Personal Energy Administration Kiosk Application

An ICT-ecosystem for Energy Savings through Behavioural Change, Flexible Tariffs and Fun

Contract No 695945

Deliverable D4.3

Report on possible improvements

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V2.0	31/10/2019	Final version	Integration of comments from PO and monitors

Table of contents

Description of work

Based on the experiences collected throughout the field tests, including consumer response at the retailers service centres, and considering the results of D4.1 and D4.2, possible improvements of the ICT-to-Human ecosystem are described in this report. This deliverable is targeted to 1) the energy retailers, 2) the software developers and 3) the customers. The provided suggestions for improvement of the use, further development as well as application of the overall system allows to build up on PEAKapp experience and implement an even more advanced solution for household electricity management.

Table of figures

1. Introduction

PEAKapp project created and tested with more than 2,500 households in Austria, Latvia, Estonia and Sweden, a unique ICT system to sensitize consumers to their energy consumption and motivate households to adopt and sustain behavioral changes through different incentives including dynamic prices, social comparison and serious gaming.

While the key functionalities of the app remained similar across the four filed test markets, already at the early stage we observed some differences which had to be taken into account in both app design, software development and further implementation of field tests. The field test of PEAKapp mobile application in Austria was the longest lasting over 69 weeks and involved the largest number of households – 1,589. However, the recruitment procedures were more effort- and time-consuming as expected due to country-specifics. In In Estonia, Latvia, and Sweden, where opposed to Austria digital signatures are commonly used, the recruiting process could be fully integrated in the download process and initial usage of the app. This is favourable, since participants do not experience a time gap between registration for the field trial and the provision of app. Further on, in the case of Sweden due to market specifics the roll-out could only take place a year after the start of PEAKapp tests in Austria.
Additionally, the mobile application functionalities in Latvia, Estonia and Sweden were also adapted to the specifics of the market. All PEAKapp test users, in these countries, agreed to supply contracts closely related to day-ahead spot-market prices and, therefore, had 24 different kWh prices per day. This leads to conclusions that while implementing such solutions as PEAKapp in different European countries, the heterogeneity observed in electricity market development and related regulatory practices should be taken into account.

While the PEAKapp was tested with the desired and even exceeding number or households in the four countries and main functionalities were similar across the countries a solid understanding of local market conditions is required for further implementation of PEAKapp in other countries in order to avoid possible delays, supplementary costs or customers complaints.

In this report based on lessons learned from PEAKapp field tests, we focus on the three key actors perspective about the possible improvements, namely electricity provider, software developer and customer perspective. One of the major improvement except an easier and potentially more unified recruitement procedures is the login function. Based on the call-center reports, as well as data collected from a post field test survey in Austria this was a major obstacle for consumers to continue using PEAKapp. In the following sections the improvements from the three perspective are described in detail with suggested potential solutions. Conclusions are given in the end.

2. Possible improvements of PEAKapp system and field test procedures

2.1 Energy retailers perspective

2.1.1 General Issues

A potential improvement from the energy retailer side is a better and faster communication with customers. While PEAKapp has a possibility for a two-way communication, communication was implemented (mostly) in form of a call-center, which is discussed bellow. However, a possibility to communicate via app would be a faster and more cost-efficient way. Such built-in communication would allow providing households also with some general

information – explaining how data from their smart meters works and how it is handles, why there are sometimes gaps in the consumption data, etc. Providing such information exchange through app would increase customers' understanding of electricity market and services in general and would help electricity provider to support customer relations in a modern and cost-efficient way.

The call-center, which was created as a support line for PEAKapp customers in order to help solve the appearing issues and have a personal contact with customers was probably a suitable solution for a test pilot. However, for a further market development of PEAKapp it may be replace by a 24 online support. Such solutions with help of bots are now being widely implemented in mobile applications and internet shops. The majority of customer calls were related to forgotten password, which can be easily automated and resolved without call-center and human involvement. The second most- popular call was related to some functions of the application – for instance, how exactly the discounts works and how there are calculated, after preparing such information on the basic functions of the application, responding to such demands can also be automated and answered online without call-center. Further on, as the call-centre only worked during working hours - there was no support on weekend or holidays when consumers would actually have time to use the application more and leading to a certain delay in receiving the information if a certain bug or application fail happened for a certain consumer.

2.1.2 Issues specific to the version applied in Austria

As discussed in Del4.1 recruitment procedures varied across the four countries where PEAKapp was tested. While recruitment procedures should comply to European and local regulation practice, easier and faster recruitment methodology will allow to maximize the number of participating households and also facilitates the work of energy supplier who in the Austrian case had to execute the recruitment in three tranches including emails and post recruitment in order to comply to all the regulations.

2.1.3 Issues specific to the version applied in Estonia, Sweden and Latvia

220E plans to extend the self-service capabilities of the application analytics in Estonia, Latvia, Sweden (and Austria, their newest field of operation since early 2019).

There are three major areas where the app shall be improved in the near future:

- Integrate gas and central heating energy data analytics and develop automatic energy auditing and benchmarking system. This will require advances in digital metering across these markets, and supporting EU policy is needed to exploit these potentials to let the app become a holistic energy data terminal.
- Integrate real-time tariffs and energy usage data with third-party smart home providers to capture the demand flexibility potential. Such a functionality of the app would allow 220E the transformation from a mere energy retailing company to an aggregator with numerous new business opportunities.
- Improve our peer-to-peer renewable energy trading solution for private customers. Such peer-to-peer trading of distributed electricity generation will most likely become an important form of citizens cooperation on energy matters, additional to the ones

emphasised in the Renewables Directive from 2018 and the Electricity Directive from 2019.

2.1 Software developers perspective

The heart of PEAKapp are consumers and their data. So the application is not possibile without these two components. The first step for app implementation – recruitment of consumers is mostly related to the electricity provider, while the second - data transfer - involves both utility and software developer and even to some extend research partner. This step is usually difficult due to heterogeneity in IT systems and data recording and storage of the mentioned above parties. In order to avoid potential pitfalls and misinterpretations of the data and related delays in application functioning, a careful research and description of data transfer related activities, protocols, etc should be conducted, with participation of IT specialists from all the involved parties. Further on, the specific aspects related to electricity consumption should be communicated to software developers by utility providers to take into account in the application developments at early stages – potential change of tariffs and how to control for this, several meters, the usual reading times of the meter.

As mentioned in the energy utility perspective, most frequently repeated consumers' request and complaint was related to forgotten password and inability to login. After update of the app the option forgot my password stopped working, so the new password reset had to be executed manually and only happened for household that called the call-center. For further development of PEAKapp, the login procedures should be improved including login with finger print login, which is possible in most app possible nowadays. This might also require increasing the time for internal tests with 'friendly users' especially taking into account the updates of the application and functioning on several different systems.

Another, key improvement would be a better built-in system of bug/failure notifications. During PEAKapp test like with any other pilot test of an application there were an episodes when app was not working or consumption data for several users was not recorded or shown in the application. For such cases an automated notification system for software, researcher and utility provider are required, which were not designed in PEAKapp. Building such system of alerts will improve usability of the application and decrease delays in execution of possible solutions for the mentioned above issues.

A further possibility to improve PEAKapp is the push-notifications, which were constructed to transfer information about discounted price. However, during the field test, but even more in the future market uptake, the push-notification can be used as a way to communicate non-price related information to consumers, which was difficult in PEAKapp case.

2.2 Consumers perspective

As stated in Deliverable 4.1 PEAKapp users demonstrated and unexpected long-lasting interest and persistent engagement with the app. Based on data from Austrian field tests 80% of households who had access to PEAKapp, used the application at least once during the field tests, 12% used the application at least once during each month of the field tests which lasted 16 months in Austria.

The consumers perspective for PEAKapp improvement is based on two sources of data: call-centre records, which are already discussed in previous section and a survey conducted after the end of field tests with PEAKapp users as well as with control group households, for which only the socio-demographic information was collected within this survey as they did not have access to PEAKapp.

Additionally to login issues and requested information on the functionalities of PEAKapp, which were the top two reasons for call-centre requests, we collected information about further functions, main issues as well as ranking of usefulness of PEAKapp functionalities. The presented results are based on answers of 255 PEAKapp users from the two treatment groups, except for push notifications' assessment which is based on 144 respondents from the treatment group with discounted prices. Looking at the results in Figure 1, we find that the majority of consumers' who answered the post-survey found Analysis page which reflected household electricity consumption very useful, followed by Benchmark and energy saving tips. The only function that was perceived as not useful by a significant share of respondents (38%) is the PEAK poker.

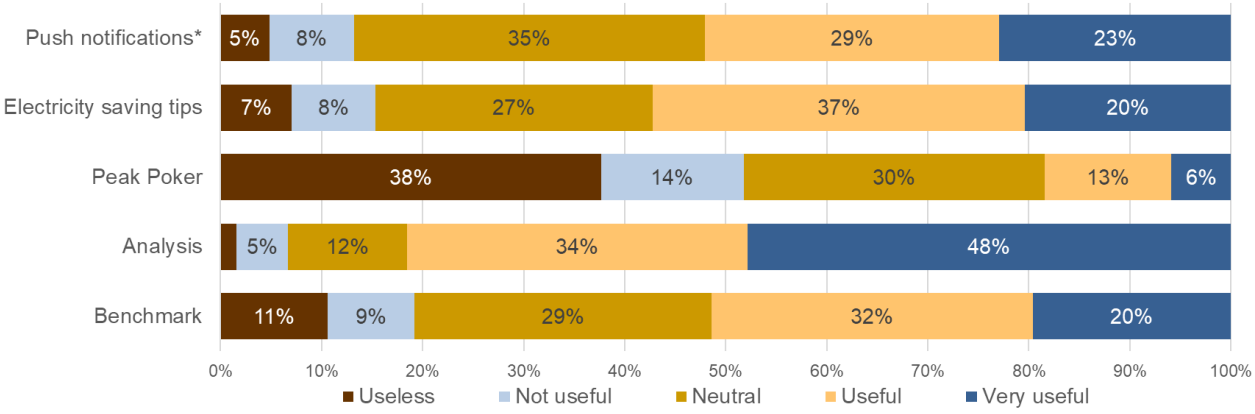

Figure 1: Consumers' assessment of PEAKapp main functions (n=255)

In the same survey, we specifically asked consumers about the improvements that would like to see in PEAKapp. The most frequently mentioned suggestions are discussed bellow:

1. No or smaller gap between consumption and data appearance in the app. In the tested versions of PEAKapp the delay between consumption and data transmission in the app was 24 hours, however is meter was not working properly or due to some other data transmission issues between the interfaces of utility provider and software developer and even longer delay or gaps in assumption were observed. Consumers argue that it was relatively complicated for them to adjust consumption within such a setting and and would be way easier if the time delay was maximal one hour or event better not delay at all.
2. Easier and faster login procedures are already well described above. In the post project survey this topic was again raised by a significant share of respondents.
3. Many household were interested to see a comparison of their electricity consumption to previous years. In this field test it was only possible when enough data was collected for a year of consumption.

4. A further significant share of consumers expressed interest in integrating actual electricity bill in PEAKapp. Although the calculations of potential saving or required payment was provided in PEAKapp there was no electricity bill available to download through the app. This could be one major and interesting improvement if PEAkapp is to be implement as the electricity management solution for the households.
5. Several customers mentioned their interest integration with PV. Currently as presented in Del 4.1 PV households were excluded from main regression analysis, as with a current PEAKapp setting we only know that they own a PV, but actually have no data about their electricity consumption from the grid vs own production own consumption. Further on, an even higher level of integration involving automation could be considered for such households.

At the end of the survey, the consumers were asked whether they would recommend PEAKapp to their friends and whether they wish to continue using PEAKapp further. We find that 82% would recommend PEAKapp while 89% would like to continue using PEAKapp further. While there is clearly a space for improvement, the empirically demonstrated long lasting user engagement and expressed interest and support of provided by PEAKapp solutions for household electricity management can be interpreted as a successful field test.

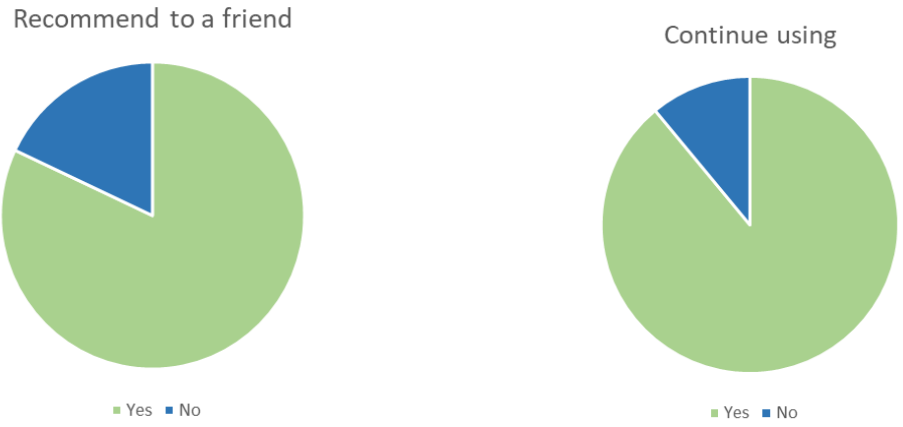

Figure 2: Attitude to PEAKapp (n=255)

3 Conclusions

In the report the potential improvements for PEAKapp and similar ICT systems is provided based on the results of the field test, and related Deliverable especially Del 4.1 and a survey conducted after the end of the field test in Austria. We separate our analysis on three perspectives of the key actors involved in implementation of PEAKapp or similar ICTs, namely electricity provider, software developer and customer. While we find some similarities across the three perspective, there are also some specific points related to the part of each actor in the field tests.

Additionally, we provide the ambitions of each electricity retailer, 220E and ENAMO, for future improvements of the app. For ENAMO, the emphasis is on providing their clients

uncomplicated support and at the same reducing the frequency of call-centre calls. They see the app as an instrument for a better communication with their customers and will evaluate an exploitation of this communication channel for future services for their own clients. 220E sees the app as platform for a variety of services, including services for households not being their customers (that buy energy form them). In this respect the plan for future developments is aims at the gathering of additional data, and the extension of the app's functionalities to prepare the ground for such new digital services.

Further on, we provide detailed analysis of consumer perspective on potential improvement which include: shorter delay in transmission of consumption data, comparison of electricity consumption with past years, integration of electricity bill in the app and integration with PV.