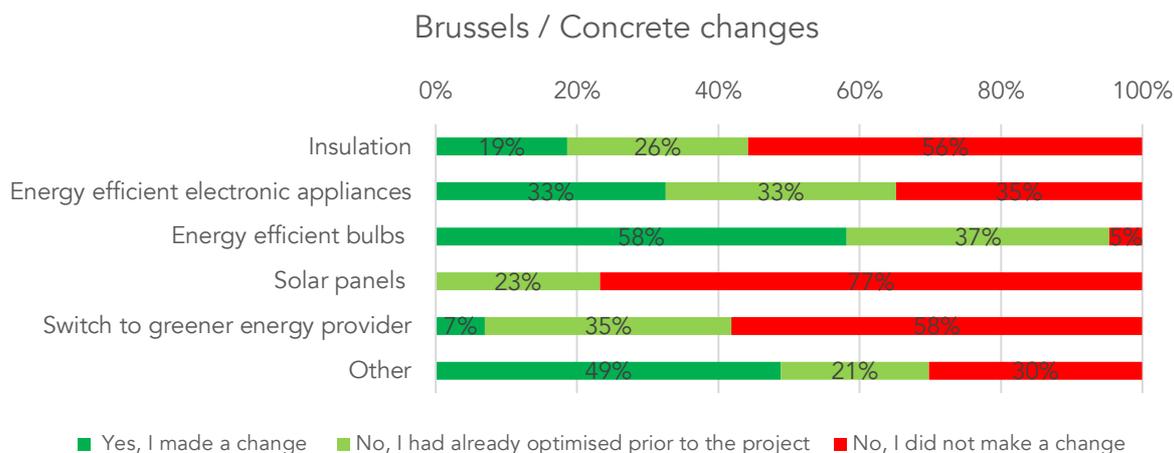


Amsterdam / Use of EPHC platform



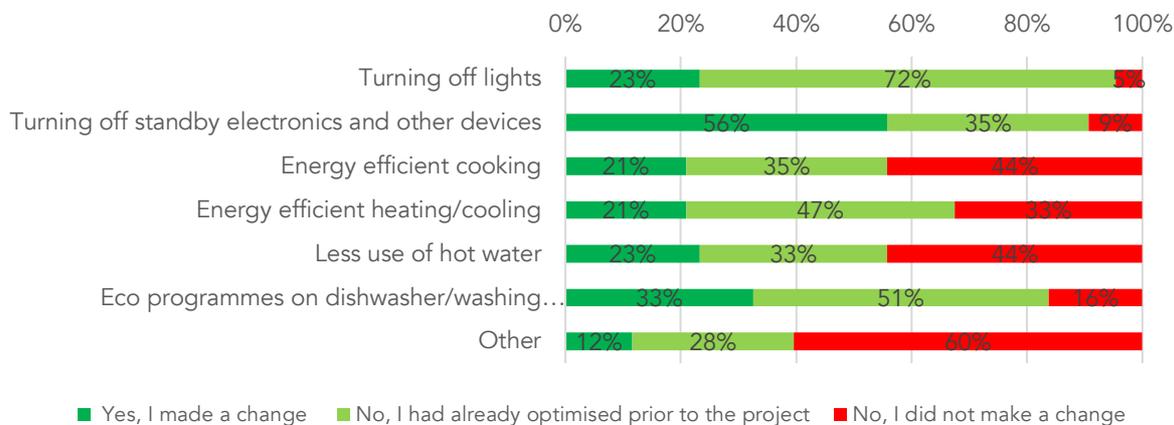
4.5 Changes made during the project

Did you make concrete changes to your home?

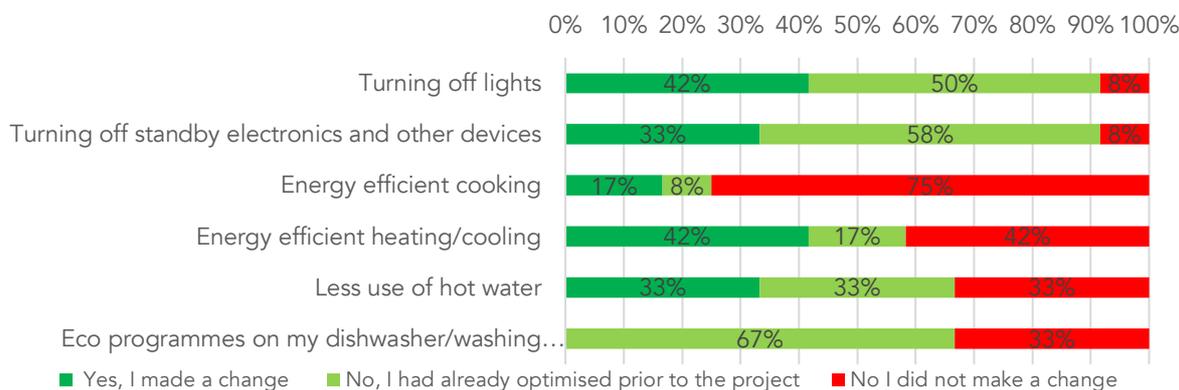


Did you make behavioral changes to your lifestyle?

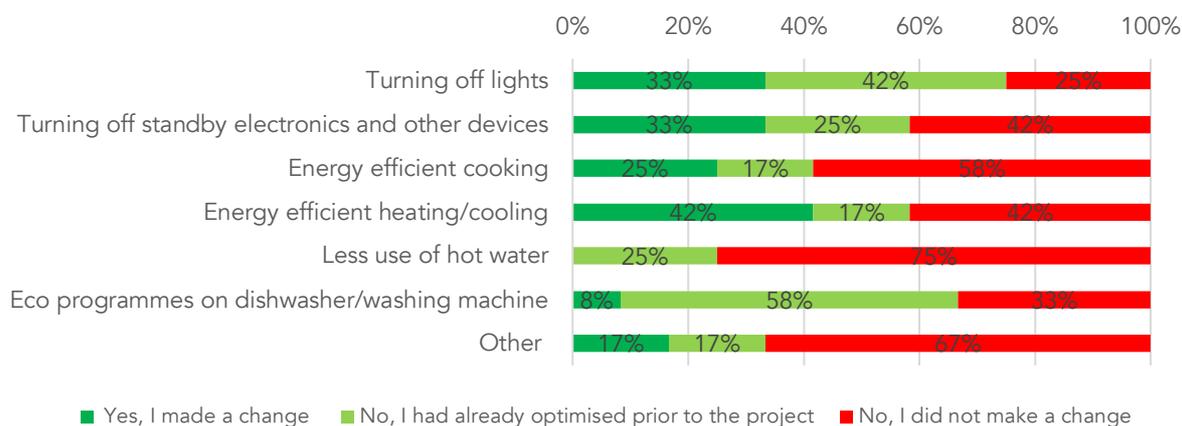
Brussels / Behavioral changes



Bergen / Behavioral changes

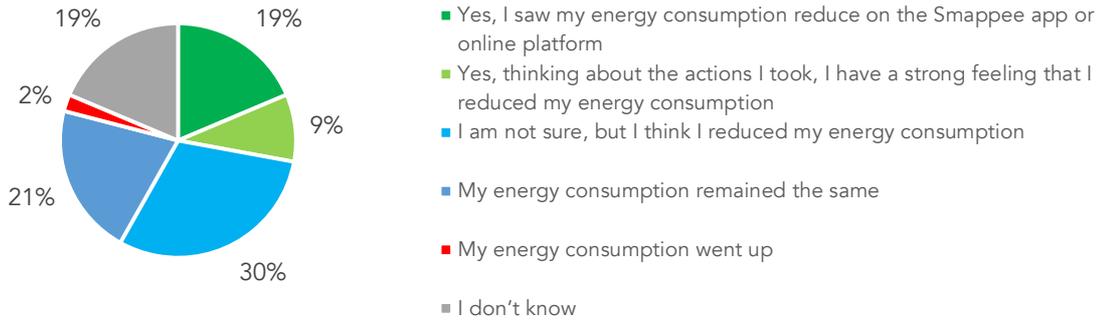


Amsterdam / Behavioral changes

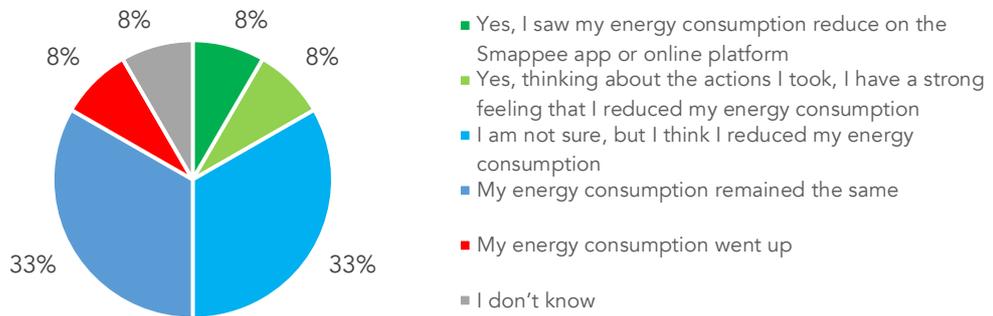


During the project, did you notice a reduction in energy consumption in your home?

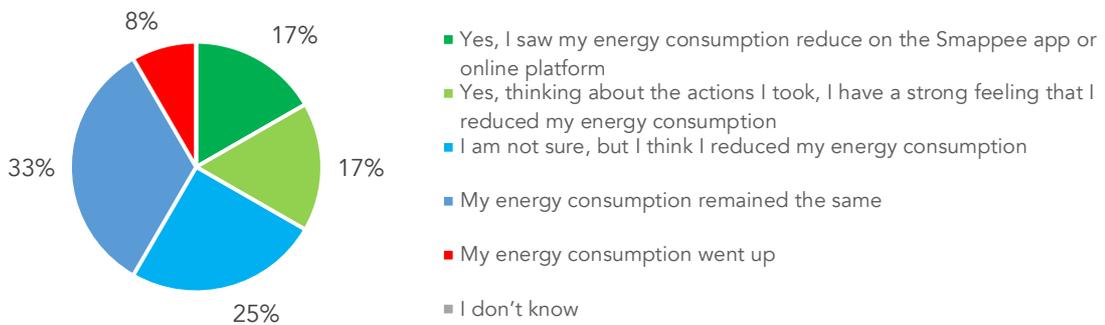
Brussels / Energy reduction



Bergen / Energy reduction



Amsterdam / Energy reduction



5 Analysis and Conclusion

Several conclusions can be drawn from the data presented in this report. Whilst it is very difficult to paint a comparative picture across the three locations for the pilots and living labs, it is possible to infer a number of factors that influence the

engagement of stakeholders and the impact of the activities. We can derive this, in part, from the differences in approach to pilot and living lab that were taken across the three countries. Furthermore, the social and environmental context plays a role that forces us to be careful about any conclusions that we wish to draw across all three locations. Not only energy costs, but also energy requirements are dramatically different across all three areas, with Norwegian participants consuming up to ten times more electricity, on average, compared to their Belgian and Dutch counterparts. Furthermore, energy in Norway is generally 'green' by definition (hydroelectric) and costs remarkably less than in our other target countries.

All locations have shown that there is a trend towards energy efficiency in the home, and that this has been carried out either during, or prior to, the pilots. This may be related to the way in which recruitment for the pilots developed: in Bergen, engaged communities were targeted, in Amsterdam, a small base of prosumers provided the 'core' of the participant base, and in Brussels, information about the PARENT project pilot was disseminated through the local municipality newsletters and 'street fairs' that had a clear environmental focus. It would be fair to say, thus, that all participants in the project already had a 'tendency' to focus on environmental or energy-related issues. Having said that, the project was still able to have a positive impact, even on these most informed/aware individuals and households. A large number of participants have reported that they have been (probably) positively affected by their participation in our project (58% in Brussels, 49% in Bergen and 49% in Amsterdam). Many of our participants were already aware of their 'environmental responsibilities' but did make changes in their behaviour during the lifetime of the pilots. Concrete changes, requiring substantial (financial) investment on the part of the participants, were also carried out, but to a far smaller degree.

There is a clear correlation shown between the engagement levels of the participants and the number of contact moments that are generated by the project team. In Brussels, 19 events were organized, and this level of engagement appears to have stimulated a clearer level of interest in the project's activities. 30% of Brussels pilot participants claimed to have learned something from the project, whereas this was substantially lower in Bergen (8%) and Amsterdam (0%).

When considering the technology that was provided as part of the pilot project, several conclusions can be drawn. In terms of the device used to collect data (the Smappee), there was a mixed review. As noted particularly in Bergen (see PARENT report: D6.4, Bergen Pilot Report), and in Brussels (see PARENT report D6.2, Brussels Pilot Report), there were substantial technical difficulties connected to the installation of the devices. The first conclusion is that technology does not always 'work as

advertised'. However, in the cases where installation worked, the participants report that they viewed the device positively. A large majority of participants viewed the interface to the Smappee once per week or more (52% in Brussels, 66% in Bergen and 75% in Amsterdam). The added feature of the PARENT Project, the PARENT Platform, was viewed positively as well. In Brussels and Amsterdam, the key feature of the platform (comparison graphs with other participants) was positively viewed. Perhaps telling of the level of non-online interactions between participants, the Brussels participants (where interaction was disparate – i.e. amongst relative strangers – but frequent) positively viewed the challenges and leaderboard, whereas the more tightly-knit community in Amsterdam (most participants were in one specific quarter of the city, and thus met frequently) rated the leaderboard much lower in terms of satisfaction.