DELIVERABLE 5.1

Pilot plans and report on demo preparations

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D5.1: PREPARE THE PLANS AND SET UP OF DEMO SITES

Summary

The purpose of this document is to provide a detailed guideline on how the Eco-Bot system will be rolled out and tested according to three different demonstration pilots for B2B2C, B2C and B2B. This includes the introduction of each pilot, the participant recruitment strategies and the choice of participants, the hardware installations, the legal framework, the trainings of users as well as strategies to motivate them for the continuous usage of the bot thoughout the pilot period.
Furthermore the specific expectations of each pilot regarding the use of the Eco-Bot system as well as the means for proving if they are met will be decribed.
The guideline will also take into account performance indicators defined in D3.3 Metrics of the Eco-Bot system and will describe the different plans and means for their determination and evaluation. The testing and evaluation results will be compiled in the next deliverabels D5.2 to D5.5. The overall aim is to develop a testing strategy and produce results that can be used for communication and dissemination during the project as well as for the future exploitation of the Eco-Bot system which will be discribed in detail in D7.3.

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DISSEMINATION LEVEL	x PU = Public □ PP = Restricted to other programme participants □ CO = Confidential, only for members of the consortium

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List of Acronyms and Abbreviations

CA: Consortium Agreement

CO: Confidential

DoW: Description of Work, referring to the Annex I of the Grant Agreement

EC: European Commission

DMP: Data Management Plan

GA: Grant Agreement

iESA: interactive Energy Savings Account

IPR: Intellectual Property Rights

OA: Open Access

PPR: Project Progress Reports

PSB: Project Steering Board

PU: Public

QA: Quality Assurance

SAB: Security Advisory Board

SOA: Service-oriented Architecture

STC: Scientific and Technical Committee

WP: Work Package

Executive summary

The purpose of this document is to provide a detailed guideline on how the Eco-Bot system will be rolled out and tested according to three different demonstration pilots for B2B2C, B2C and B2B. For all three pilots the report includes the introduction of each pilot, the participant recruitment strategies and the choice of participants, the hardware installations, the legal framework, the trainings of users as well as strategies to motivate them for the continuous usage of the bot thoughout the pilot period.
Furthermore the specific expectations of each pilot regarding the use of the Eco-Bot system as well as the means for proving if they are met will be described.
The guideline will also take into account performance indicators defined in D3.3 Metrics of the Eco-Bot system and will describe the different plans and means for their determination and evaluation. The testing and evaluation results will be compiled in the next deliverabels D5.2 to D5.5. The overall aim is to develop a testing strategy and produce results that can be used for communication and dissemination during the project as well as for the future exploitation of the Eco-Bot system which will be discribed in detail in D7.3.

In the B2B2C pilot two companies are involved, SEnerCon and co2online. Both companies are linked together: SEnerCon is developing software tools and platforms to increase energy efficiency which are applied in co2online's energy efficiency and climate protection campaigns. Within the B2B2C pilot, 150 German private consumers will test Eco-Bot integrated in an energy management platform, the interactive Energy Account (iESA) which has been developed by SEnerCon and is applied by co2online in German climate protection campaigns. Among the 150 households testing Eco-Bot, 40-50 households will be equipped smart electricity meters of a 10 second data frequency. Both companies expect to innovate iESA by the chatbot as new easy-to-use communication channel for users, thus attracting users which are not so familiar with data charts and more dialogue interested. Additionally, the NILM evaluation of energy consumption on appliance level would bring a real added value for iESA users and a market advantage for co2online and SEnerCon. As both companies are also involved in scientific studies on building modernisation in Germany and have already built up a large data base of over one million building data, Eco-Bot could also assist in motivating iESA users to enter more data on building modernization and energy efficiency measures. Correlated with energy consumption data, the effect of these measures can be assessed to provide information for policy and funding schemes. In Germany, the smart meter is delayed and only by 2032 all households have the obligation to use smart meters. During the pilot the energy savings of both pilot groups - with and without smart meter use – will be compared. If the smart meter group will achieve higher savings, this could be an economic argument for an accelerated smart meter roll-out combined with this energy service. Eco-Bot participants were recruited by e-mailings to iESA users. Throughout the pilot, they will be motivated to use Eco-Bot by energy specials (short articles on energy efficiency themes) combined with small incentives and asked for their user experience by different user surveys, in the middle and at the end of the pilot. Additional iESA data base evaluations will be performed to investigate the effect of the Eco-Bot system in terms of energy and cost savings, CO_2 reductions and energy saving measures performed.

In the EYPESA B2C pilot a Spanish utility offers Eco-Bot to residential end users. The pilot setup has included many actions and also the identification of several issues of interest to the deployment of Eco-Bot after the project or the deployment of similar tools. First the legalities were addressed in the pilot, and several legal issues were identified regarding limitations that the

Spanish sector structure imposes on the offering of a tool like Eco-Bot by a utility or third party, as well as issues with data accessibility and quality. The conditions for user participation in the pilot were defined and the recruitment process started, identifying first the process, the available channels, and the needed material for promotion of the pilot. The KPIs that need to be obtained on data from the users and from the utility were identified and their measurement method was defined, regarding users surveys they will be sent through the bot and through e-mail. As an additional meter with higher granularity is also needed for a group of the users, different equipment options were considered and finally the Wibeee device was chosen and tested. As recruitment started, installations of the meter have also been performed gradually to the needed users. Ten preliminary pilot users were also signed up and accompanied in the sign up process of Eco-Bot allowing the collection of feedback on the signup process and certain aspects of the tool and how it need to be presented users. To date 33 users have been signed up with 14 meters have been installed. The experience to date allowed the identification of issues with installations, user perceptions, and quality of customer data in utilities.

The demo case carried out by DEXMA is the B2B use case, meaning that users of the chatbot will be facility or energy managers with a portfolio of tertiary buildings and who are already using some kind of Building Energy Management System. Currently, in the energy management sector, there aren't any chatbots as complete as Eco-Bot that can act as assistants to facility or energy managers. In this demo case, the Eco-Bot chatbot will be embedded in DEXMA's BEMS, DEXMA Analyse, formerly known as DEXCell EM. The chatbot provides added value to DEXMA Analyse, for instance, it makes several functionalities in DEXMA Analyse more accessible to the user and it is therefore a time-saving solution.
The sectors represented in this demo case are three: hotels, supermarkets and restaurants from 4 countries: UK, Italy, Andorra and Spain. These sectors have been chosen because there were already buildings with already installed submetering from these sectors in DEXMA Analyse's database and they were also sectors with a differentiated typical energy consumption. Each sector has been divided into three clusters according to their surface. The demo case is planned to last 12 months starting in February 2020. So far, 20 buildings managed by 7 facility managers have been onboarded.
DEXMA's demo case will be evaluated according to the KPIs which were defined in Deliverable D3.3, some of which will be evaluated during the pilot phase, i.e., sensibilization for the rebound effect, and some other will be evaluated once the pilot phase is finished, i.e., total amount of savings achieved. Several activities are planned to increase user engagement with the chatbot, such as user satisfaction and usability surveys or posting in social media channels.

1. Introduction

1.1. Purpose

The purpose of this document is to provide a detailed guideline on how the Eco-Bot system will be rolled out to participants and tested according to the different scenarios of the three demo cases. The guideline will take into account all performance indicators defined in D3.3 Metrics of the Eco-Bot system and will describe the different ways for their determination and evaluation. The testing and evaluation results will be compiled in deliverables D5.2 to 5.5. The overall aim is to develop a testing strategy in order to produce results that can be used for the future exploitation of the Eco-Bot system.

1.2. Aim of the piloting: Testing and evaluation of the Eco-Bot system taking into account project's objectives and pilot specific objectives

Eco-Bot aims to engage various types of energy consumers, with the common goal of changing their behaviour regarding energy efficiency. This includes personalized energy recommendations as well as an easy access to energy, cost and environmental impact data for any period the user is asking for - for some of them even on appliance level. The Eco-Bot system consists of different components, such as central backend, bot frontend, behavior modul, NILM module and the backends of the pilot partners which are energy monitoring systems which have to interact soundly.
Therefore the aim of the piloting is to provide a common approach and strategy and roadmap of all three use cases to test and validate the Eco-Bot system. This includes proving if the bot is easy to use and well integrated into the user frontend of the pilots and the recommendations made are reasonably tailored to the user. Furthermore, the transfer and accuracy of data between the pilot backend, the single modules and the central backend has to be tested and evaluated. This will take place in two stages: During the first 6 months of the pilot user feedback will be gathered and evaluated continuously by collecting and evaluating the user communication with the bot and the bot statistics as well as by user surveys at the end of the six months. After this first stage, the system will be improved, e.g. energy recommendations and the linguistic intelligents of the frontend will be modified to achieve a better fit to the user intents. In the second stage of the pilot the improved system will be tested for the rest of the pilot duration and evaluated at the end of the pilot phase by user questionnaires, data evaluation also regarding the impact of the system in terms of energy and cost saving and CO_2 reduction.
In deliverable D3.3 all test parameters are listed and described in detail. In the case of some parameters the validation is not requiring an extra involvement of test participants (e.g. by questionnaires or interviews) but can be performed by the Eco-Bot backend and administration tool. In this report only the paramters which require the involvement of pilot participants will be regarded and the focus will be on the timing and on the means of evaluation in practice. Especially when different parameters have the same time of evaluation, a procedure has to be defined to avoid user frustration of filling in too many questionnaires.

The following table shall give an overview on the general parameters to be validated involving the feedback of pilot participants. In the next chapters the focus will be on the pilot specific objectives and parameters:

Table 1: General testing parameters for all demo cases

Category	Parameter	Measurement Method	Time of evaluation	Target/KPI
Behavior Model	P2 – Accuracy of the classification model	Extended behaviour survey	Month 34 and month 40	At least 80%
Chat bot	P8 – User experience	User survey	Month 34 and month 40	4.25 of 5 points as average user satisfaction
Energy saving actions	P25 - Total increase of energy savings by participating users	Pilot backend, comparison of energy consumption before and after the pilot duration	Month 40	15%
Energy saving actions	P26 - Users that made a change to save energy (behavioral change or investments)	Backend evaluation of energy events entered by participants	Month 34 and month 40	30 % (DoW) Adapted: 19 for EST 45 for SEN
Energy saving actions	P27 – Consumers making monetary investments to save energy	Backend evaluation of energy events (only investments) entered by participants	Month 34 and month 40	10%
Energy saving actions	P28 – Commercial buildings (facilities) that were affected by a change to save energy (behavioral change or investments)	Backend evaluation of number of facilities that implemented energy saving actions in relation to total number of facilities (building)	Month 34 and month 40	80%
Energy saving actions	P29 - Implemented energy saving measures recommended by Eco-Bot	Bot backend: Number of recommendations user implemented	Month 34 and month 40	SEN and EST: 640 DEXMA:160

Category	Parameter	Measurement Method	Time of evaluation	Target/KPI
Green Impact	P30 – Overall energy savings achieved (in MWh)	Pilot backends	Month 40	SEN: 90 MWh/year for electricity and 112.5 MWh/year for space heating EYPESA: 34,521 MWh/year for electricity DEXMA: 500 MWh/year
Green Impact	P31 - Average amount of avoided CO2 emissions of each user	Pilot backends	Month 40	SEN: 484.4 kg/year per user for electricity and 150kg/year user for space heating EYPESA: 178,3 kg/year per user for electricity DEX: kg/kWh = 2 220 CO2 kg/year per participating facility
Green Impact	P32 -Turn to sustainable energy: Number of users interested in turning to renewable/sustainable energy	User survey	Month 40	15% of Eco-Bot user are switching to a green energy plan/provider or producing supporting renewable energy yourself e.g. by investing in solar panels or investing in a windmill
Econo-mic impact	P33 - Amount of money saved per household/facility	Backend: kWh saved multiplied by energy price for electricity and space heating	Month 40	SEN: 180 EUR/year per household for electricity (and 45 EUR/year per household for space heating

Category	Parameter	Measurement Method	Time of evaluation	Target/KPI
				EYPESA: 78,45 EUR/year per household DEX: 1125 EUR/year per facility
Rebound effect	P34 - Sensibilization of the users for the rebound effect	User survey	Month 40	50% of users who received information on the rebound effect found it useful

From the table it can be seen that the validation will be in two stages mainly, after 6 months at month 34 and at the end of the pilots at month 40. To avoid user frustration and loss on engagement, the user surveys have to be very concise and if possibly aggregated to one or two surveys at the beginning and end of the due month.

The parameters that are considering the performance of the single Eco-Bot modules and that are evaluated by the backend of the Eco-Bot system are not part of this report as no active test participant involvement is needed for their validation. Each partner will be responsible for the testing of his single module (e.g. ERRA for the chatbot or KAT for the behavior module or STRATH for the NILM module) and will inquire all necessary information from other partners involved (e.g. from PLEGMA responsible for the central backend). These parameters as well as their time of evaluation are described in detail in D3.3.
All results of the testing including all parameters – evaluated with and without active user involvement - will be compiled and described in the next deliverables D5.2 to D5.5.

Eco-Bot will be tested for different business models and user types – residential customers and professional uses. In the following, the three demo cases for business to business to consumers (B2B2C, residential end-customer), business to consumer (B2C, residential end-customer) and B2B (end-customer facility managers) will be introduced and their testing scenarios and evaluation strategies as well as their specific expectations and targets will be decribed for each pilot.

2. Planned demonstration and validation of the three pilots

2.1. B2B2C demo case: SEnerCon/co2online interactive Energy Savings Account (iESA)

2.1.1. Introduction to demo case

The Business to Business to Consumer demonstration case is composed of the two companies SEnerCon and co2online (B2B) and the customers of co2online (2C) using the interactive Energy Savings Account (iESA), an energy monitoring system for private households and SMEs.

SEnerCon Ltd. has more than 20 years experience in energy consulting and software development, especially of online tools and services in the field of energy efficiency and interactive energy advising tools. SEnerCon has developed the iESA and a lot of tools that supplement iESA providing energy advice for special issues (e.g. CoolCheck for fridges and freezers, PumpsCheck for circulation pumps, building modernisation Check) and energy certification of buildings and SMEs.

Co2online is a non-for-profit company which is specialised in energy efficiency and climate protection campaigns on national level where SEnerCon's tools come to operation. With its network of 900 partners from industry, public administrations, energy agencies, crafts, academics, energy consultants, banks that are using these tools on their websites and portals, co2online reaches a large audience. Every year, around four million consumers use the offers on the co2online websites. The Federal Environment Ministry and the European Commission support a large number of these campaigns and the development of energy advising tools.

The **interactive Energy Savings Account (iESA)** is a monitoring system for the use of energy and water mainly of private households. This includes the electicity use of households as well as energy used for space heating and the water usage as well as the energy demand for mobility. For the Eco-Bot project only the electricity use and the energy use for space heating will be considered. IESA displays the energy consumption cost and emission in charts and tables based on data from energy bills and meter readings entered by users.

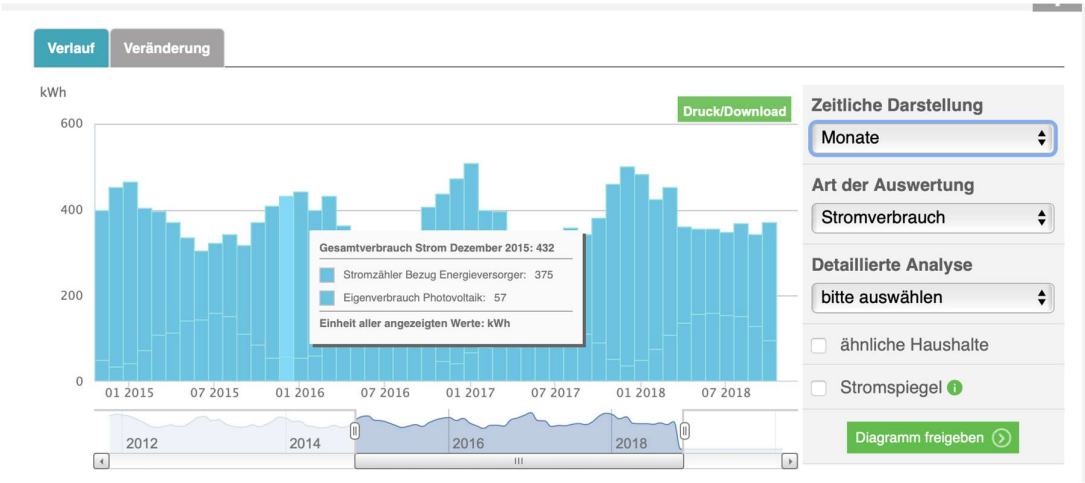


Figure 1: Interactive Energy Savings Account - Electricity consumption chart

iESA use is free of charge. Up to date, no real smart meter roll out took place in Germany. The German law "Gesetz zur Digitalisierung der Energiewende[1]" regulates the obligation of smart meter installation for private households with an annual electricity consumption between 6,000 and 10,000 kWh until 2020 and a total obligation for all households until 2032. Up to now, most of the iESA users have conventional mechanical electricity meters, only very few iESA users (around 40) are equipped with smart meters, mainly of the company Discovergy which is a business partner of SEnerCon and co2online. Therefore a data interface to transfer Discovergy smart meter data to the iESA backend has already been implemented.
Users may also enter so called "events" that influence their energy behaviour, this could be absence for holidays as well as additional persons staying in the home but also energy saving events and investments. These "events" are depicted as little flags in the energy consumption curves, thus providing a feedback on how the "event" has influenced the energy consumption such as the success of energy saving investments. For co2online and SEnerCon these data are very interesting for scientific statistial studies to evaluate the impact of energy saving measures of a significant sample of users. Based on these studies, new campaigns can be designed to promote the most efficient energy investments and governmental consultations can be made. User can evaluate the effect of "events" by comparing the energy consumption of a certain period before and after the event within a chart.

In order to communicate with its users, iESA offers a user forum which is frequented by 13,940 users in total as well as a support hotline and e-mail address.

[1] https://www.bmwi.de/Redaktion/DE/Downloads/Gesetz/gesetz-zur-digitalisierung-der-energiewende.pdf?__blob=publicationFile&v=4

Figure 2: interactive Energy Savings Account - user forum

Target group for Eco-Bot are iESA users (customers of co2online) which are residential households distributed all over Germany. Households are families or single households owing or renting a flat or a house. Buildings are single- or two-family homes or multifamily dwellings of different types or ages. Different energy sources for space heating are applied, like e.g. natural gas, fuel, wood pellets, district heating, electricity (heat pumps). Electricity provenience is not restricted, energy of all kinds of distributers and retailers (of fossils or renewables) can be considered by the iESA. In total 150 iESA users testing and experiencing Eco-Bot are targeted, 50 of them shall use smart meters for electricity.

2.1.2. Definition of demo case's expectations and added value using the Eco-Bot system

Both the entry of energy data and of event data takes up the already limited time of users, so that only very motivated users are ready to enter data on a very frequent basis. Former user evaluations of co2online have revealed that the main users of the iESA a male, 50+ with a technical educational background. Co2online's expectations towards the bot are that due to the facilitated dialogue with the user, more data can be collected and also users who are not very technically focused and who are more interested in a communication approach can be convinced and motivated to use the iESA more frequently. By applying the NILM evaluation and offering data on appliance level without submeters the iESA gains a market advantage as this is not yet a market standard in Germany. Thus, these features will ensure user retention and maybe also attract new iESA users if they are proved to work efficiently.

2.1.3. Demo case specific objectives using the Eco-Bot system and testing scenarios

For D3.3 pilot partners were asked to define specific parameters for their pilot situation based on test hypotheses. For the B2B2C pilot the following test hypotheses were defined:

Table 2: Test hypothesis of the SEN pilot

First hypothesis:	Eco-Bot users with smart meters will achieve 5 percent higher savings than Eco-Bot users without smart meters.
Second hypothesis:	Eco-Bot users will enter 15 percent more energy events into the iESA compared to their normal use of iESA before Eco-Bot.

Third hypothesis:	Eco-Bot is the preferred channel of communication over other iESA options, like the hotline and the user forum for younger (<45) and/or female users (30 % share).

As described above or as value proposition in D7.2, SEnerCon expects that due to the use of Eco-Bot, iESA users will:

- Achieve 15% energy and cost savings due to the comprehensive personalised and user-friendly energy information and advice
- Enter more data, i.a. "events" (energy saving measures and investments as well as living circumstances such as absences) that can be used by the platform to improve offers
- Enter more energy data: Electricity and space heating (meter readings and data from energy bills), especially for users without smart meters
- Perform energy saving measures due to the recommendations of Eco-Bot and document this in iESA by informing the bot on the implementation of measures
- Make reasonable investments due to the recommendations of the bot (cost-benefit analysis of new appliances) and document them with the help of the bot
- Reduce their CO_2 emission and increase the use of renewable energy
- Become more "green" by switching to an advanced behaviour segment

Furthermore, the bot shall enable a good customer retention and can serve as a channel for offering new services or products

2.1.4. Introduction of KPIs and targets and means of verification taking into account challenges that might occur

For the specific objectives described above, testing parameters were defined. In the table below these parameters are listed including their validation method and time of evaluation.

Table 3: Demo case B2B2C specific testing parameters

Category	Parameter	Measurement Method	Time of evaluation	Target/KPI
Energy savings	P38 – SEN Energy savings achieved by users with smart meters compared to users without smart meters	Pilot backend: Total energy savings achieved in kWh are compared among the users with and without smart meters.	Month 40	5 % higher saving with smart meter use
Energy events	P39 – SEN increase of energy saving events in percent entered into the iESA system	Backend: Total number of energy saving events entered by iESA users into the system within the	Month 34 and month 40	15 % increase

Category	Parameter	Measurement Method	Time of evaluation	Target/KPI
		pilot phase divided by the total number of energy saving events entered by the same users during a corresponding (annual) period before the pilot started (multiplied by 100).		
User group	P40 - SEN Evaluation of Eco-Bot as channel of communication	Question in the user survey. All pilot participants are asked which channel of communication they preferred/ found the most effective (Eco-Bot, the service hotline or the user forum).	Month 40	30 % share of younger (< 45) and/or female users preferred communication over the other options.Eco-Bot as a channel of

Challenges that might occur:

- Users are not ready to take part to too many surveys
- Testing period is too short for implementation of energy saving events as decision taking process might be longer for investments in home improvements

Parameter P40 will be assessed as single question in the user survey at the end of the pilot phase.

2.1.5. Analysis of equipment required

50 participants among the 150 iESA users that take part to the pilot will be equipped with smart meters of the company Discovergy which were selected because an API for feeding the meter data into the iESA is already available and also Strath has already been working with Discovergy meter data. After the review meeting in Brussels, it was decided to increase the smart meter data frequency to 10 s to achieve a higher accuracy of NILM data as this was one crititcal point araised by the reviewers.
Discovergy is an innovative smart metering company not only providing smart metering service but also its own energy monitoring portal for their customers. It is involved in the energy efficiency project of the German government called "Einsparzähler" aiming at increasing energy efficiency by the use of digital solutions. Discovergy showed also their

interest in using synergies with the Eco-Bot project and will send out an e-mailing to the "Einsparzähler" participants to ask them for participation also in Eco-Bot. These users will be guided by SENerCon to register for an iESA account including Eco-Bot participation and their Discovergy meters will be connected to the iESA backend. Throughout the pilot, SEnerCon will provide support to Eco-Bot users in case of missing data and problems with smart meters. Discovergy has also a hotline and support email for user questions and problems.

Figure 3: Discovergy smart electricity meter for households

Up to date only few of our current iESA users have smart meters installed in their homes. Therefore around 30 to 50 Discovergy electricity meters (depending on the readiness of the formerly mentioned Discovergy users to participate) will be contracted and applied in the pilot. Eco-Bot participants will not have to pay for the installation of the smart meters and the metering service cost will be covered for two years. After this period, users will have to pay an annual fee of 100 Euro for the metering service. Part of these cost are balanced by approximately 30 percent reduced annual basic cost to the energy utitlity and the rest can be allocated as expenditures in the annual tax declaration of the users.

2.1.6. Legal framework

Within the registration process for Eco-Bot, iESA users are asked to login in a special iESA test environment and click on a button to take part to the pilot. Once agreed, they have to perform the behaviour as well as the appliance survey. The Eco-Bot icon will appear immediately and after a certain delay the full functionality of Eco-Bot can be used including consumption and cost data (if available) communicated via the chatbot. Within this registration procedure users are informed on the project and asked for they consent to use their data by a consent form. Apart from the Eco-Bot system environment Eco-Bot will not be connected to any social media channels or used as stand-alone app.

In Germany the "Bundesdatenschutzgesetz (BDSG)[2]" based on the EU General Data Protection Regulation (GDPR)[3] is the legal framework for the transfer, storage and processing of data. Based on this law and taking into account considerations of the Eco-Bot data management plan, the data consent form for the German Eco-Bot pilot was designed.

[2] https://dsgvo-gesetz.de/bdsg/
[3] Regulation (EU) 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data.

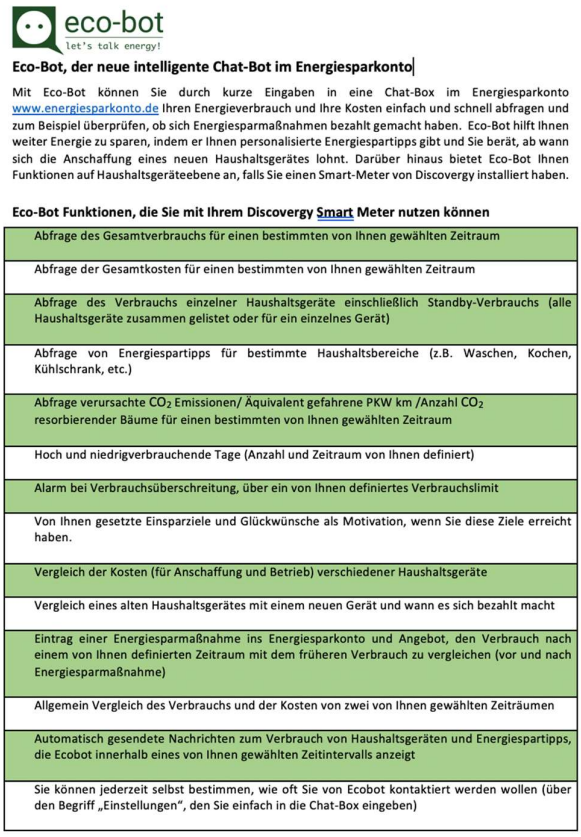
Although data are anonymized when they are transferred from iESA to the different Eco-Bot modules to be processed, the situation of data protection is not obvious as user data are transferred and evaluated by different partner organisations. This should be explicitly explained to the user to get his/her agreement and avoid legal problems during and after the testing phase. The German consent form provides a detailed description of data that are transferred indicating all partner organisations involved in handling and evaluating their data. The German consent form is attached to the Annex of this document.
In case iESA users use Discovergy smart meters, they can issue this meter in the iESA as main or submeter and – using their Discovergy credentials – they can connect the smart meter to the iESA. The API between iESA and Discovergy will then transfer smart metering data into the iESA. The data are not stored as 10 s intervalls but as aggregated data of one-hour intervalls. Thus, the users as owner of his data gives his/her consent to connect the smart meter as well as to use and store the data for the Eco-Bot pilot.

Figure 4: iESA - Connection of Discovergy smart electricity meter

2.1.7. Recruitment strategies

SEnerCon and co2online already started early with the user recruitment by identifying 3,000 active iESA users within the iESA customer base. Active means that they entered energy data in the last year 2019. Five e-mailings in tranches of 200 recipients (in total 1,000) were sent to these customers asking for their participation as pilot participants of the Eco-Bot system and informing about their benefits and duties during the projects, e.g. free smart meter installation and usage for selected users, providing anonymized data and participation to user surveys. Two different e-mailings were sent out – one offering smart meters as incentives and maybe also for attracting more technical interested users and one without the offer to provide free smart meters to rather attract users that are not so much technical but communicational interested and could be hesitating to install technical equipment in their homes. Additionally, users that have already installed a Discovergy electricity smart meter were asked for their participation already in the small scale pilot. The general feedback of 10% response rate for all e-mailings was good.

Discovergy showed also their interest in using synergies with the Eco-Bot project and will send out an e-mailing to the their customers to ask them for participation in Eco-Bot. SEnerCon prepared a compilation of Eco-Bot features for Discovergy customers, to show them the added value of Eco-Bot.



eco-bot
let's talk energy!

Eco-Bot, der neue intelligente Chat-Bot im Energiesparkonto

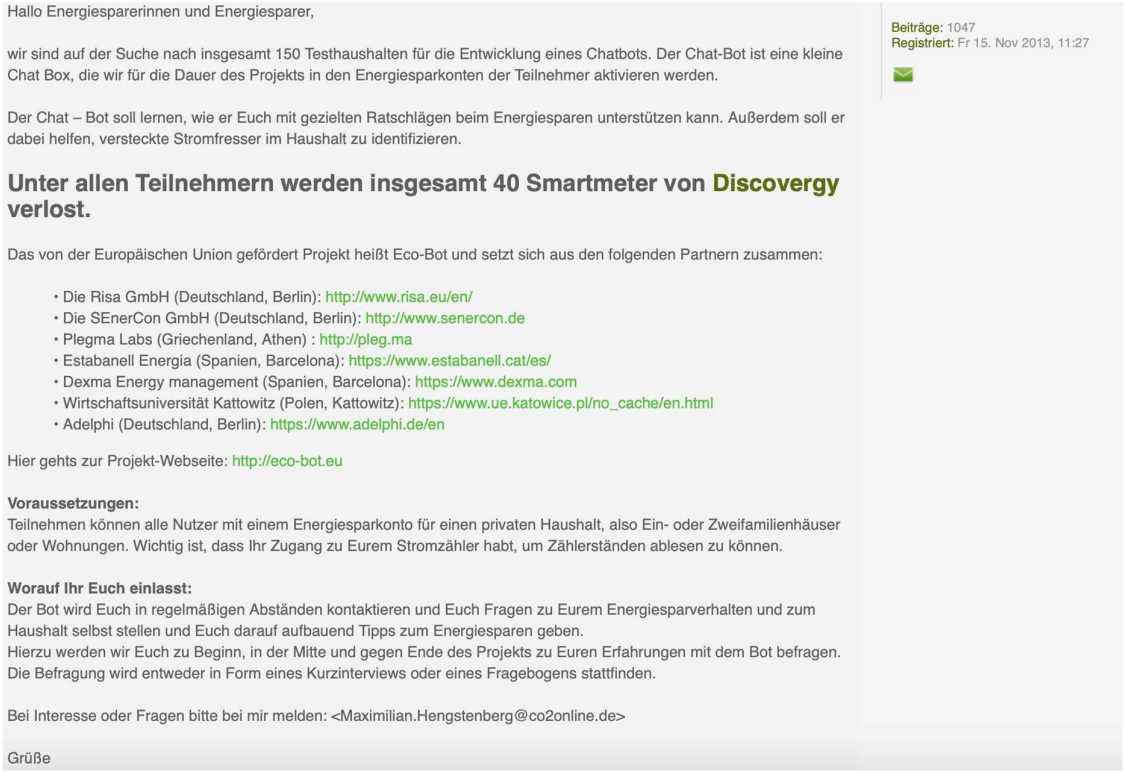
Mit Eco-Bot können Sie durch kurze Eingaben in eine Chat-Box im Energiesparkonto www.energiesparkonto.de Ihren Energieverbrauch und Ihre Kosten einfach und schnell abfragen und zum Beispiel überprüfen, ob sich Energiesparmaßnahmen bezahlt gemacht haben. Eco-Bot hilft Ihnen weiter Energie zu sparen, indem er Ihnen personalisierte Energiespartipps gibt und Sie berät, ab wann sich die Anschaffung eines neuen Haushaltsgerätes lohnt. Darüber hinaus bietet Eco-Bot Ihnen Funktionen auf Haushaltsgeräteebene an, falls Sie einen Smart-Meter von Discovergy installiert haben.

Eco-Bot Funktionen, die Sie mit Ihrem Discovergy Smart Meter nutzen können

Abfrage des Gesamtverbrauchs für einen bestimmten von Ihnen gewählten Zeitraum
Abfrage der Gesamtkosten für einen bestimmten von Ihnen gewählten Zeitraum
Abfrage des Verbrauchs einzelner Haushaltsgeräte einschließlich Standby-Verbrauchs (alle Haushaltsgeräte zusammen gelistet oder für ein einzelnes Gerät)
Abfrage von Energiespartipps für bestimmte Haushaltsbereiche (z.B. Waschen, Kochen, Kühlschrank, etc.)
Abfrage verursachte CO_2 Emissionen/ Äquivalent gefahrene PKW km /Anzahl CO_2 resorbierender Bäume für einen bestimmten von Ihnen gewählten Zeitraum
Hoch und niedrigverbrauchende Tage (Anzahl und Zeitraum von Ihnen definiert)
Alarm bei Verbrauchsüberschreitung, über ein von Ihnen definiertes Verbrauchslimit
Von Ihnen gesetzte Einsparziele und Glückwünsche als Motivation, wenn Sie diese Ziele erreicht haben.
Vergleich der Kosten (für Anschaffung und Betrieb) verschiedener Haushaltsgeräte
Vergleich eines alten Haushaltsgerätes mit einem neuen Gerät und wann es sich bezahlt macht
Eintrag einer Energiesparmaßnahme ins Energiesparkonto und Angebot, den Verbrauch nach einem von Ihnen definierten Zeitraum mit dem früheren Verbrauch zu vergleichen (vor und nach Energiesparmaßnahme)
Allgemein Vergleich des Verbrauchs und der Kosten von zwei von Ihnen gewählten Zeiträumen
Automatisch gesendete Nachrichten zum Verbrauch von Haushaltsgeräten und Energiespartipps, die Ecobot innerhalb eines von Ihnen gewählten Zeitintervalls anzeigt
Sie können jederzeit selbst bestimmen, wie oft Sie von Ecobot kontaktiert werden wollen (über den Begriff „Einstellungen", den Sie einfach in die Chat-Box eingeben)

Figure 5: Eco-Bot features for Discovergy smart meter users

SEnerCon launched a call for participation in the iESA user forum, 7 users were interested to participate.



Hallo Energiesparerinnen und Energiesparer,

wir sind auf der Suche nach insgesamt 150 Testhaushalten für die Entwicklung eines Chatbots. Der Chat-Bot ist eine kleine Chat Box, die wir für die Dauer des Projekts in den Energiesparkonten der Teilnehmer aktivieren werden.

Der Chat – Bot soll lernen, wie er Euch mit gezielten Ratschlägen beim Energiesparen unterstützen kann. Außerdem soll er dabei helfen, versteckte Stromfresser im Haushalt zu identifizieren.

Unter allen Teilnehmern werden insgesamt 40 Smartmeter von Discovergy verlost.

Das von der Europäischen Union gefördert Projekt heißt Eco-Bot und setzt sich aus den folgenden Partnern zusammen:

- Die Risa GmbH (Deutschland, Berlin): http://www.risa.eu/en/
- Die SEnerCon GmbH (Deutschland, Berlin): http://www.senercon.de
- Plegma Labs (Griechenland, Athen) : http://pleg.ma
- Estabanell Energia (Spanien, Barcelona): https://www.estabanell.cat/es/
- Dexma Energy management (Spanien, Barcelona): https://www.dexma.com
- Wirtschaftsuniversität Kattowitz (Polen, Kattowitz): https://www.ue.katowice.pl/no_cache/en.html
- Adelphi (Deutschland, Berlin): https://www.adelphi.de/en

Hier gehts zur Projekt-Webseite: http://eco-bot.eu

Voraussetzungen:
Teilnehmen können alle Nutzer mit einem Energiesparkonto für einen privaten Haushalt, also Ein- oder Zweifamilienhäuser oder Wohnungen. Wichtig ist, dass Ihr Zugang zu Eurem Stromzähler habt, um Zählerständen ablesen zu können.

Worauf Ihr Euch einlasst:
Der Bot wird Euch in regelmäßigen Abständen kontaktieren und Euch Fragen zu Eurem Energiesparverhalten und zum Haushalt selbst stellen und Euch darauf aufbauend Tipps zum Energiesparen geben.
Hierzu werden wir Euch zu Beginn, in der Mitte und gegen Ende des Projekts zu Euren Erfahrungen mit dem Bot befragen. Die Befragung wird entweder in Form eines Kurzinterviews oder eines Fragebogens stattfinden.

Bei Interesse oder Fragen bitte bei mir melden: <Maximilian.Hengstenberg@co2online.de>

Grüße

Beiträge: 1047
Registriert: Fr 15. Nov 2013, 11:27

Figure 6: iESA user forum - call for Eco-Bot participation

In August 2019, SEnerCon posted a call for participation to the Eco-Bot project on Facebook, without direct effect on registration:

Figure 7: Eco-Bot post on SEnerCon's Facebook account

At the beginning of the pilot phase participants will be provided with a description of the Eco-Bot features and on how they can register for Eco-Bot and connect their smart meter to iESA and proceed with the testing. During the registration they have to agree to the German Eco-Bot consent form that can be found in the Annex to this document and fill in the behavior user survey (see chapter 2.1.6). Only after registration and taking part to the behaviour survey, it is possible to allocate participants to the different user segments identified in D2.3. Therefore, it will not be possible to select participants according to their allocation to a certain segment in order to ensure an equal distribution to the different user segments. The distribution will be assessed at the beginning of the pilot, after six months and at the end of the pilot in order to detect if users switched to other segments during the course of the pilot (or were allocated incorrectly to the wrong segment).

2.1.8. Planned Eco-Bot launch and roll-out and user involvement strategies over the pilot phase

Eco-Bot will be launched in March 2020, new smart meters will be installed at 40 to 50 test households managed by the company Discovergy. The other 100 users are already committed to take part and only have to register to the project by entering in a separate test environment of the iESA (https://neu-dev.energiesparkonto.de) that is used for innovative solutions developed within the course of research and innovation projects. Once they login with their normal iESA credentials, they have to click on the European project space and are asked to participate. Clicking the participate button they are asked to also click the behavioural survey button and are subsequently led to the survey with 10 important questions regarding their energy behaviour and attitude and life circumstances. After successful completion of the questionnaire they are led to the questionnaire of the appliance survey. If they have finalized this procedure they have to refresh the iESA page and wait until their data

are transferred from the iESA backend to the central Eco-Bot backend. To retrieve NILM data, they have to wait one day until the data are transferred and processed by the central backend and the NILM module.

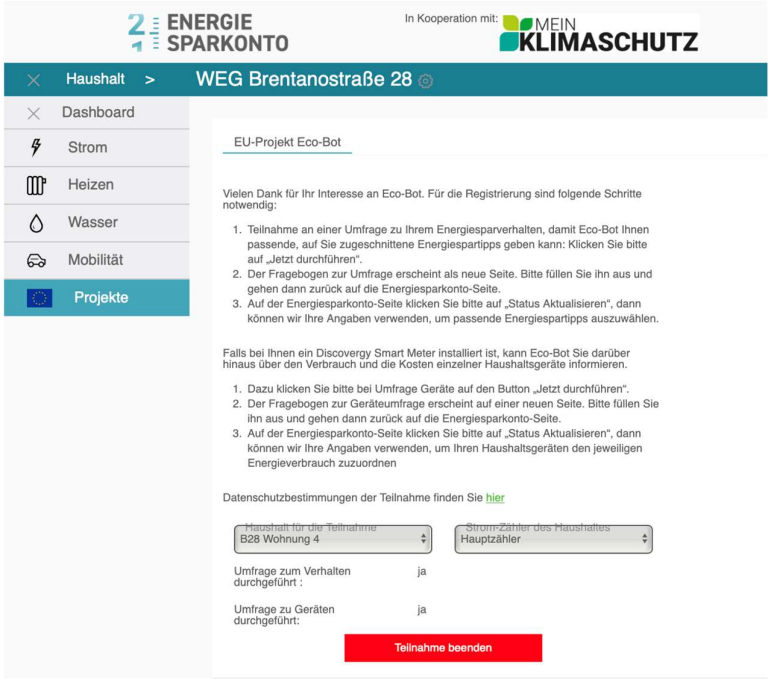


Figure 8: Eco-Bot registration on iESA test environment

Once registered, users are provided with a description on the features (use cases) of Eco-Bot and what should be tested. To motivate them to keep track throughout the whole pilot phase, they are asked for their experiences and if any problems might have appeared in frequent e-mailings (every two months). For this purpose, Senercon has a special user support contact and hotline.

Additionally, small lotteries with incentives to use the bot in combination with energy specials (energy information and tips for different household consumers) and intermediate results (e.g. on energy events performed by participants) will be launched and sent to users. This way, participants which contacted Eco-Bot more frequently will be awarded. This approach has been successfully applied during another EU project, the European Citizens Climate Cup (ECCC) where iESA participants had to be motivated to enter energy data and energy saving measures into the iESA.

To tackle the problem of inactive users, SEC will identify them and ask for the reason of losing the track in order to solve problems and document potential obstacles.

2.1.9. Planned evaluation of the segmentation model and of user recommendations by user survey and administration backend

The personalised energy recommendations have been developed for 5 different user segments compiled in D3.2 which were identified by a user survey to households at the

beginning of the project including questions on different energy behaviours and attitutes i.a. towards the environment, social pressure, income as well as investments in the home (D3.1). Based on the evaluation of this user survey, 10 most important questions were extracted which are essential to allocate a user to a certain segment. Registering to the Eco-Bot system each user has to fill in a questionnaire with these 10 questions to allocate him/her to a user segment and to provide him/her with recommendations that match to his/her personal situation and attitude.
During the pilot phase the Eco-Bot user segmentation shall be proved - this means if the allocation of users is still correct but also if the recommendations fit to the respective user segment. For this purpose after six months of the pilot phase a more detailed user survey regarding energy behavior similar to the one which was designed to build up the user segmentation will be performed. It will be provided to users as user survey within the Eco-Bot frontend, like the behavior survey at the start of the registration to Eco-Bot.
Based on the Eco-Bot statistic engine it is possible to detect if a recommendation was useful for the user and also if it has been implemented. Thus, the recommendations can be assessed and also their fit to the user segment (e.g. a recommendation which has only a different phrasing for the different segments could have been more useful and applied by one segment compared to the other). In addition to this rather quantitative evaluation, a user survey sent out to all users at the end of the pilot phase will assess the most useful and implemented recommendations from the user perspective. The survey will be designed by KAT and send out as a Survey Monkey link in an e-mail sent by SEnerCon. The survey can be anonymous.

2.1.10. Planned evaluation of the user satisfaction and usability of the system and of user interaction

The user satisfaction will be evaluated by a user survey which will be performed in the middle (month 34) and at the end of the pilot phase (month 40) by a link to an online survey questionnaire (survey monkey). The survey can be anonymous. A first version of questions for the related questionnaire is available in D3.3. It will consist of different parts inquiring the pragmatic, hedonic and the bot-specific as well as the generic user experience of Eco-Bot. The pragmatic user experience regards typical usability aspects, i.e. efficiency, perspicuity, dependability, while the hedonic experience is related to the way the user perceives the system in terms of stimulation and novelty. The bot-specific user experience considers the chat interface and conversational intelligence of the chatbot, and indicates user acceptability and satisfaction which is also part of the subjective evaluation by the user derived from the generic user experience questions of the questionnaire.

2.1.11. Planned evaluation of energy saving measures and investments triggered by the Eco-Bot system

All energy saving measures and investments that were entered during the use of Eco-Bot into the system are stored in the iESA backend according to the following event categories:

Table 4: Energy saving events in the iESA backend

Event	Event Category
Replacement of dishwasher	Replacement of appliances
Replacement of fridge/freezer	Replacement of appliances

Event	Event Category
Replacement of washing machine	Replacement of appliances
Maintenance of heating/cooling system	Heating/Cooling System
Installation of a thermostat	Heating/Cooling System
Switch to non-electric heating system	Heating/Cooling System
Installation of solar collectors for water heating	Heating/Cooling System
Replacement of heating/cooling system	Heating/Cooling System
Separate heating/cooling control for each room	Heating/Cooling System
Thermal insulation of walls	Insulation
Thermal insulation of roof	Insulation
Replacement of windows	Insulation
Installation of PV system	PV System
Maintenance of PV system	PV System

Based on common averages for the purchase of appliances or for home improvements in Germany, the total investment triggered by Eco-Bot users can be estimated. All energy saving measures entered by Eco-Bot users be it on the advice of Eco-Bot or on the user's own initiative will be assessed and listed according to user segments to assess their suitability to the single segments (see 2.1.9).
All energy saving measures (recommendations) suggested by Eco-Bot that were found useful and/or have been implemented will be assessed by the statistical engine of the Eco-Bot backend.
This evaluation will be performed two times: after six months and at the end of the pilot phase.

2.1.12. Planned monitoring and evaluation of energy, emission and cost development of single users and of the aggregated usage by all test participants

Based on the iESA backend the actual energy and cost savings and CO_2 reductions can be assessed for each user, taking into account the household's data before the use of the Eco-Bot system which are already stored in the iESA compared to the same data entered while using Eco-Bot. This evaluation will be performed at the end of the pilots. For the heating energy consumption this is only possible if data of the two heating periods are available (winter 2018/2019 and 2019/2020). Heating data will be climate-adjusted. To evaluate the impact of Eco-Bot to the B2B2C use case, the energy consumption and cost data as well as the CO_2 emission data of all participants will be summed up and provided as total aggregated figures.

2.1.13. Monitoring of socio-economic, environmental and institutional barriers

Throughout the pilot testing phase any barriers that become obvious are collected and compiled in D5.5. Additionally, barriers will be inquired by user survey questionnaires in months 6 and after the pilot phase at the end of the project.

Some examples of barriers that might appear are:

- Hardware installation problems and institutional problems with the metering service not providing data or missing data
- Test households are hesitating installing smart meters as they will have to pay for them (annual fee) after project completion (socio-economic)
- Test households are reluctant in entering their behavioural data and to complete the user and the appliance survey
- Behavioral changes and energy saving measures don't have the desired impact (environmental)
- Test households cannot effort investments in new appliance (socio-economic)

2.2. B2C demo case: ESTABANELL

2.2.1. Introduction to demo case

To introduce the demo case a quick introduction to the Spanish electricity sector is first made for a better understanding of the current company layout and challenges as well as legal limitations involved and identified throughout the project with regard to the pilot itself and with regard to the exploitation of Eco-Bot in Spain outside the context of a European project.

2.2.1.1. The Spanish electricity sector [1][2]

From the process of electricity generation until the delivery of electricity to end users there are several activities involved in the chain namely, generation transport, distribution, and retail. In the Spanish electricity sector each of these steps is separated and is subject to a different legal framework.

- Electricity generation, a nonregulated activity in Spain performed by companies that own electricity generation technology, produce electricity and sell it on the Iberian electricity market.
- Transmission, a regulated activity in Spain performed by "Red Eléctrica de España" (REE), it consists of electricity transmission at high voltages and over large distances, locally or internationally, with the objective of distributing electricity from where it is produced closer to where it will be consumed.
- Distribution, a regulated activity in Spain, where electricity that arrives from the higher voltage transmission network is delivered to end users through the electricity distribution network at lower voltages.
- Retail, a nonregulated activity in Spain, where retail companies buy electricity on the Iberian electricity market and sell it to end users, using the infrastructure of transmission and distribution.

Previously in Spain one company could perform several activities at once and the electricity sector was an oligopoly of vertically integrated companies that operated in electricity generation, distribution, and retail at once. However, since 1997 the Spanish electricity sector has undergone drastic reforms and it is no longer possible for one company to perform these activities at once. This led to two things, first that the existing companies in the electricity sector had to create companies and separate their generation, distribution, and retail activities per company, and second that many new retail companies have appeared in the Spanish market increasing the options end users have and thus increasing competition in

electricity retail. Electricity retail is also an unregulated market such that there is a lot of flexibility in the kind of offerings retail companies can make to their clients.
Of main interest to the project are the activities performed by distribution system operators (DSOs) and retailers. The activities usually performed by each of these players can be seen in table 5.

Table 5: Main function of a Distribution System Operator vs an Electricity Retailer in Spain

Distribution System Operator activities	Electricity Retailer activities
• Maintenance of the medium and low voltage grid • Guarantee the quality of the electric supply • Fix electric incidents that can happen in the grid • Maintain the measurement devices (Smart meters and maximeters) that are legally rented by the end users. • Perform the meter readings and make sure they arrive to the electricity retailers. • Execute actions such as registering and deregistering points of supply, changes in tariffs, changes in contracted power, and changes in titleholders. All these actions are performed on petition of the retailer of a certain consumer.	• Buy energy on the energy market based on the needed predictions/estimations of its client base. • Uses the infrastructure of the transmission and distribution operators so that electricity arrives to its clients. Pays the regulated prices for using the infrastructure or for the actions they may ask the distributor to perform. • Sell energy to the end consumer and send them the corresponding bill. • The retailer is also free to perform other activities in retail.

2.2.1.2. EYPESA and the Estabanell group

Estabanell is a company that is more than 100 years old with origins in the textile industry of Catalonia. Estabanell powered its textile factories with hydro powerplants on the Ter river in northern Catalonia. In 1910 it started making the first steps towards electrifying its factories and providing electricity from its hydropower plants. This began Estabanell's steps into the electricity sector as it later started providing surrounding villages with electricity as well. Slowly Estabanell consolidated itself as a small vertically integrated utility in Spain, generating electricity with its hydropower stations on the Ter River, distributing electricity in several regions in Catalonia, and selling electricity to end users.
After the liberalization of the Spanish electricity market in the late 1990s the Estabanell group formed and today consists of the following companies:

- Estabanell y Pahisa, S.A. (EPSA): performs electricity generation activities, owner of the Estabanell's electricity generation facilities, and is also the owner of the other Estabanell companies.
- Estabanell y Pahisa Energia, S.A. (EYPESA – Estabanell Distribució): an electricity distribution company, that owns and operates the electricity distribution grid shown in the Figure 7. It delivers electricity to more than 56,000 customers.
- Estabanell y Pahisa Mercator, S.A. (Mecator – Estabanell Energia): an electricity retail company with more than 50,000 customers.
- E-Phos Digital SLU (Emagina): a telecom and fiber optics company founded in 2015

EYPESA is the company involved in the Eco-Bot project, however in many instances Mercator (the retailer) was involved due to the following reasons:

- Distribution is a completely regulated activity in Spain and under usual conditions, a distribution company cannot perform actions that do not fall under outlined activities for distribution according to regulation (described previously in table 5). Activities performed as part of a European project are an exception.
- In Spain all interaction with clients, except for communication related to the quality of the electricity supply, is generally done through the electricity retailer (this includes billing, info on contracts and related procedures, offers etc…).
- EYPESA does not have permission to contact clients for issues not related to supply, and the only clients that can be contacted by EYPESA regarding the Eco-Bot project are clients of Mercator that gave consent to receive communications from companies in the Estabanell Group.
- The retailer has a lot more experience in interaction with clients and can give valuable feedback to the preparation of the pilot.
- A retailer has more potential to exploit a tool like Eco-Bot in Spain than does a DSO, as a DSO cannot legally perform any commercial activity (such offering a tool like Eco-Bot for a certain fee).

How the above points were taken in consideration are described in more detail in upcoming sections.

2.2.1.3. Target group in the EYPESA pilot

The target group of the Estabanell pilot is described in the following points:

- Kind of energy consumers: Residentials households
- Location: Granollers and surrounding areas (Figure 9). This is understood as the city of Granollers, capital of the region "El Vallés Oriental" and the towns around it as they share a very similar consumer profile and are areas where Estabanell is present both as a DSO and a retailer. Details on home size and age distribution in Granollers and the surrounding region can be seen in Table 6, Table 7, Table 8.
- Target number of participants: 100
- Duration: 1 year

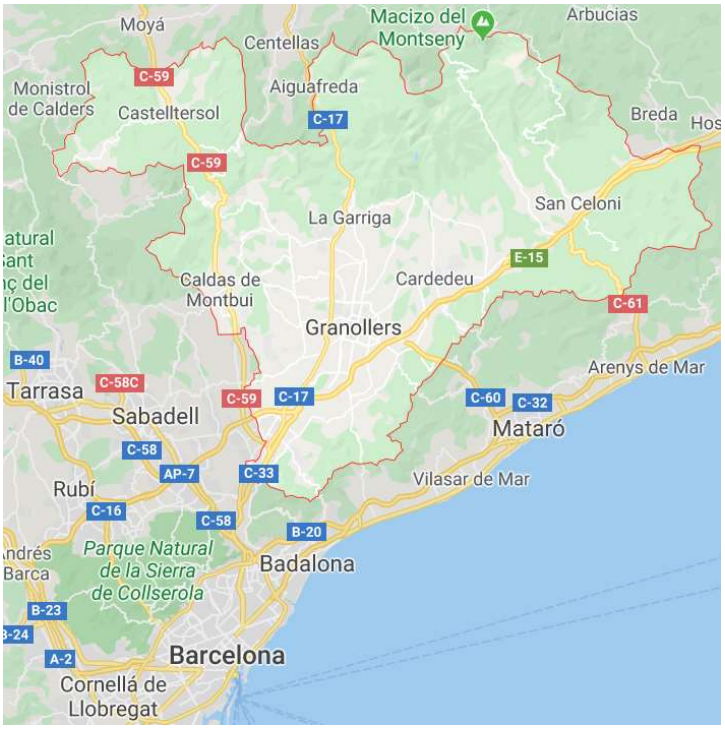


Figure 9: Granollers, capital of the marked catalan region of El Vallés Oriental, north of Barcelona.

Table 6: Households by nucleus type in Granollers and the Vallés Oriental region [5]

	Town/city	Council
Nucleus type	Granollers (households)	Vallés Oriental (households)
1 person	21.85%	18.76%
2 people or more co-habiting	2.42%	2.24%
Couple without children	24.47%	24.55%
Couple with children	38.11%	42.01%
Mother or father with children	10.55	10.04%
Two nuclei or more	2.60%	2.40%
Total number	22,831	148,710

Table 7: Population in Granollers and the Vallés Oriental region based on age groups [5]

	Town/city	Council
Age group	Granollers (households)	Vallés Oriental (households)
From 0 to 14 years	15.32%	16.87%
From 15 to 64 years	67.03%	66.70%
From 65 to 84 years	14.87%	14.01%
85 years and more	2.78%	2.43%
Total number	60,981	406,289

Table 8: Distribution of households in Granollers and Vallés Oriental based on area m2

	Town/city	Council
Household areas	Granollers (households)	Vallés Oriental (households)
Until 60 m2	-	-
From 61 to 90 m2	57.38%	48.06%
From 91 to 120 m2	18.68%	20.91%
121 m2 and more	7.48%	18.42%
Total number	22,831	148,710

As can be deduced from the tables and drawing on company insights into customers and the region, the typical profile of a residential consumer, is a family living in a medium sized apartment. Generally speaking, residential consumers, have a negative perception of the electric companies, this as a consequence of a sector that for a long time has been dominated by a small number of giant utilities and characterized by increasing energy prices, of the highest in Europe [7] [8].
Further conditions were then applied on the target group due to the considerations described previously and the structure of the Spanish energy sector are described in Table 9.

Table 9: Further conditions applied to participate in the Spanish pilot

Condition	Description/Necessity
Connected to the EYPESA grid	The participant should be connected to the EYPESA grid, otherwise it is not possible to obtain consumption from the smart meters on a daily basis.
Meter titleholder	The participant should be the titleholder of the meter/electricity retail contract, otherwise they cannot get or give access to the consumption data of the respective meter.
Client of Mercator	The participant should be a customer of the retailer Mercator so they the users can be contacted, and additionally relevant information can be provided to them by Eco-Bot regarding their contract and certain procedures and offers.

2.2.2. State of the art before the pilot and definition of demo case's expectations and added value using the Eco-Bot system

The main groups of the functions that Eco-Bot fulfills for a utility are listed in Table 10, and are contrasted with the current "state of the art", as currently found available for clients of EYPESA and Mercator. Note that the customer service mentioned in the table can be contacted by email, phone, or personally at Estabanell's offices.

Table 10: Eco-Bot functionalities in comparison to current options available to Estabanell clients.

Eco-Bot general functionality	Current availability in Estabanell	Current accessibility
Obtain general information on company, offers, contact information, and procedures	• Company website www.estabanell.cat • Company social media platforms (facebook and twitter) • Customer service	Medium
Obtaining information and inquiries related to the client contract and billed consumption	• Customer service • Virtual office available to clients where they can see a graph of their monthly consumption up to the last billed month as well as access all their previous bills. • Distribution companies also provide a portal where customers can see their historic billed consumption [4] however often consumers are unaware of this option.	High
Obtaining consumption between two dates in a period that has been billed	• Customer service	Low
Automatically calculate the adequate contracted power	An automatic calculation is not possible. A consultation can be made to the customer service office and they can give an estimation.	-
Obtaining consumption between two dates that have not yet been billed (the current month)	Not possible	-
Obtain information on environmental impact based on real consumption	Not possible	-
Obtain information on the consumption of appliances	Not possible	-
Obtain energy efficiency recommendations	Customer service office, usually this is done in person or by phone	Low
Receive notification on high consumption	Not possible	-

Eco-Bot general functionality	Current availability in Estabanell	Current accessibility
Obtain high low consumption days in a period	Not possible	-
Consult on the purchase of a new appliance	Not possible	-
Measure the impact of energy saving actions performed by a consumer	Not possible	-
Compare consumption of appliances in different periods	Not possible	-
Set consumption, cost, CO2 goals	Not possible	-

As can be seen in Table 10 there are a large number of functionalities that Eco-Bot makes possible for clients on one hand or facilitates them significantly on the other. The pilot will allow us to see to what extent users use and value these functionalities and to what extent they enhance the client's energy efficiency. Additionally, the pilot will evaluate Eco-Bot as a tool and the value it can add to the clients and the company at different levels.
Based on the analysis presented in D7.2 the unique value proposition of Eco-Bot is summarized by the following points (the full text can be consulted D7.2):

- Raises awareness about end-user's energy usage
- Provides information on total and appliance consumption
- Provides personalized advice
- User has an added value from their utility, improving the utility-customer relationship
- Improve customer retention in an increasingly competitive electricity sector
- Perform routine customer service tasks
- Improve a utility's customer relationship management

Through the pilot described in this deliverable and the KPIs defined in D3.3, the value propositions of Eco-Bot can be practically validated.

2.2.3. Demo case specific objectives using the Eco-Bot system and testing scenarios

The target of a utility can be quite wide as practically all kinds of people are possible clients of a utility. With regard to Eco-Bot all people that fulfill the conditions previously described will be considered and targeted. This will also help evaluate in which kinds of energy consumers Eco-Bot raises interest.

Users of Eco-Bot in the pilot can then participate as part of the following two groups:

Group	Description	Additional device required?
Basic	Uses Eco-Bot	No installation required at the household level. Data is

		obtained from the DSO hourly meter.
Advanced	Uses Eco-Bot that will have better data on the energy use of specific appliances due to the higher granularity data.	Installation of an additional 1-minute measurement device at the household. The installation is free of cost to the client.

In addition, the metrics of the users of Eco-Bot in the two above mentioned groups will be compared to a control group of Estabanell clients that do not use Eco-Bot. This can allow a better interpretation of any results and identification of factors that affect the consumption of everyone regardless of their use of an energy efficiency tool (such as weather).
Users are encouraged to participate in the pilot promoting the following benefits:

- Positive impact on the environment
- Be on top of your energy consumption
- Receive assistance 24/7
- Furthermore, energy consumption information much more easily
- Control your energy costs
- Participate in an innovative project
- Receive a 30 euro amazon gift card when you start using Eco-Bot

All the above was included to make participating in Eco-Bot as appealing as possible to different kinds of people/segments, whether they are interested in the environment, energy efficiency, are techies, or just want to make their life easier by accessing information more easily. Finally it was also decided to include an Amazon voucher of 30 euros as a bigger incentive for someone that could already be interested, but also to make the pilot appealing to people that would not be normally up to participating in pilot, using new tools, or very curious about the environment or energy efficiency.

2.2.4. Introduction of KPIs and targets and means of verification taking into account challenges that might occur

KPIs as documented in D3.3 were reviewed and regarding the pilot preparation in the case of EYPESA a focus is made on KPIs that require:

- Interacting with the user (by sending a questionnaire/survey)
- Data that only the pilot has and that are needed for KPI calculations.

2.2.4.1. KPIs that include a questionnaire/survey to the user

KPIs that require an interaction with the user by sending a questionnaire/survey are listed below as they appear in D3.3:

- **P2: Accuracy of the classification model** - This indicator evaluates the quality of the classification model. It measures the percentage of correct predictions made by the classification model. The term "correct prediction" means that it is identical to the actual segment the user belongs to.
- **P8: User experience** - User experience involves both pragmatic and hedonic quality aspects; pragmatic quality aspects are typical usability aspects, i.e. efficiency, perspicuity, dependability, while hedonic ones are related to the way the user

perceives the system in terms of stimulation and novelty. User experience involves also the perceived quality from the user's perspective as regards the chat interface and conversational intelligence of the chatbot, as well as indicates user acceptability and satisfaction. Feedback on user experience will enable the qualitative assessment of the Eco-Bot system based on subjective evaluation from the users.

- **P32: Turn to sustainable energy**: Number of users interested in turning to renewable/sustainable energy - This indicator describes how many users (in %) are interested in turning to renewable energy (e.g. by becoming a prosumer or changing energy plans or provider etc.)
- **P34: Sensibilization of the users for the rebound effect** - This parameter addresses the sensibilization and awareness for the rebound effect among Eco-Bot users since the challenge is that users are often unaware of this issue. When a user registered the purchase of a new appliance, Eco-Bot will automatically inform the user about the risk of the occurrence of a rebound effect and give recommendations on how to avoid it. Another message will be sent two months after the purchase of a new appliance.

Table 11 shows those KPIs with their measurement method, length of the questionnaire in case it is defined, and when it needs to be measured, and whether the users' needs to identify with their answers.

Table 11: KPIs that require interaction with the user with their measurement details

KPI	Measurement method	Length of questionnaire	End of preliminary pilot	Middle of the pilot	End of the pilot	Need to be linked to the User ID?
P2: Accuracy of the classification model	Extended survey of the classification model (Content provided by UKAT)	16 questions		X		Yes
P8: User experience	User experience questionnaire (Defined in D3.3)	19 questions	X	X	X	No
P32: Turn to sustainable energy: Number of users interested in turning to renewable/sustainable energy	1 Question in User survey	1 question			X	No
P34: Sensibilization of the users for the rebound effect		Not defined			X	No

KPIs that need collection of information linked to UIDs and that allow segmentation
Of the above 4 KPIs the first one, P2: Accuracy of the classification model, needs to be linked to the user (their respective UID), and it collects information that allows the segmentation of the client (done by UKAT). Therefore, it is preferable according to the data management plan that EYPESA does not collect this information directly from the user as it would be linked to their real identity which is known to EYPESA. This is also consistent with the way that user segmentation questions are being asked to the user upon registration. The proposed method for collecting this data, is to create a survey that is shared with the user through the bot, and therefore is only linked to the UID, and EYPESA would not access the results and would not relate them to real identities.

The link can be shared through the bot upon the login of the client until the client fills in the survey. However not filling the form would not stop the user from using the bot. Before the form is shared through the bot it will be reviewed by EYPESA for translation into Catalan or Spanish.

KPIs that collect anonymous information from users
The 3 KPIs P8, P32, and P34 do not collect sensitive data and do not require the collected information to be linked to the identity of the person, and so they can be collected separately by EYPESA through an email and not through the bot. Sending several surveys through the bot may lower the user experience.

The tool that is available for EYPESA to prepare and send the questionnaires is survey monkey, where a link can be created with the respective questions and sent to the pilot participants in a prepared email.
For obtaining the necessary feedback in this case the following steps will be followed:

1. In case a definition or revision of the question is needed it will be made with the involved partners.
2. The definitive version of the questions will be translated into Catalan (which is the language the company uses in all customer communications).
3. A form can be setup in survey monkey that includes (P8, P32, and P34)
4. A draw or a prize will be defined for the users that answer the questionnaire as a motivation.
5. The email that includes the link to the questionnaire will be prepared through Survey monkey.
6. The email will be sent to the users.
7. Participants that have not filled the survey will be sent a reminder automatically in case they do not fill the survey.
8. EYPESA will then pass the result to Adelphi for further analysis.

2.2.4.2. Challenges in obtaining the KPIs dependent on user answers

As generally in the case of Surveys the big challenge is achieving that a high number of users fill the survey successfully.

The surveys are collected at 3 stages and the identified challenge in each and the planned way to mitigate it can be seen in

Table 12: Surveys and risk involved

Time of survey	End of preliminary pilot	Middle of the pilot	End of the pilot
Number of survey forms	1	2	1
Risk of not obtaining replies	Low	High	Medium
Description	The risk of not obtaining replies here is low as preliminary pilot participants are more engaged and can be contacted more directly.	Users are being asked to fill two surveys (which they could find long), from different channels.	Users are being asked to fill one survey. At the end of the pilot there is also the risk that some users might be no longer engaged.

To mitigate the above risks of not obtaining replies in the middle and end of the pilot, the following planification is done:

- The user is first sent the survey needed for the evaluation of P2 (classification model evaluation).
- When it is available through the bot, EYPESA can send an email to all users informing them about the survey with a link to enter the bot and fill in the survey.
- Two weeks later an email is sent with the link to the second survey (as well as a link to the bot), informing that when they fill the two surveys successfully, they will enter the draw to win a prize (to be determined during the first phase of the pilot)
- A reminder is sent automatically through survey monkey to users that have not filled in the survey setup in survey monkey 1 week later.
- Technical partners pass to EYPESA the UIDs that filled the survey needed for P2, and through survey monkey EYPESA can identify the users that filled the second survey with the needed information for P8, P32, and P34.
- A thank you and motivational email is sent to all the users that successfully filled in both surveys, and the winner of the prize is informed that he/she received the prize.

2.2.4.3. KPIs that require data from EYPESA

The KPIs that require data directly from EYPESA are identified as the following:

- P10: Total users
- P25: Total increase of energy savings by participating users
- P30: Overall energy savings achieved (in MWh)
- P31: Average amount of avoided CO2 emissions of each user
- P33: Amount of money saved per household/facility
- P35: EYPESA Energy savings achieved by users with basic smart meters compared to users with advanced smart meters
- P36: EYPESA: Energy savings achieved by Eco-Bot users compared to the control group of non-Eco-Bot users

The information needed to calculate the above KPIs is listed in Table 13.

Table 13: Data needed for calculation of KPIs dependent on EYPESA

Data needed for calculation	Availability of information
Consumption information	The hourly consumption data can be used for consumption information needed. EYPESA has at least a two year historic stored and available for Eco-Bot.
CO2 emission factor in Spain	CO2 emission factor is constant that can be found in the literature.
Energy price of the user	The current energy price the user has is also known as the users are clients of the utility. However, the history of the contracted tariffs by users is not available, so if users change their tariff at some point, only their current tariff is visible, and it is not possible to know the previous tariff or when the change was made. This can introduce a small error into the calculation; however, this is not a scenario that is expected to be common.
The group the user belongs to in the pilot (advanced, basic, control)	This is information is known by EYPESA on each pilot participant and can be linked to the participant's consumption.

2.2.5. Analysis of equipment required

For the additional meter that needs to be installed for the Advanced user group with 1 minute granularity, several options of meters where analysed and compared to arrive to the final decision on the meter to be used.
The meters considered for the pilot are the following 4 options (Seen in Table 14):

- Circuitor Meter CEM-C5. Technical details: http://circutor.es/en/products/metering/partial-consumption-energy-meters/ac-measurement2/cem-c5-detail#documentation
- Landis+Gyr E750. Technical details: https://www.landisgyr.com/product/landisgyr-e750/
- Wibeee meter. Technical details: https://wibeee.com/producto/wibeee-one-2w/#tab-description
- Discovergy meter. Technical Details at: https://discovergy.com/en/meters#electricity-meter

Table 14: The four meters considered for analysis

Figure 10: Cirucuitor CEM-C5 meter

Figure 11: Landis+Gyr E750 Meter

Figure 12: Wibeee meter

Figure 13: Discovergy meter

Each of the options was analysed and compared. Factors that were considered especially important are the following:

- Cost of the meter
- Ease of installation
- Intrusive or not to the user
- Ease of obtaining the information from the meter in a reliable and secure way

A summary of the analysis can be seen in Table 15.

Table 15: Analysis of meter options

Meter options	Circuitor meter	Landis+Gyr E750 meter	Wibeee meter	Discovergy meter
Granularity	1 minute	1 minute	1 minute	2-10 seconds
Pros	1) Not large in size expected to	1) Adequate granularity	1) Easy to install	1) Adequate granularity

	fit in most electrical boxes 2) Adequate granularity		2) Easy setup for communication through wifi 3) Adequate granularity 4) Small in size and installed discretely in the existing electrical setup	
Cons	1) Not simple to install 2) Communication needs a SIM card and configuration with a computer with an ethernet port	1) Not simple to install 2) Large in size 3) Communication needs a SIM card and configuration with a computer with an ethernet port	1) As it goes in the current installations, if the installation an old electrical setup there could be complications with the installation	1) Relatively large size 2) Communication needs a SIM card and configuration with a computer with an ethernet port
Estimated cost of meter and installation	210 €	310 €	190 €	310 €

The Wibeee meter was the one identified as being cost effective, most easy to install, least intrusive as it is small and is setup on the current electrical board directly, and it was considered by EYPESA as an option that is also easy in terms of communication. For obtaining the data, the Wibeee connects to user wifi and sends the minute data to the Cloud where it is stored. EYPESA then built an API that gets the data from the Wibeee platforms and passes it to the central node. Additionally, a free APP is available that gives instructions and allows configuring and monitoring the device, which is practical for the installers and for EYPESA to monitor the device status. Setting up of the device and its communication was considered the simplest.
An additional plus of using Wibeee is that if for some reason communication is lost or the device is not working EYPESA is automatically notified through the Wibeee platform, through the APP, and by email [11] [12]. Hence if there is an extended loss of communication an installer can be notified to revise the installation and identify the problem. Additionally, if the Wibeee device for some reason loses communication it stores the data locally for up to 30 days and sends the data when the connection is re-established.

Figure 14: Wibeee can be discretely installed in the current electrical board [11]

The steps for installation are then outlined as follows:

- The installer installs the device in the home of the client and configures it through the APP, with links the device to the Wibeee business account of EYPESA.
- The device appears on the EYPESA account and is linked to the respective client, with the name of client and the unique number of the device (the MAC)
- The device sends the data to the Wibeee cloud, the data appears on the platform.
- EYPESA retrieves the data from the Wibeee cloud through an API and each device's MAC and sends the data to the central node.

Figure 15: The wibeee platform accessible from a computer, phone, and tablet.

During the pilot all the installed devices are linked to the EYPESA account, so the users do not have access the Wibeee platform to visualize their consumption. This is done so that during the pilot the users only access their consumption through Eco-Bot for a more controlled evaluation of the bot.

The additional Wibeee device is installed for the advanced group to provide higher granularity data to the NILM module enabling better results on appliance disaggregation. All functionalities of the bot other than the NILM are performed with the hourly meter data obtained by the meter already installed by the DSO.

2.2.6. Legal framework

In the case of the EYPESA pilot the bot is not integrated in social media and is on a separate webpage where Eco-Bot can be accessed. The legal considerations in the pilot are then concerning:

- Smart meter data access and legalities in Spain
- Consent form for participants.

2.2.6.1. Smart meters and smart meter data ownership, quality, and access in Spain

Smart meter deployment in Spain has reached 99% [3], mainly at a residential level the meters deployed provide the hourly consumption curve (measurements at every hour), between the clients of Estabanell Distribution meter deployment is at 100%. The details of the data obtained by the smart meters currently installed by distributors in Spain are outlined/evaluated in the following points [4]:

- **Data collection and storage:** The responsibility of smart meter data collection and storage in Spain lies with distribution companies. With the current EYPESA communication infrastructure in the distribution grid, data from the meters are collected every day for the previous day. This data is stored in EYPESA's meter readings data base.
- **Data Quality:** What is collected by the meters at a residential level is the hourly consumption curve. Due to occasional problems with the meter or communication issues the data may have missing data points and it is later cleaned and fixed for any holes in the data before it is passed to the electricity retails, who are billed by the distribution company, and in turn the retail companies use the past data to bill their clients for electricity consumption. Distributors are obliged to pass the data to retailers at least once a month [9].
- **Data ownership:** Despite the fact that the data is collected and stored by the client's respective distribution company, the owner of the data is the client, and the data cannot be used by the distribution company without the consent of the client for activities that are not regulated and marked as distribution activities by regulation.
- **Data accessibility:**
    - To the consumer: the distributor is obliged to make the data accessible to the client through a web portal where the user can view and download their hourly consumption curve. By law the consumer should be able to view their consumption for the last 24 months. The data is only available to the titleholder of the electricity contract.
    - To the retailer: The distributer is obliged to make the consumption data available to the retailer of each consumer so that this data can be used for billing.
    - To third parties: In theory in Spain it is legally possible to share the data of the smart meter with third parties if the consumer has given their explicit consent. However practically speaking the regulation is not specific and does not

outline a clear or standard way in which this data can be accessed easily and safely by third parties. This makes data access by third parties uncommon.

Figure 16 shows how the flow of data between the different actors when it comes to exchange of meter data.

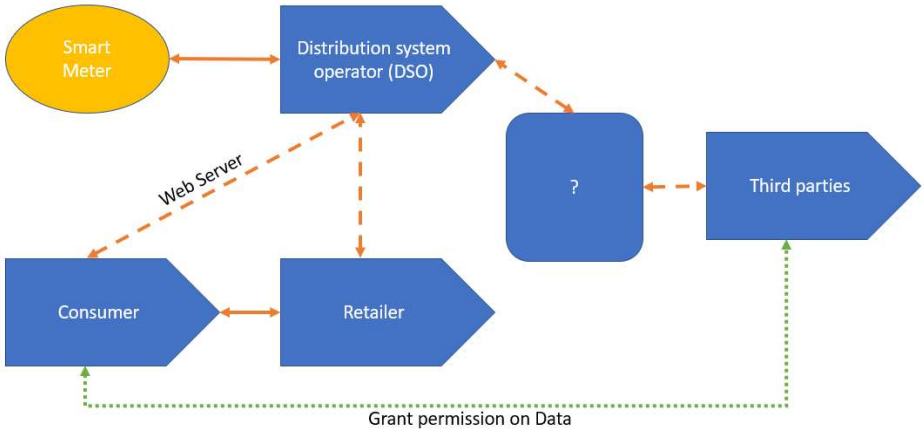


Figure 16: Conceptual scheme of the data access process in Spain [4].

2.2.6.2. Implications of the current model for smart meter data collection and exchange in Spain on the offering of tools such as Eco-Bot

Note that the current structure of the sector in Spain has several implications on tools like Eco-Bot that want to capitalize on consumption data to offer value to end consumers and help them become more energy efficient. The implications are described in the following points:

- The currently installed meter for installed residential meters are hourly meters, which for more advanced kinds of analysis on consumption (such as appliance consumption) fall short.
- Smart meters have been installed in the past years in Spain but not all communications systems in the grid have been updated, this means that the data arrives with a delay to the DSO and with possible issues in the quality of the data. In the case of EYPESA, the meter data arrives every day for the previous day. However, obtaining real time is generally still not possible.
- The company that stores and has easy access to the most up to date meter data available is the DSO, which on the other hand is not allowed to perform any commercial activity or use this data for any end other than strictly distribution activities.
- Distribution companies have a legal obligation to pass the meter data to retail companies only once a month according to Real Decreto 1718/2012 [9]. This means that retail companies with the more active relationship with clients and with the flexibility to offer further products as they operate in an unregulated market, are limited

when they want to capitalize meter data to offer value and up to date information to their clients.

- Due to the lack of a clear and safe way for 3rd parties to access the meter data collected by the distributor [4] smart meter data is seldom accessed by 3rd parties.
- The implication of the above two points, is that if a retailer or a 3rd party want to offer a service where higher granularity data is needed, or where more up to date data is available (not just the measurements of the last month) they would probably need to resort to installing an additional meter or measurement device in the home of the client, such as the Wibeee device in this pilot which was installed to provide better data granularity for the NILM module.
- The necessity of retailers or third parties of installing an additional meter if they want better data or simply access, significantly affects the success of new products or services, as it increases the cost of the offering and requires installing an additional device/devices in the home of client, which results in complications at different levels such as acceptance by clients, cost of the product, and installation issues.
- The structure of the Spanish electricity sector and the details relating to data exchange between the different actors is not very clear or well understood by the average consumer, which produces certain confusion for clients regarding the consents they are giving, what they are installing at home, and the consumption data they receive.

2.2.6.3. Legal setup and consent form for participating in the Eco-Bot EYPESA pilot

Estabanell's legal department formulated a consent form for clients to which they must agree to participate in the pilot. The document titled "Politica de protección de datos" (Data protection policy), was formulated taking the following into consideration:

- Regulation on the data protection (GDPR)
- Spanish regulation
- The functions that Eco-Bot will perform and the implications this has on how a user's data is used
- D1.3 where the Data Management Plan of Eco-Bot is described

The data protection policy of EYPESA is written in Spanish considering it is a Spanish legal document and needs to also be consulted and understood by clients that largely do not speak English. Nevertheless, the structure of the policy and the main points it addresses are translated and outlined below:

- Who is responsible for the treatment of your data?
- What are the purposes of the treatment of your personal data?
- What is the legal basis for the treatment of your personal data?
- What is duration of the treatment of your personal data?
- With whom will your data be shared?
- How do we protect your personal data?
- Know your rights in relation to your personal data

The full document is available for consultation in the annex of this deliverable and online at any time and can be found at this link: https://Eco-Bot.estabanell.cat/politicadades

2.2.7. Recruitment strategies taking into account segmentation and means of verification of segmentation including explanation and justification if not all segments are representative

Recruiting residential consumers to a pilot such as Eco-Bot is a challenging task considering the following:

- Traditionally there has been minimal contact between utilities and their clients (also applicable to Estabanell), and the contact has been limited to receiving electricity bills and only interacting with the company when there is a problem.
- Due to historic reasons client data is not up to date or is simply missing, making these clients hard to contact.
- Many clients do not have a registered email address with the company and do not use the company online office, and are not considered "digitally" active, this is also due to a large number of elderly clients on one hand, but also to the nature of the company and sector that lags behind on digitalization.
- After the GDPR came into force on May 24 2018 [10], consent had to be solicited again from clients regarding how they can be contacted by the company and consent was given by a relatively small portion of clients.
- Estabanell does not have a strong presence on social media.
- Based on input from our communication and customer service office, the Granollers Area could be challenging to regarding the adoption of new tools and technologies.

The recruitment strategy was designed with the above in mind and it attempts to use different channels to arrive to the users, provide them with easily understandable and accessible information, and outline different motivations/incentives to join the pilot to make it attractive to a wider set of people. Considering the expected difficulties in recruitment no previous filter was made regarding the segment of the client, first all clients would be addressed and if there is a need to be selective then the issue of segments can be taken into consideration before signing up for the pilot. It was also not technically feasible to segment according to the segments defined in WP3 prior to a user's registration in the pilot. Hence taking the segments into consideration in the recruitment process was not further contemplated at this phase.
The recruitment process included several steps that include:

- Definition of the sign up process.
- Identification of the channels available to EYPESA to arrive to end consumers.
- Preparation of material to support the recruitment process.
- Recruitment.

Each of these points is further developed in the following sections.

2.2.7.1. Definition of the signup process

The sign-up process was defined as follows:

- A possible participant fills an online form (https://es.surveymonkey.com/r/Eco-Bot-estabanell) with personal information that allows identifying:
  - If the user is a client of EYPESA,
  - If the user is a client of Mercator,
  - The kind of smart meter the user has at his/her household (e.g. if it is a single or three phase installation), as this affects the kind of meter that needs to be ordered for this user

  - If the user is interested in appliance level information and a possible installation of an additional meter at their household.
  - If the user has a photovoltaic installation at home (as this would affect the NILM results)
  - A text on how the data in this form and in the project will be treated with a link to the full data protection policy, and a check where the consent of the client is required.
- EYPESA checks if the interested person fulfils the prerequisites of participating in the pilot.
- The interested person is contacted with the following information:
  - Informing whether or not their participation in the pilot is confirmed
  - Defining under which group the person will participate based on whether they wanted to have an installation at their home (basic or advanced group).
  - In case they participate as part of the Advanced group, they are given more information regarding the installation and will be later contacted so that the installer can come to their house and perform the installation.

2.2.7.2. Identification of the channels

The channels identified as available for EYPESA to arrive to residential end consumers are the following:

- Employees as a channel, as many Estabanell employees are from the Granollers area, they could be used as a channel to recruit people they know.
- Email, email to clients on the project and pilot, promoting participation.
- Social media, posts on Facebook and Twitter
- Professional network, share information on pilot recruitment on Linkedin
- Customer service offices

2.2.7.3. Preparation for the recruitment process

Material prepared to support the recruitment process includes the following:

- Preparation of an Eco-Bot brochure in Catalan.
- Preparation of an easy document in Catalan that explains the pilot/conditions/benefits
- Internal recruitment material
- Preparation of a recruitment email
- Preparation of social media posts
- Customer service personnel training

Preparation of an Eco-Bot brochure in Catalan.
Easy to understand brochure, both printed and available online, that describes the Eco-Bot project, the uses and benefits of Eco-Bot, and the pilot in an easy and visually attractive way Can be seen in Figure 17 and Figure 18. The main points it covers are:

- General information about the project
- Description of the pilot with links to read more and sign up
- Description of project partners
- Facts about energy consumption/efficiency to raise interest of the reader in Eco-Bot as an energy efficiency tool in a section titled (Did you know…)
- Introduction of Eco-Bot more specifically as a tool

- What is a chat-bot?
- What can Eco-Bot do for you? Outlining main functionalities and their benefits.

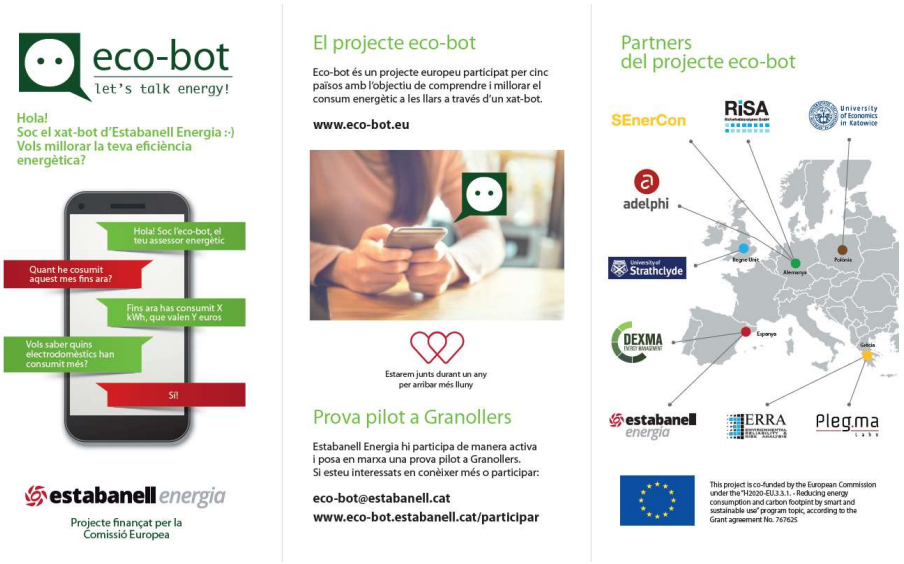


Figure 17: Eco-Bot Estabanell brochure, digital version page 1

Figure 18: Eco-Bot Estabanell Brochure, digital version page 2

The brochure is accessible publicly online at this address: https://Eco-Bot.estabanell.cat/intro

Preparation of an easy document in Catalan that explains the pilot/conditions/benefits.

A document was elaborated in easy to understand language that describes all of the following for potential Eco-Bot pilot participants:

- Title: Participate in the Eco-Bot pilot, join an innovative project and sign up for the pilot!
- The Eco-Bot project: a short description of the project.
- The Eco-Bot pilot: a description of the EYPESA pilot, including the location, duration, and in what format the user can participate (Outlining the three groups, basic, advanced, and control, what participation in each of them means and if it requires a meter installation at the household).
- Benefits of Eco-Bot in terms of energy efficiency, environment, and access to information.
- Additional advantages: User of Eco-Bot will receive a 30 euro amazon gift card and the possibility to receive more surprises throughout the year with draws performed by Estabanell.
- How to participate? Including the steps to sign up and the conditions that the user needs to fulfil.
- What does it mean to be a participant? Further information on events that Estabanell will organize, the monthly newsletter, how to cancel participation, links for further information on the project.

The document which describes how to participate and the conditions that apply is publicly available online at this link: https://Eco-Bot.estabanell.cat/participar

Internal recruitment material

To promote Eco-Bot internally several presentations were prepared and given in Catalan to explain the project and pilot to employees. In addition, a post was prepared and published on the company intranet with information on the project, pilot, and signing up, the entry can be seen in Figure 19. The aim was that employees themselves recruit people they know in the area to participate in the pilot and promote Eco-Bot themselves in their circle of connections.

Figure 19: Post on company intranet visible to all employees: We need your help to get to 100 participants in the Eco-Bot pilot!

Preparation of a recruitment email

An email was prepared to be sent to the clients. The email described the Eco-Bot, when the pilot starts, how to participate, prerequisites, benefits, and a link for signing up. The email can be seen in Figure 20.

Figure 20: Email sent to clients on participation in the Eco-Bot pilot

Preparation of social media posts

A post promoting the participating in the pilot and the benefits/incentives was share on the Facebook and twitter pages of Estabanell (both EYPESA and Mercator).

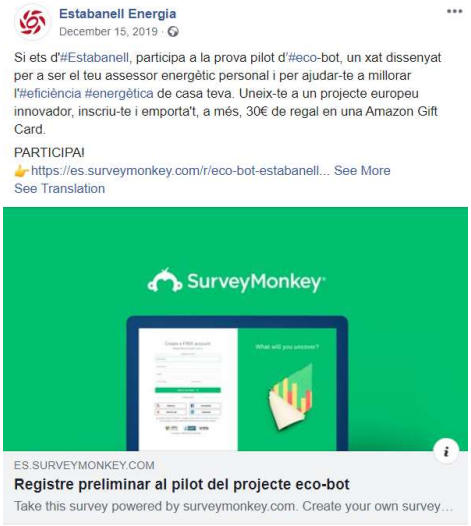


Figure 21: Facebook post on pilot participation by Estabanell Energia (Mercator)

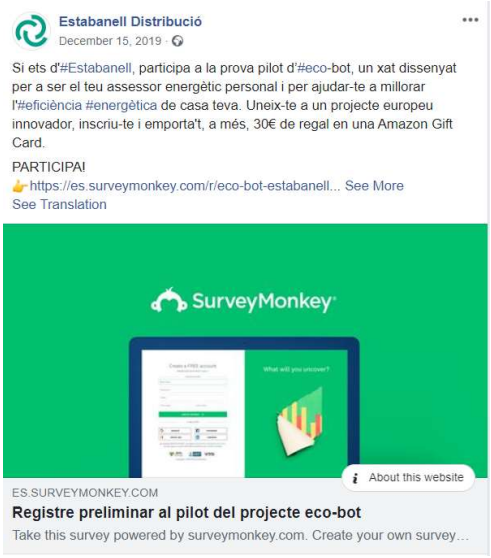


Figure 22: Facebook post on participation on pilot participation by Estabanell Distribució (EYPESA)

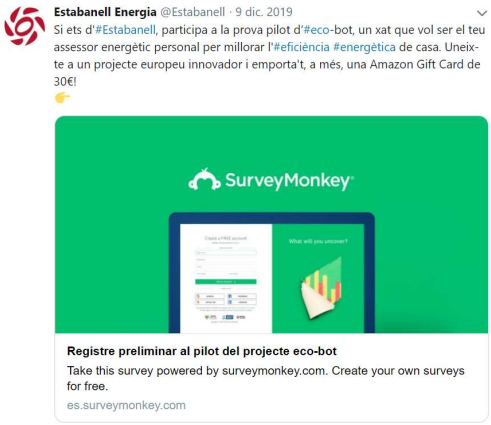


Figure 23: Twitter post on participation in Eco-Bot pilot by Estabanell Energia

Professional network post

The pilot was promoted in Linkedin by the Head of Innovation at Estabanell with a wide local network. The article can be seen in Figure 24.

Figure 24: Article on linkedin for pilot participation and promotion

Customer service personnel training

Two trainings were done with customer service personnel with the following aims:

- Resolve client doubts about the pilot. A person contacting the customer service office to ask further questions about Eco-Bot after hearing about the pilot or seeing material about it online can have their doubts resolved by the office.

- Promote Eco-Bot. In case there is a client in the office that could be a possible participant in Eco-Bot customer service personnel are able to promote Eco-Bot to them directly.

2.2.7.4. Results of the recruitment process to date (05/02/2020)

Recruitment action	Timeframe	People reached	Participants successfully registered in the pilot
Internal company presentations	4 presentations held between June 27 and July 2, 2019	34 company employees attended	16
Post on Eco-Bot recruitment published on the company intranet	Published on October 19, 2019	Available to 121 company employees	
Email sent to clients	November 28, 2019	Sent to the 572 clients that fulfill the following: • The company has their email address • They are clients of Mercator and EYPESA at once • They have given consent to receive communications from the companies in the Estabanell Group • They live in the Area of Vallés Oriental of which Granollers is the capital city.	7
Published on social media	Published on Twitter on December 9, 2019 and on Facebook on December 15, 2019	Publicly available online in the case of twitter, in the case Facebook a geographical segmentation was made to promote the post to a population of around 4000 people in the area of Granollers.	4

Recruitment action	Timeframe	People reached	Participants successfully registered in the pilot
Professional network, share information on pilot recruitment on Linkedin	Shared on Linkedin by Ramon Gallart on December 4, 2019	485 connections in the greater Barcelona area (that includes the pilot area)	1
Customer Service office	Received training on July 1st and again on November 28.	The customer service personnel had the Eco-Bot brochures available for clients on their desk,º and also answered questions on the project and promoted it between clients.	2* *Customer service often answered questions by clients that had seen the post somewhere and contacted customer service to inquire about it. The number shown here are clients that were not reached first by other channels but came directly through customer service.
Unidentified: people that signed up and there is no traceable recruitment action			3
Total			33

The recruitment process is still ongoing, and the form is open and will be maintained open for any interested person. The total participants successfully signed up to the date 05/02/2020 are 33 participants.
Of the participants that signed up for the pilot those that expressed interest in forming part of the advanced group through their answer to their signup form are the great majority of the signups. Where all current registered clients except five form part of the advanced group.
The goal for participants in the advanced group is 33 participants, which is almost achieved. While the goal of reaching the rest of 64 basic participants to reach the 100 participants goal has still a large number of participants to go. The recruitment process is still ongoing and some of the actions will be repeated at another attempt to recruit more clients.
Additionally, a barrier that was identified during the recruitment process was the issue of the meter/contract titleholders. For the smart meter data to be used the consent of the smart meter titleholder is needed. However, with regard to smart meters titleholders the following situation is encountered generally today in Spain and by the pilot, many smart meter titleholders are not up to date, and are in the name of a:

- A previous owner of the household (that in some cases has even passed away).
- In the case of a rented flat, often the titleholder of the meter is the owner and not the person living in the house.

The above two situations are brought about for the following reasons:

- Previously it was possible that person that is billed be different from the person that is the meter titleholder (with new clients at Estabanell this is no longer possible)
- Up until recently if a person wanted to make a change of the meter titleholder and the installation at the household is more than 20 years old it was necessary to present an official document by an electrician that has revised the electrical installation. The cost of the electrician and obtaining the document had to paid for by the client, which resulted in people simply not changing the meter titleholder. Today a change of the titleholder no longer requires this revision and large fee to be paid by the client which has lowered the barrier towards making this change and updating client data.
- Tenants are not always aware that they can be the title holders of their meter or the home owners do not want to put the house electricity contract in the name of a tenant.

In the case of the pilot the following situation was encountered:

- The contact information that the company has is that of the titleholders, which in the cases where the person is no longer living in the respective household would express no interest in participating in a pilot such as Eco-Bot.
- 2 of the people that signed up had to have the consent of their meter titleholder as they were living in the house but did not have the meter/contract in their name. This was done by asking them to have the titleholder fill the sign up form and give their consent.
- 2 users had to perform the procedure of the changing their meter titleholder because the titleholder was a previous owner of the apartment.

2.2.8. Planned Eco-Bot launch and roll-out and user involvement strategies over the pilot phase and means of verification (are users still active and actions taken to tackle inactive users)

2.2.8.1. Launch of recruitment

Recruitment was launched with the previously mentioned activities. As the recruitment was launched doubts coming from potential participants had to be resolved. These doubts came through employees, the Eco-Bot support email Eco-Bot@estabanell.cat, or through customer service.

2.2.8.2. Smart meter roll-out

In parallel with the recruitment activities the preparations for the smart meter rollout were performed and the installation were performed for the confirmed participants of the advanced group.
The preparation of the smart meter rollout included the following steps:

- Test installations of the Wibeee devices in the company and house of an employee
- Test configuration of the device and how it communicates the data.
- Clear outline of the steps to perform the installation in single phase and 3 phase electrical installations.
- Contacting with two possible installers with whom Estabanell has collaborated previously.
- Decision on the installer that will perform the Wibeee installations.

- Giving the installation company general information on the Eco-Bot project, and training of installers on how to install the devices.

Challenges identified during the smart meter roll-out to date
14 meters are installed to date. As the installations are ongoing certain situations were identified:

- A client with an old electrical setup where it is not possible to install the Wibeee device in the electrical board. This user was passed to the Basic group where no installation is needed.
- Due to the age of one user's electrical setup, and the user had two meters home, half of the house was connected to each meter. As the Wibeee device is put directly on the meter. The Wibeee device currently only collects 1 minute data on half the consumption of the house.
- At the time of installation two users wanted to receive more information on the project and one of these two users decided to drop their participation.
- One user had an electrical problem at their household and though that it is related to the newly installed device. A clarification was given that the device is not related to the problem.
- Two users communicated that the device sometimes produces a low noise. This is currently being investigated with the provider.

2.2.8.3. Content preparation for pilot and considerations on language

Due to the context of the EYPESA pilot all the bot content needs to be translated into Spanish. The company communication with the client is typically entirely in Catalan, however as dialog flow (which is used in Eco-Bot) does not support Catalan it was decided to have the bot in Spanish. Leaving the bot in English would lower its accessibility to possible participants as it is uncommon to speak English between clients and in the area generally.
The translation of all the bot content is still ongoing between ERRA and EYPESA.
Considering the area and context of EYPESA, it was considered necessary to comment on the issue of the language choice. To tackle this, directly on the page where the bot will appear the following sentence was put "I speak Spanish and English and I hope that soon I will be able to speak to you in Catalan"¨. The full text can be seen in Figure 25. The text will be edited to remove "and English", as it was finally decided that the chatbot will only be available in Spanish for the EYPESA pilot.

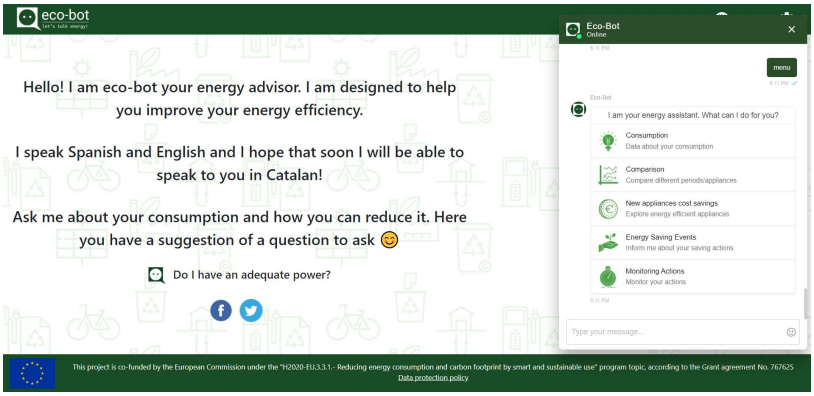


Figure 25: Page where the users find chatbot in the EYPESA pilot.

2.2.8.4. User engagement strategies

Several approaches where taken to keep the users engaged, lower the probability of inactive users, and also help participants use the bot better. These approaches are outlined below:

- A monthly Eco-Bot newsletter to participants. These newsletters include engaging information that raises interest in energy efficiency (such as ideas for energy efficient presents for Christmas), information on functionalities of the Eco-Bot so that the user is more aware of how it can be used, and when the pilot starts a link to the bot will be included in the emails to encourage the use to login at least once a month. (One example is see in Figure 26)
- A pilot event. A pilot kick-off event is planned in March where the participants are invited to come and learn about the project and ask questions. The event will also include some takeaway dissemination materials (such as booklet, pen, and shirt).
- On the page where the user finds the bot, every time the user logs in the user will find a suggestion of a question to ask the bot. This was done so that the user is more aware about what the bot can do and can also get some ideas on what to ask.
- A draw will be performed during the pilot for users that answer the needed questionnaires.

Figure 26: One of the newsletters that have been sent to participants in the EYPESA pilot

2.2.8.5. Early feedback collection

At this phase the signups of the preliminary pilot participants was also performed. The signups were performed as such:

- The user was accompanied in person during the entire signup process signup
- The user was given a demo on the spot
- Feedback was obtained on the spot.

This was done for the 10 participants already registered in the EYPESA Eco-Bot page and in the project. Valuable feedback was obtained, notabley regarding the following points:

- Reformulating certain questions in the behavioural survey that the users did not find very clear or needed an explanation on why they need to give this information (such stating to what income group they belong).
- Improving the format of the behavioural survey that users need to fill in so it is more user friendly.
- Users are likely to compare bot information with the information in the bill.
- Users that pay a shared electric bill (e.g. for the building services with their neighbours), expressed that appliance disaggregation could be interesting in the future to detect if anyone was consuming too much in a shared installation.
- Users wanted to know how the bot could detect appliances.

2.3. B2B demo case: DEXMA: DEXMA Analyse system

2.3.1. Introduction to demo case

DEXMA Sensors S.L. is a European pioneer in energy management, has already +10 years track record in the Energy Management Software market. DEXMA's existing monitoring product, DEXMA Analyze, provides monitoring, analytics, reports and alarms to energy managers handling mid-sized and large enterprises in commercial and industrial sectors. DEXMA's cloud-based software is currently monitoring more than 24,000 buildings, distributed through a network of 275 partners serving 2,500 customers in 45 countries. Partners are mainly energy services companies (ESCOs), utilities and integrators that manage tertiary buildings like corporate buildings, hotels, retail sector, public administration buildings (hospital, city halls, public schools, cultural centres, universities, etc) and industries.

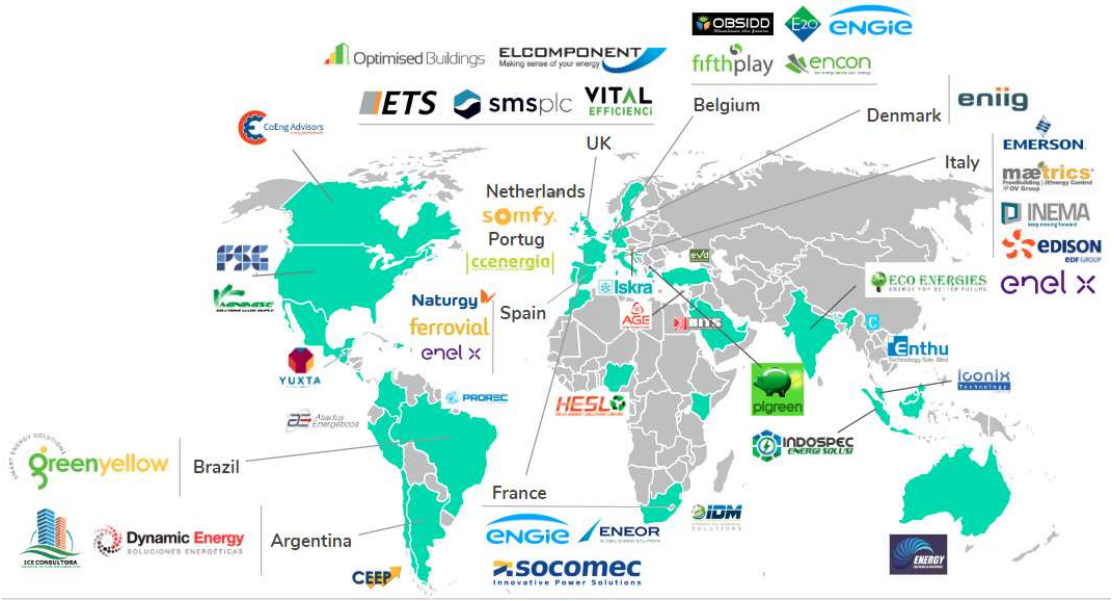


Figure 27: Some of DEXMA's partners by country

DEXMA Analyse is a cloud-based software that helps reduce energy consumption and cost by means of bill managements, fiscal meter readings, consumption submetering and control, together with advanced analytic functionalities (M&V projects), alerts and reports. The main uses of DEXMA's energy management software are:

- Cost and emissions reduction
- Increase in business profits
- Cost assignment
- Cost forecast
- Corporate Social Responsibility (CSR)

The main functionalities in DEXMA Analyse are:

1. Dashboards, reports and alerts
   a. Dashboards allow to get the main energy KPIs in customized widgets for specific users.
   b. Automatic custom reports can be sent to the clients in order to update their building performance.
   c. 6 levels of alert available: threshold, no data, tunnel, reactive excess, load excess, cost.

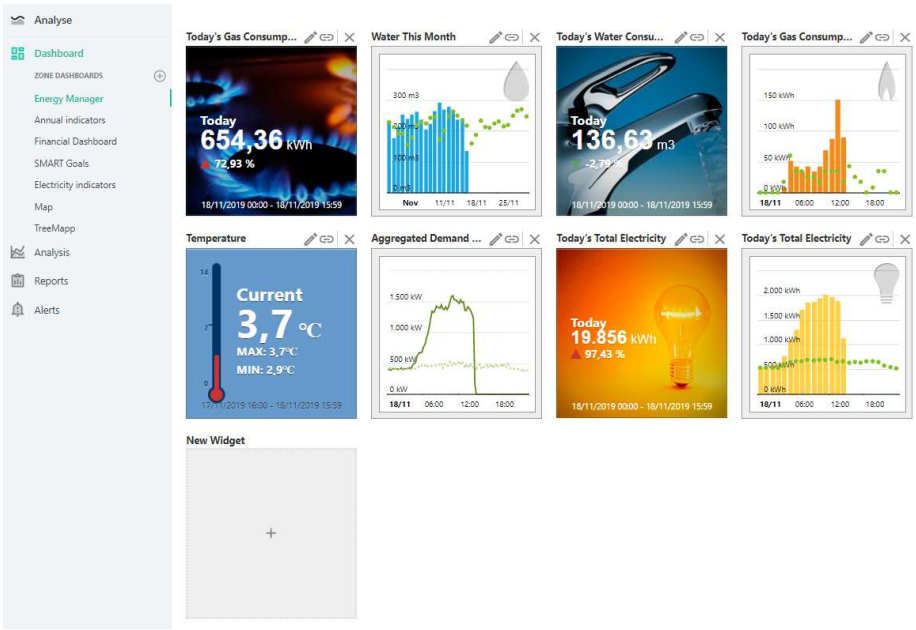


Figure 28: Dashboard in DEXMA Analyse

2. Real-time monitoring and analysis: Targets can be set up comparing to other similar periods (or a generated baseline) and savings can be tracked.

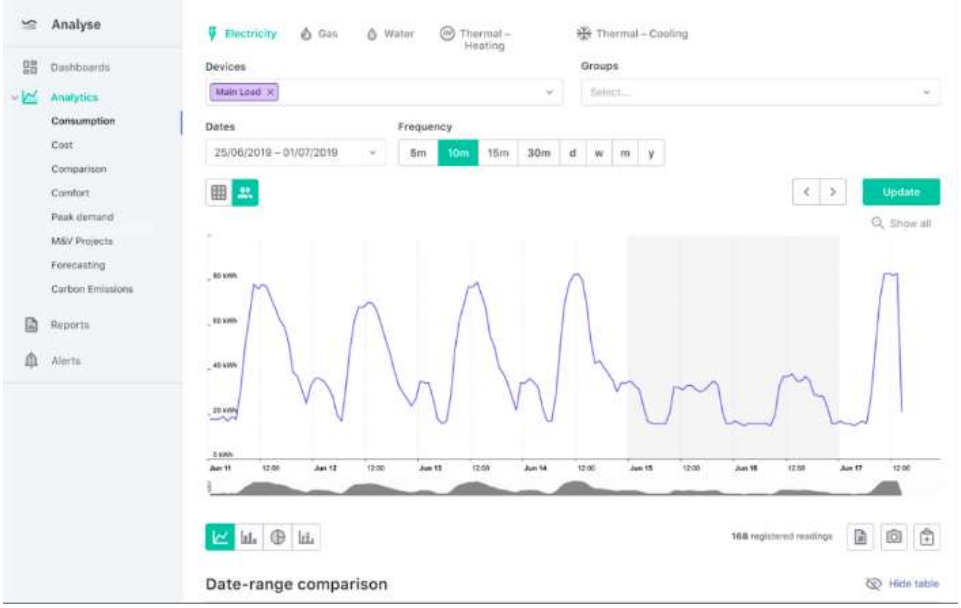


Figure 29: Consumption analysis in DEXMA Analyse

3. High-performance API: DEXMA's API is a fully documented REST API.
4. More than 30 Apps available for every user in DEXMA's Apps Market, including Carbon Emissions app, PassivesApp and much more.

Eco-Bot can enhance many of these functionalities for facility managers, due to the time saved retrieving, for instance, the general consumption overview of the portfolio or the virtual disaggregated consumption in locations with no submetering. Hence, the chatbot provides added value, which will be described in 2.3.3.

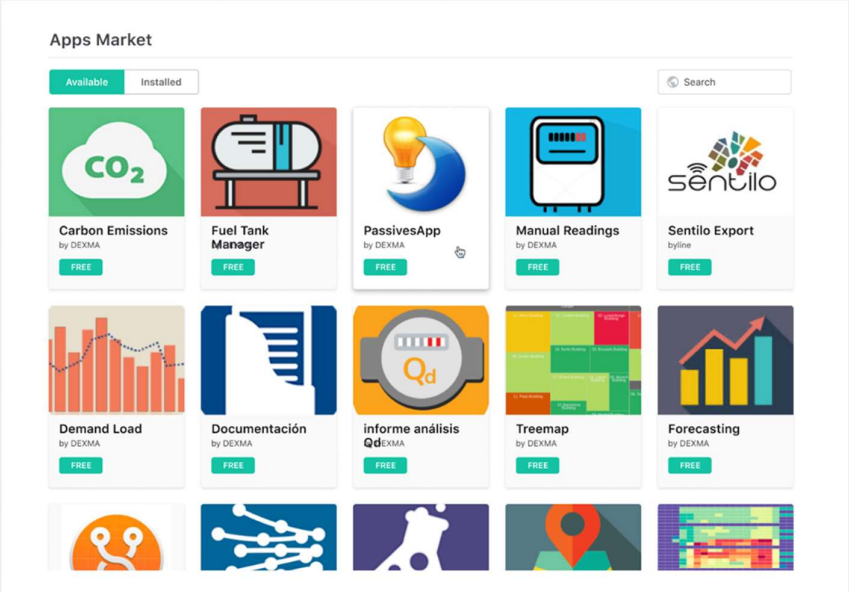


Figure 30: DEXMA's Apps Market

2.3.1.1. Target group definition

The target groups for the B2B demo case are defined according to the commercial building use and its surface. In this case, the defined target groups are: restaurants, hotels and supermarkets and are classified into 3 different sizes: small, medium and large. The reason for choosing these sectors is that they are present in DEXMA's database and they are among the sectors which DEXMA has more experience working with. Supermarkets, restaurants and hotels also are sector where locations are more homogeneous from an energy profile point of view than other sectors available in DEXMA's database, such as offices or educational facilities. It should be noted that each sector has a different definition of the size. This can be seen in the table below:

Table 16: Target group sizes

	Restaurant	**Supermarket**	**Hotel**
Small	< 250 m^2	< 1000 m^2	< 2000 m^2
Medium	250 < S < 500 m^2	1000 < S < 2500 m^2	2000 < S < 5000 m^2
Large	> 500 m^2	> 2500 m^2	> 5000 m^2

When setting up a new location or editing an existing one in DEXMA Analyse, the sector information of each building can be introduced in the Information page on Locations section under Settings. Also, the surface in m^2 can be filled in the same section.

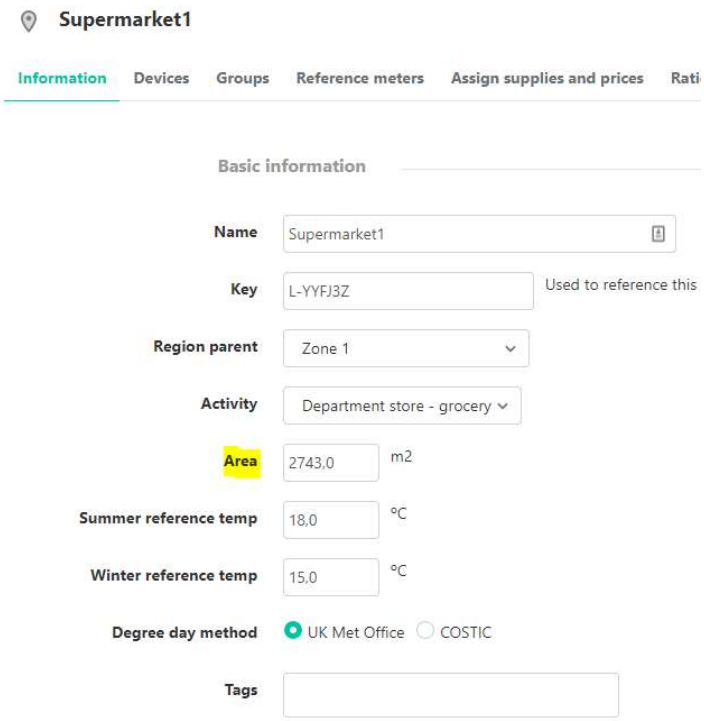


Figure 31: Surface introduction in a location (in yellow)

2.3.2. State of the art

DEXMA Analyse does not have a chatbot that serves as an assistant to facility managers. However, some chatbots can be found in the energy industry. For instance, UK utility Pure Planet developed an AI-powered chatbot called WattBot which answers usual customer queries which were previously answered by their team on energy experts. Another example is Sam, the chatbot created by German utility E.ON which gives meter readings to customers, enables them to choose their tariff and to raise doubts to advisors.
Nevertheless, Eco-Bot fills the need of facility managers and ESCOs for energy efficiency chatbots by using NILM methods and advanced energy data analytics to break energy consumption down to the appliance level and communicate the information through the chatbot's interface.

2.3.3. Definition of demo case's expectations and added value using the Eco-Bot system

The demo case in DEXCell Energy Manager is a B2B use case – this means that Building Energy Management System (BEMS) users, like facility managers, will use the chatbot in order to increase and/or improve the functionalities of the BEMS (DEXMA Analyse, formerly known as DEXCell EM). The Eco-Bot chatbot offers a variety of functionalities for facility managers and/or owners and energy managers such as a recommendation engine that displays the best available recommendation in order to increase the energy savings in the

locations managed by the user. The added value of Eco-Bot for facility managers is described in the following table:

Table 17: Value Proposition for DEXMA

Value Proposition
• Allows for time saving and efficiency through better decision making • Reduces energy duties management to 1h/week • Delivers constant legislation updates for building related topics • Enables control of major KPI´s at a glance • Energy cost and saving control possible • Allows early problem detection • Offers various options for push notification intervals • Offers a chat function, which does your service work • Allows FMs to switch from reactive to proactive • Increases building safety

As a time-saving solution for facility managers, an accessibility and availability comparison has been made in the table below between existing functionalities in DEXMA Analyse and Eco-Bot.

Table 18: Functionality accessibility in Eco-Bot compared to current state in DEXMA Analyse

Eco-Bot functionality	Current availability in DEXMA Analyse	Current accessibility in DEXMA Analyse	Accessibility in Eco-Bot	Strategic relevance for DEXMA
League tables	Unavailable	-	High	High
Portfolio management tracking	Unavailable	-	High	Very high
Energy savings	Available	Low	Medium	High
Sensor data	Available	Medium	High	Medium
Load disaggregation per appliance	Unavailable	-	High	High
Metrics	Available	Medium	High	Very high
Contracts status	Available	High	High	Medium
Retrofits opportunities	Unavailable	-	Medium	High
Change settings	Available	Medium	High	Medium

Eco-Bot functionality	Current availability in DEXMA Analyse	Current accessibility in DEXMA Analyse	Accessibility in Eco-Bot	Strategic relevance for DEXMA
Congratulate behavioural change	Unavailable	-	Medium	High
User support	Available	High	High	High
Legal information	Unavailable	-	High	Medium

2.3.4. Demo case specific objectives using the Eco-Bot system and testing scenarios

For the B2B demo case, as in the rest of demo cases, the main aim is to generate savings in the tertiary buildings which are being managed by the participating ESCOs (Energy Service Companies) and facility managers. However, as detailed in Deliverable D3.3, the objective in the B2B case is that end users will be greatly satisfied with the chatbot and recommend it to colleagues and professionals in other ESCOs. The objective is that 50% of Eco-Bot's end users in the B2B pilot are promoters of the solution. In order to track this KPI, NPS surveys will be conducted among the end users of the B2B case. The NPS surveys will be sent to the end users once: at month 40, when the pilot ends. Further detail about NPS calculation is given in 2.3.5.2.

Furthermore, for this demo case there is another specific objective: the amount of commercial buildings that are affected by a change to save energy, via behavioural change or through an investment. As in the B2B case end users are likely to be managing portfolios with several buildings, it is more representative to evaluate each building or location than to evaluate the end user, who will most definitely have implemented at least one energy saving measure.

2.3.4.1. Grouping of locations and facility managers per group

For this demo case, the locations are grouped according to the ESCO that manages the location. In each group there are one or several facility managers, depending on the amount of target groups in each location group. Hence, 3 location groups are created:

- Group 1: 9 locations (restaurants and hotels) and 3 facility managers
  - 1 Facility Manager manages restaurants
  - 1 Facility Manager manages hotels
  - 1 Facility Manager manages restaurants and hotels
- Group 2: 1 location (a hotel and 1 facility manager)
- Group 3: 10 locations (supermarkets) and 1 facility manager

On top of all these users there will be 2 super users which will be able to see the whole portfolio of the demo case to be able to calculate the KPIs for the project and modify the account settings, if needed.

2.3.5. Introduction of KPIs and targets and means of verification considering challenges that might occur

KPIs for the B2B demo case can be classified in several types, further explanation can be found in the following points:

- Energy savings actions related parameters
- Green impact related parameters
- Economical parameters
- Rebound effect related parameters
- User involvement related parameters
- Pilot specific hypotheses related parameters

These KPIs have been already described in Deliverable D3.3, however, some of them need information from DEXMA's end in order to be calculated. The information needed from DEXMA for each KPI is described in the following section.

2.3.5.1. Information obtained from DEXMA's end needed to calculate KPIs

Total increase of energy savings by participating commercial users

This KPI indicates the percentage increase of energy savings achieved by the Eco-Bot B2B demo case users after they started using Eco-Bot. It will be measured using the total energy consumption of the buildings managed by the users during the 12 months of the pilot compared to the baseline before the pilot phase.

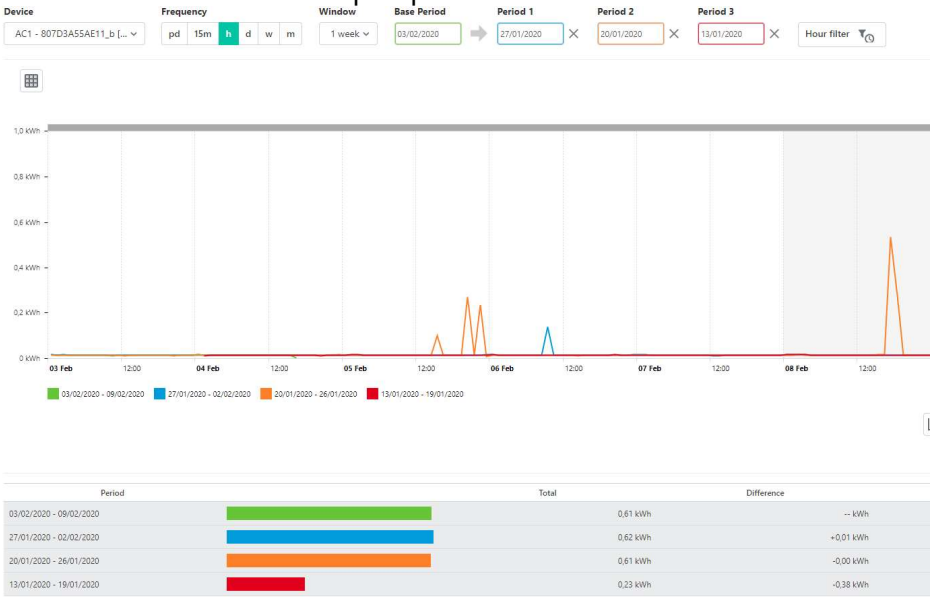


Figure 32: Comparison section in DEXMA Analyze

The calculations will be performed by DEXMA, which will have this information available in the DEXMA Analyse's Comparison section and in DEXMA's backend. The target for this KPI is to achieve a 20% increase in energy savings for the mentioned period.

Overall energy savings achieved (in MWh)

The total amount of savings in MWh achieved throughout the Eco-Bot B2B demo case is measured once the pilot finishes. The target for the commercial pilot is of 1500MWh/year. This information is obtained in a similar way as in the previous KPI: in DEXMA Analyse's Comparison section.

Average amount of avoided CO_2 emissions of each user

This parameter describes the estimated amount of CO_2 emissions that have been avoided in each facility. This KPI, is obtained by multiplying the Overall energy savings achieved (in MWh) by the European average carbon emission factor conversion, which is 0.296 $kgCO_2$ per kWh and dividing this amount by the total amount of facilities. The target for the commercial pilot is the following:

$$\frac{1500000kWh/year}{20\ locations} \times \frac{0.296\ kgCO_2}{kWh} = 2200\frac{kgCO_2}{year}$$

This can be also be calculated by the Carbon Emission app, available in DEXMA's Apps Market. This app calculates the amount of CO_2 emissions produced by the electrical consumption in a facility for a certain period, so emissions avoided can be calculated by subtracting the difference.

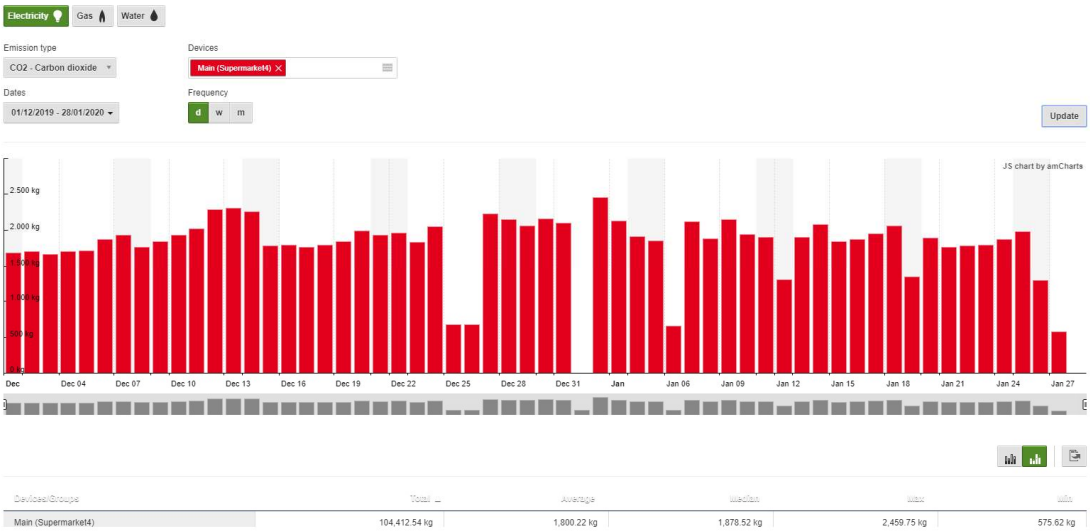


Figure 33: Carbon Emissions app in DEXMA Analyze

Costs saved per facility

This KPI describes the amount of costs saved (in €) that have been saved by the use of Eco-Bot. Multiplying the energy savings for each facility, which can be obtained by Eco-Bot or in DEXMA Analyse's backend, times the price of energy (in €/kWh), which can also be obtained in DEXMA Analyse's backend. It will be calculated every 4 months since the start of the commercial pilot. The target for this KPI is of 1125€/year per facility, assuming electric costs of 0,15€/kWh.

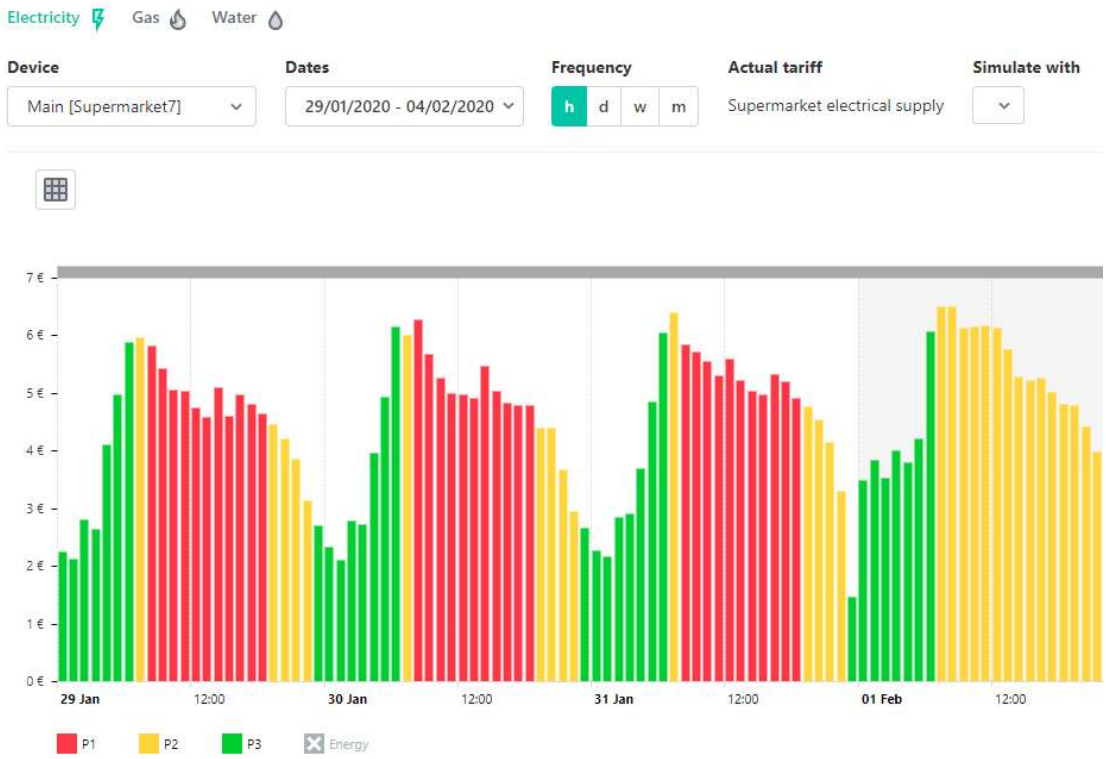


Figure 34: Calculated electric cost in a location for a certain period

Electricity cost can be calculated in the Cost section in DEXMA Analyse, so this KPI can be calculated as well by subtracting the cost from the different periods.

2.3.5.2. Rebound effect related parameter

Sensibilization of the users for the rebound effect

The rebound effect is described as the overcompensation by facility users after an energy efficiency measures has been implemented. For instance, old lighting devices in a facility have been changed to LEDs and there is an expected 50% energy savings in lighting, but the savings are only 40%. Then, it is possible that the savings are not achieved because of the rebound effect. That is, users have changed their habits and have used more lighting because they know lighting is now more efficient.

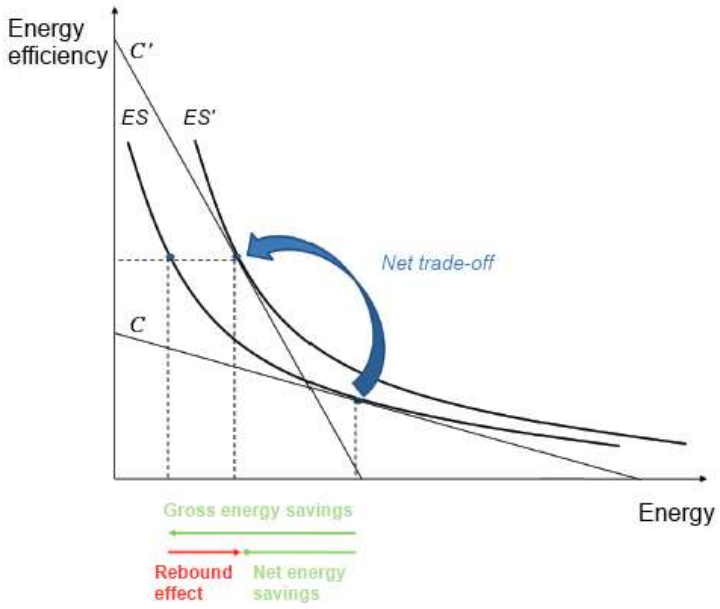


Figure 35: Rebound effect chart[4]

Eco-Bot will raise awareness of the rebound effect by informing the user about the risk after a facility manager installs new equipment and registers it in Eco-Bot. Another message will be sent 2 months after the installation of new equipment. The target of this KPI is that 50% of facility managers who received information about the rebound effect found it useful.

2.3.5.3. User involvement related parameter

First involvement (Recruitment)
This parameter indicates the number of consumers engaged in Eco-Bot and it is measured during the first month of the commercial pilot. The defined target for this KPI is of 20 facilities managed using Eco-Bot. The first involvement KPI target has been achieved in this demo case, as 20 facilities managed by 3 of DEXMA's partners have already been onboarded. The details of these facilities (sector, country, partner, etc) are displayed in the following table:

[4] Energy 3.0, Energy Efficiency Magazine: http://www.electrical-efficiency.com/2014/06/rebound-effect-energy-efficiency/

Table 19: Recruited pilot entities for Eco-Bot and the ESCO which is managing it

Pilot entity	Sector	Managed by partner	Country	Postal Code
Location 1	Hotel	Optimised Buildings	UK	DE74 2TZ
Location 2	Restaurant	Justa Energía	Spain	08003
Location 3	Restaurant	Justa Energía	Spain	08005
Location 4	Restaurant	Justa Energía	Spain	08029
Location 5	Restaurant	Justa Energía	Spain	08011
Location 6	Restaurant	Justa Energía	Spain	08002
Location 7	Restaurant	Justa Energía	Spain	08029
Location 8	Restaurant	Justa Energía	Spain	08038
Location 9	Hotel	Justa Energía	Spain	17320
Location 10	Hotel	Justa Energía	Andorra	AD500
Location 11	Supermarket	Emerson	Italy	53048
Location 12	Supermarket	Emerson	Italy	06059
Location 13	Supermarket	Emerson	Italy	06023
Location 14	Supermarket	Emerson	Italy	52100
Location 15	Supermarket	Emerson	Italy	50127
Location 16	Supermarket	Emerson	Italy	50053
Location 17	Supermarket	Emerson	Italy	59100
Location 18	Supermarket	Emerson	Italy	50143
Location 19	Supermarket	Emerson	Italy	50134
Location 20	Supermarket	Emerson	Italy	56023

2.3.5.4. Information obtained from surveys or user interviews used to calculate KPIs

Success of first involvement strategies
This represents a qualitative assessment of the different first involvement strategies in order to identify the successful ones. It is measured interviewing the participants, in this case the facility managers, between month 2 and month 3 after the pilot launch. The target defined for this KPI is that at least 3 aspects of successful second involvement strategies are identified.

Sensibilization of the users for the rebound effect
The rebound effect is described as the overcompensation by facility users after an energy efficiency measures has been implemented. For instance, old lighting devices in a facility have been changed to LEDs and there is an expected 50% energy savings in lighting, but the savings are only 40%. Then, it is possible that the savings are not achieved because of the rebound effect. That is, users have changed their habits and have used more lighting because they know lighting is now more efficient.

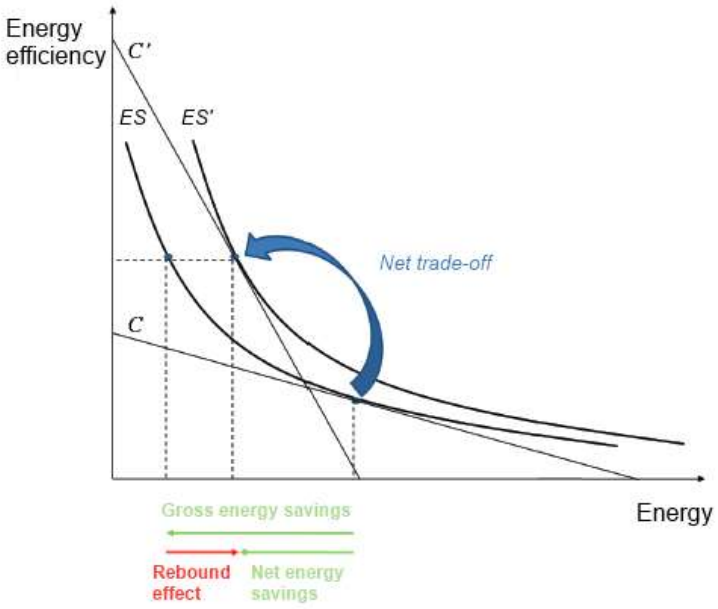


Figure 33: Rebound effect chart[5]

Eco-Bot will raise awareness of the rebound effect by informing the user about the risk after a facility manager installs new equipment and registers it in Eco-Bot. Another message will be sent 2 months after the installation of new equipment. The target of this KPI is that 50% of facility managers who received information about the rebound effect found it useful.
This information will be asked on the survey sent to the user at the end of the pilot.

DEXMA Analyse Net Promoter Score (NPS)
This KPI reflects how many users recommend DEXMA Analyse thanks to the Eco-Bot chatbot solution. The Net Promoter Score is calculated based on responses to a single question: How likely is it that you recommend our company/product/service to a friend of colleague? There is a 0 to 10 scale, where 9 and 10 are Promoters, 7 and 8 are Passives/Indifferent and 0 to 6 are Detractors. NPS Score is the % Promoters minus % Detractors.

5

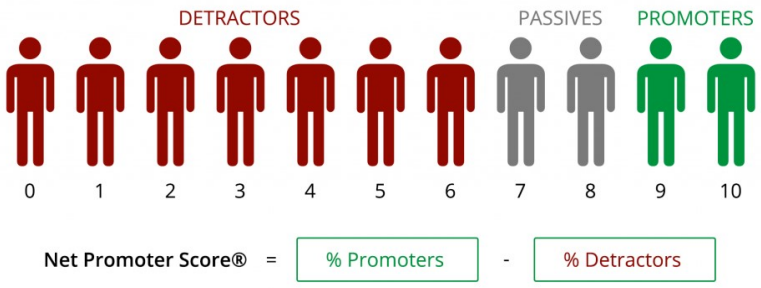


Figure 36: Net Promoter Score calculation

The user, in this case the facility manager, will be asked to give the NPS rating for 'DEXMA Analyse with Eco-Bot' and 'DEXMA Analyse without Eco-Bot'. The target for this demo case is that:

- More than 50% of users give higher NPS rating for 'DEXMA Analyze with Eco-Bot' than for 'DEXMA Analyse without Eco-Bot'.
- 50% of the ens users are promoters of Eco-Bot.

The NPS-related questions will be sent to the user included in the final survey, sent at the end of the pilot phase (Month 40).

2.3.5.5. Information obtained from Eco-Bot's backend used to calculate KPIs

Commercial buildings (facilities) that were affected by a change to save energy (behavioural change or investments)

As described in D3.3, this KPI reflects the amount in percentage of facilities managed by an Eco-Bot end user that have been affected by a change in energy usage after starting to use Eco-Bot. It takes into account any changes that are recommended by Eco-Bot (energy-saving recommendations) and energy-saving event which may have been introduced by the user. In DEXMA's pilot case, the aim is to achieve that 80% of the facilities have implemented at least 1 measure to save energy. At this moment, this means that 16 out of 20 facilities should implement at least one recommendation or energy-saving event before the end of the pilot. The information regarding which facilities have implemented at least one recommendation or recorded an energy-saving event will be stored in Eco-Bot's backend.

Implemented energy-saving measures recommended by Eco-Bot

Similarly, this KPI indicates the number of energy-saving recommendations have been implemented have been implemented by the user. The difference is that, in this case, only recommendations and insights suggested by Eco-Bot are considered. This is measured every four months since the start of the pilot and the target that 160 recommendations have been implemented in facilities during the pilot phase.

2.3.6. Analysis of equipment required

Equipment was already installed in the pilots before their participation in the Eco-Bot project, as the facilities are managed by some of DEXMA's participants in the **Beta Tester Programme** and other partners which are not participants but already have been monitoring the facilities for some time. DEXMA engaged partners participating in its **Beta Tester Programme**, which includes partners that want to be the first to test new functionalities in DEXMA Analyse and most of their facilities already have submetering devices installed. Maintenance has been done by DEXMA's partners in order to reset some inactive meters and sensors.

2.3.7. Legal framework

Eco-Bot end users will receive an email with a link to register on DEXMA Analyse. Once they have registered in DEXMA Analyse, where they will have accepted DEXMA's Privacy policy[6]. Eco-Bot users will see the consent information in Eco-Bot's landing page in DEXMA Analyze. The consent form is displayed in the Annex at the end of this document. The consent form explains which personal data is collected from the end user, how it is being collected, under what legal basis, for how long and what can the user do if he/she wants to delete the personal data.
In order to onboard the pilots, an agreement was signed with each of the partners involved in the project to be able to use the data for Eco-Bot. A template of this agreement is displayed in the Annex at the end of this document (Pilot Agreement 2). The aim of this document is to set a legal basis for the use of facility data (consumption, building metadata) by the project consortium. It also defines the duration of the data assignment to the consortium, partner's responsibilities with the pilot locations and the intellectual and industrial property rights.

2.3.8. Recruitment strategies considering segmentation and means of verification of segmentation

The segments in DEXMA's pilot (3 types of buildings of different sizes: supermarkets, restaurants and hotels) are very well represented in DEXMA's platform, which contains more than 24.000 tertiary buildings in a network of more than 275 partners.
Initially, the recruitment strategy involved offering free datapoints in exchange of equipment installation and use DEXMA Analyse of the facilities recruited for the Eco-Bot B2B pilot. This strategy drew some interest from partners, but it was finally discarded because there were time constraints in order to install all the equipment in the facilities selected by the partners.
Once that it was clear that the installation of submetering devices and sensors was not a viable initiative, the option of recruiting facilities which already had submetering gained strength. Several beta tester partners expressed their interest in Eco-Bot, but only 2 of them had the building types that belonged to the defined target groups. These 2 partners, Justa Energía and Emerson were finally recruited to participate in the pilot phase of the Eco-Bot project. One of these partners, Justa Energía, was already participating in the pilot of another project and the data from these facilities was being stored in a third-party platform. Therefore, several legal challenges had to be overcome in order to onboard the partners' facilities in Eco-Bot project. After many conversations between DEXMA, the partner and the owners of the third-party platform, an agreement was reached so that DEXMA could use the data for

[6] DEXMA's Privacy Policy: https://www.dexma.com/legal-stuff/privacy-policy/

this project. A template of this agreement has been added to the Annex of this document (Pilot Agreement 1).
The difference between the Pilot Agreement 1 and 2 is that, in the latter, data from the pilots (historical and real-time data) is collected through a third-party platform, which then is passed on to DEXMA Analyse while in Pilot Agreement 1 data is transferred to DEXMA Analyse without any third party platforms. In both cases, data belongs to the pilot entity and it can be used for Eco-Bot project purposes for a limited period.
In addition, both agreements state the anonymization of personal data. However, only Pilot Agreement 2 defines the parties' responsibilities with the pilot tests. This is not mentioned in Pilot Agreement 1 because it is defined in the agreement between the third-party platform, the partner and the pilot entities.
The final recruitment strategy was manually searching in DEXMA's database for suitable facilities for Eco-Bot and contacting the partner which was managing these facilities. This way, another partner which was not participating in the beta tester program but was managing facilities with submetering was recruited for the project.
DEXMA's recruitment strategy for partners focused mainly in explaining the added value of the chatbot for their facility managers, stressing the high accessibility of functionalities using the chatbot (hence saving time) and the accurate push notifications that they would receive.
As partners tend to specialise on a certain type of building, several partners were addressed and recruited. This way, a good representation of the segments was ensured. The information about the pilot locations that have been recruited for the Eco-Bot project can be seen in table 20. Clusters or segments for this demo case were defined according to the use of the building and its size, so verifying the segmentation consists of checking that these 2 variables are well represented in the portfolio of recruited buildings.
However, it must be noted that, in these 3 sectors, bigger facilities could be more easily recruited than smaller ones because they tend to have more resources for facility management and usually have more room for savings and/or improvements. Hence, it is probable that the bigger segments are better represented than the smaller ones in size.

2.3.9. Planned Eco-Bot launch and roll-out and user involvement strategies over the pilot phase and means of verification

Eco-Bot launch is planned for February 2020 and it is expected to last for the next 12 months. During the pilot phase, users (facility managers in this demo case) will be able to use the chatbot to retrieve consumption data from the facilities, set goals, energy-saving events, etc. Also, users will receive recommendations via push notifications periodically.

Table 20: Planned Eco-Bot pilot launch, roll-out and result evaluation

	2020											2021			
	Feb	Mar	Apr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic	Ene	Feb	Mar	Abr
Pilot Phase															
Evaluation of results															

As mentioned in 2.3.7, the first user involvement strategy consisted on speaking to the facility managers of the partners which displayed interest in Eco-Bot. The chatbot's added value described in 2.3.2 was emphasized to the facility managers in order to increase their engagement with Eco-Bot.
As a parallel user involvement strategy, several posts were published on social media (mainly LinkedIn and Twitter) from DEXMA's account in order to disseminate and involve users in the Eco-Bot project.

Figure 37: DEXMA post in LinkedIn about Eco-Bot project

The interview on Month 34 will provide some insights regarding second involvement strategies which will be applied in the following months.
Regarding the tracking of user engagement with the chatbot, the backend of the system will track the use of the chatbot by the end users. DEXMA will ask PLEGMA for that information sometime after the launch and detect any inactive users. Any inactive user would be contacted via email and encouraged to participate in the pilot. This can be done manually because the quantity of real end users will not be high: there will be a few facility managers.

2.3.10. Planned evaluation of the segmentation model and of user recommendations by user survey and administration backend

The evaluation of the segmentation model and the user recommendations will be done so months after the pilot phase has begun. From DEXMA's side, the way to check if recommendations are well suited for the buildings managed is by sending a survey to the facility managers asking them to rate the recommendations received until that moment. The surveys sent for NPS and user satisfaction results will include questions about the evaluation of the recommendations by the end users. This feedback will include questions regarding the general usefulness of the recommendations, the accuracy of the segmentation, the resistance by the facility users to follow it, etc.

The backend will store recommendations lists which contain the recommendations per pilot and segment. These lists will also contain parameters such as the times each recommendation has been implemented, users found it useful, etc. This anonymized information will be shared with DEXMA, which will then be able to evaluate the segmentation model and the recommendations. The main conclusions obtained in the analysis of the recommendations lists will be double-checked with the results of the survey sent to the users.

2.3.11. Planned evaluation of the user satisfaction and usability of the system and of user interaction

Surveys sent to the facility managers will include an NPS score and other questions related to the facility managers' satisfaction with the chatbot. Their opinion on the chatbot's usability will also be collected in the survey. Ideally, these surveys will be conducted 3 times: at the end of the small-scale validation, at the middle of the pilot and at the end of the pilot phase.. The user experience survey, which will be sent to the end users, is defined in Deliverable D3.3. In order to obtain further information about user satisfaction and usability of the chatbot, Intercom messages will be sent to the user through email and DEXMA Analyse software linking to a survey about user satisfaction and usability of the chatbot.

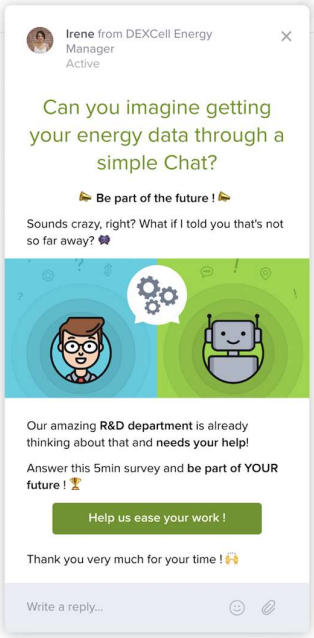


Figure 38: Example of message sent through Intercom to DEXMA Analyse user used for Eco-Bot project within WP2

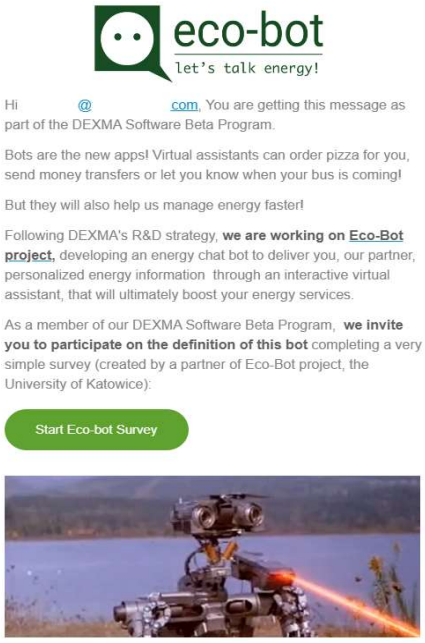


Figure 39: Example of email message sent through Intercom used for Eco-Bot project within WP2

2.3.12. Planned evaluation of energy saving measures and investments triggered by the Eco-Bot system

When the facility managers introduce an energy-saving event in the chatbot, the backend will store it and if the time lapse for the event has passed, it will inform the user via push notifications if the event was successful or not. The information about all energy-saving events and investments introduced in the chatbot by the end user will be stored in the backend. The data, in order to be evaluated by the pilot entity, should be shared by the backend and processed at least once during the pilot phase.

2.3.13. Planned monitoring and evaluation of energy, emission and cost development of single users and of the aggregated usage by all test participants

As mentioned in section 2.3.4.2, several KPIs related to aggregated energy and CO_2 emissions savings will be calculated at the end of the pilot phase and they will be compared to the target set in the same section.
Energy savings achieved in individual facilities will be checked in DEXMA Analyse interface at the end of the pilot phase, where consumption can be compared in different periods, as well as carbon emissions and cost savings.

Compare with | Previous period (23/01/2020 - 29/01/2020)

Periods	Tariff	Consumption	Cost	Average	Max	Min
P1	0,014530 €/kWh	13.431,70 kWh -21,8 %	195,16 € -21,8 %	4,44 € -2,2 %	6,28 € -8,6 %	2,87 € + 13,9 %
P2	0,014530 €/kWh	10.572,96 kWh -19,3 %	153,63 € -19,3 %	4,52 € -2,7 %	7,29 € + 2,1 %	2,91 € -3,3 %
P3	0,014530 €/kWh	14.368,77 kWh -17,6 %	208,78 € -17,6 %	3,31 € -5,9 %	6,94 € -1,1 %	1,69 € + 31,8 %
TOTAL	**0,014530 €/kWh**	38.373,43 kWh -19,6 %	557,57 € -19,6 %	-- -- %	7,29 € + 2,1 %	1,69 € + 31,8 %

Figure 40: Comparison table in Cost section of DEXMA Analyse

Analyse

2.3.14. Monitoring of socio-economic, environmental and institutional barriers

Some DEXMA's partners might prefer not to dedicate time from their facility managers to the pilot phase, as it involves some user formation and dedication. Even though this is a timesaving (among other savings) application, partners might not initially view it this way and be discouraged by the initial time investment required for formation and facility user engagement.

Also, behavioral recommendations will require an involvement from the facility users, who will have to be engaged by the facility manager. The facility manager might face some resistance to change from the facility users. Facility managers will be inquired about which behavioral recommendations face more resistance from facility users as part of the feedback on the energy-saving recommendations described in 2.3.10.

3. Conclusion:Next steps until the roll-out of the three pilots

All three pilots will start in February/March following the implications defined in this deliverable. The results of the single pilots will be compiled in D5.2 to D5.4 and D5.5 will summarize the quantitative and qualitative results for all pilots including all parameters defined in D3.3, lessons learned and a SWOT analysis. The results will be used for dissemination (WP6) and future exploitation of Eco-Bot system and its single components (WP7).

ANNEX A: Consent form SEnerCon

This informed consent sheet explains the further processing of your data and information provided in the research process and documents your rights.

1. Description of the Project

The Eco-Bot project aims at increasing energy efficiency in private households by integrating an innovative chatbot function into the interactive Energy Savings Account (iESA) that is combined with energy data evaluations on appliance level by disaggregating smart electricity meter data. Additionally, personalized energy recommendations are provided based on statistical evaluations of behavior surveys.

This research is based upon Article 89 General Data Protection Regulation and Regulation (EU) 1291/2013 on establishing Horizon 2020.

2. Technical data protection:

The web portal iESA ensures an SSL encrypted data transfer to the Eco-Bot data base. All personal user data are stored in strict compliance with the European and German data protection law on external ISO 27001 certified servers run by the company Cronon IT services AG. Regarding data analytics and data base maintenance at SEnerCon, only staff with a special authorisation has access to Eco-Boz user data with signed obligation to confidentiality.

The protection of personal data through the collection, processing, and use during the use of Eco-Bot is an important matter. No data will be collected without the explicit user acceptance of the Eco-Bot data privacy statement. Login Data to the iESA and Eco-Bot system will be granted only through the so-called double-opt-in method[1]. Data will be protected within the framework of legal regulations. Listed below are information about the type of data that will be obtained and how they are used:

The Cronon IT services AG automatically collects and saves information that your browser transmits to them in their server log files. This includes:

- Browser type and version
- Operating system being used
- Referrer URL (the last visited website)
- URL (the requested page)
- Hostname of the accessing computer (IP address)
- Time of server request.

This information will be deleted automatically after 14 days. Only SEnerCon GmbH has access to that data and it is not assignable to any person. Merging of this information with other data sources will not take place.

In addition to that, for registered users the following data is also collected on the platform:

- Username
- Energy consumption data
- Energy cost data
- Data on appliances used in households
- Energy efficiency measures and behavioural changes performed
- Data on the attitude towards energy efficiency and energy behaviour and social data of participants
- Feedback on recommendations made by Eco-Bot and on the use of the system

SEnerCon will forward these data only anonymized to the Eco-Bot partners, so they can evaluate them and send them back using a User ID. Eco-Bot partners are not able to identify the person behind the user ID.

Aggregated anonymized user data will be reported to the European Commission to evaluate the effect and impact of the project.

4. Cookies

Internet sites utilize so-called cookies in several places. They serve the purpose of making the Eco-Bot quality of experience more effective, user-friendly, and safer. Cookies are small text data that are stored and saved in your browser. Most of the ones that we utilize are so-called "Session Cookies". They will be automatically erased after a visit on the iESA.

6. Use and disclosure of personal data

Provided that a user has given us more personal data than mentioned in subparagraph 3, we guarantee to use that information only for the response to your questions, to process closed contracts made with a user, and for the technical administration.

The data collected will only be used for the activities relating to Eco-Bot. This includes providing you with personalized Eco-Bot recommendations as well as the processing for research purposes, dissemination activities in an anonymized format.

The contact data may also be used to invite the you to a survey or an interview at the end of the project to assess the success of Eco-Bot (e.g. your user experience) and improve the Eco-Bot system based on your feedback. Your personal data will under no circumstances be sold to any third party.

The entered personal and appliance and energy data (cost and consumption) will be used to give you feedback on your consumption and cost and personalized energy saving recommendations and help you identify energy wastage in your household.

You shall have the right at any moment to access, to rectificate, to erase, to restrict the processing, the right to data portability and the right to object, as granted in GDPR Article 15 -22. You can also withdraw the consent given by subscribing to the Eco-Bot system at any time according to GDPR Article 6(1) and Article 9(2) without any consequences. Upon request your local supervisory authority will provide you information on exercising your right according to Article 57(e) GDPR.

7. Right to information

A user has always the right to information about the data saved related to him, its source and recipient, as well as the purpose for collection. Upon written request we inform users about the data saved about them.

8. Links to other websites

This explanation about data protection applies to the internet portal of www.energiesparkonto.de. The websites in this internet portal may contain links to other hosts within and outside of www.energiesparkonto.de to which the data protection does not extend.

9. Children

SEnerCon GmbH assures not to knowingly collect data from children in any manner or use them or expose them to unauthorized third parties.

10. General

After having stated these general conditions and rules, we are looking forward to a good cooperation and positive project results. We would like to thank you in advance for your participation in the project.

By clicking on "I agree", the undersigned declare that he/she understand and consent to the conditions and rules stated in this document.

[1] *A new subscriber that wants to be subscribed to the iESA portal receives a confirmation email to verify it was really them that signed up. Using a confirmed opt-in (COI) (also known as a Double opt-in) procedure helps to ensure that a third party is not able to subscribe someone else accidentally, or out of malice, since if no action is taken on the part of the e-mail recipient, they will simply no longer receive any messages from the list operator. https://en.wikipedia.org/wiki/Opt-in_email.*

ANNEX B: Consent form ESTABANELL

Consent form ESTABANELL

Política de Protección de Datos

La persona que participa en el proyecto Eco-Bot (en adelante el "Proyecto" o "Eco-Bot", indistintamente) consiente explícitamente el tratamiento de sus datos personales conforme a lo descrito en la presente Política de Protección de Datos (en adelante la "Política").
Es importante que leas la Política para informarte de cómo, por qué y para qué usamos tu información personal en el Proyecto.
Este Proyecto ha sido co-financiado por la Comisión Europea bajo el programa *"H2020-EU.3.3.1. - Reducing energy consumption and carbon footpint by smart and sustainable use"*, en cumplimiento con el "*Grant Agreement nº 767625*".

1. ¿Quien es el Responsable del Tratamiento de tus datos?

El responsable del tratamiento de tus datos es la mercantil ESTABANELL Y PAHISA ENERGIA, S.A. con NIF A61121752 (en adelante "**Estabanell Energía**"). Nos encontramos en la Calle Rec, nº 28, 08401, Granollers, Barcelona – Tlf. 900 250 260.

Estabanell Energía ha nombrado un Delegado de Protección de Datos ante el que puedes poner en conocimiento cualquier cuestión relativa al tratamiento de tus datos. Puedes contactar con nuestro Delegado de Protección de Datos en: lopd@estabanell.cat

2. ¿Con qué finalidades tratamos los datos personales?

Los datos personales serán tratados con las siguientes finalidades, según apliquen:

Para los Grupos I y II, detallados (según definido en los términos de uso y condiciones del Proyecto Eco-Bot.estabanell.cat/participar), (i) ofrecerte consejos personalizados sobre eficiencia energética basados en tu perfil, es decir, basados en el "tipo de consumidor" que eres - por ejemplo, si te preocupa el medio ambiente el Proyecto te dará consejos sobre cómo utilizar mejor la calefacción eléctrica con menor consumo y mismo resultado; (ii) analizar la información y datos de consumo que obtiene automáticamente de tu contador eléctrico que actualmente ya tienes instalado, para ofrecerte consejos de eficiencia de la forma más precisa y completa posible; (iii) ofrecerte publicidad personalizada sobre los productos y servicios que ofrece tu compañía eléctrica; (iv) ofrecerte recomendaciones personalizadas sobre los electrodomésticos eficientes que están disponibles en el mercado, así como nuevos mecanismos o instalaciones a tal fin; (v) contestar automáticamente a todas las preguntas que formules a la aplicación, (vi) mejorar las experiencias de los usuarios en su relación con Eco-Bot, como mejorar el diseño y usabilidad de la web.

Adicionalmente y para el Grupo II, se recopilarán, generarán y analizarán los datos obtenidos del contador adicional instalado en su domicilio (de forma gratuita) para dar información sobre el consumo eléctrico de los electrodomésticos del hogar. Esta información adicional obtenida tiene la finalidad exclusiva de mejorar la experiencia de usuario y dar información de consumo más precisa.

Para el Grupo III, se recopilarán y analizarán información y datos de consumo que obtiene automáticamente de tu contador eléctrico para ser comparados con datos obtenidos de los Grupos I y II.

Para todos los Grupos, los datos serán usados con finalidad de gestión y emisión de documentos y notificaciones relacionadas con la participación en el Proyecto y para responder al ejercicio de los derechos aquí establecidos, consultas y reclamaciones.

La finalidad del tratamiento de estos datos es cumplir con los objetivos del Proyecto que responden a objetivos públicos y ambientales amparados por la Comisión Europea. A tal fin, le informamos que compartiremos los resultados de este piloto, de forma anónima, con los participantes adscritos al mismo programa, garantizando en esta cesión los derechos aquí establecidos y el anonimato de los mismos.

3. ¿Cuál es la base legal del tratamiento de tus datos personales?

Nuestra base legal para recopilar tu información personal y utilizarla para todas las finalidades señaladas en esta Política es el **consentimiento explícito** que nos otorgas i) al firmar el formulario de inscripción al Proyecto, (ii) al registrarte como usuario de la web “ECO-BOT” o como participante en el Grupo III de referencia.

4. ¿Durante cuánto tiempo los trataremos?

Los datos obtenidos y elaborados por el Proyecto serán conservados hasta su finalización o, de forma anterior, en el caso que nos solicites su cancelación.
Si después de rellenar el primer formulario de contacto, no participas en el Proyecto, cancelaremos los datos facilitados inmediatamente.

5. ¿A qué destinatarios se comunicarán tus datos?

Excepto por lo aquí expresamente establecido, en ningún caso comunicaremos tus datos personales a terceros y tampoco serán vendidos ni cedidos, excepto cuando así lo exija la ley (normativa fiscal, laboral, de Seguridad Social o cualquier norma aplicable) o cuando sea imperativo para proteger tus derechos o los nuestros.

6. ¿Cómo Protegemos tus datos personales?

Usamos las técnicas de seguridad de información, control de accesos y mecanismos que tienen la finalidad de evitar el acceso no autorizado a los datos y garantizar la seguridad de los mismos. Manifestamos adoptar medidas suficientes a tal fin, así como para evitar su pérdida, alteración y acceso no autorizado de terceros.

7. Conoce tus derechos en relación con tus datos personales

Tienes derecho a obtener información sobre qué datos personales tratamos en **Estabanell Energia** sobre ti, la fuente de los datos, con qué fines los utilizamos, entre otros.
Puedes **acceder** a tus datos personales, para consultar y obtener confirmación sobre los datos que tenemos.
Tienes derecho a solicitar la **rectificación** de los datos que sean inexactos o que se completen cuando sean incompletos.
Puedes solicitarnos su **supresión** cuando, por ejemplo, hayas dejado de participar en el Proyecto o consideres que ya no son necesarios para la finalidad para la que fueron recogidos, entre otros motivos.
Tienes derecho a solicitar la limitación del tratamiento de tus datos, en cuyo caso solo los conservaremos para los fines si aceptados.
En algunos casos podrás **oponerte** al tratamiento de tus datos, así como a solicitarnos la limitación del tratamiento. En estos casos **Estabanell Energia** sólo los conservará para el tratamiento necesario, como la resolución de quejas y reclamaciones.
Tienes derecho a **retirar tu consentimiento** en cualquier momento, sin que ello afecte a la licitud del tratamiento basado en el consentimiento previo a su retirada.
Puedes ejercer estos derechos enviando tu solicitud a lopd@estabanell.cat indicando como asunto ECO-BOT EJERCICIO DERECHOS RGPD. La solicitud deberá acompañarse de una copia del documento oficial que acredite la identidad del titular de los datos, indicándonos qué es lo que necesitas en relación con tus datos. Si lo prefieres puedes enviarnos tu solicitud, también junto con una copia del documento oficial que acredite la identidad del titular de los datos, por correo ordinario a nuestra dirección Calle Rec, nº28, 08401, Granollers, Barcelona. Por favor, no olvides indicar que es un tema relacionado con la protección de datos.
Si no respondiésemos satisfactoriamente a tu solicitud, puedes presentar la reclamación que consideres oportuna ante la Agencia Española de Protección de Datos, que es la autoridad encargada de velar por el cumplimiento de tus derechos en esta materia, en Calle Jorge Juan, nº6, 28001, Madrid o en su sitio web: www.agpd.es.

Gracias por tomarte el tiempo para leer esta Política de Protección de Datos.
¡Esperamos que disfrutes del chat Eco-Bot!

ANNEX C: Consent form DEXMA

INFORMATION SHEET ON PARTICIPATION WITHIN ECO-BOT PROJECT (DEXMA PILOT)

The person participating in the Eco-Bot project (hereinafter the "Project" or "Eco-Bot", without distinction) explicitly consents to the processing of his or her personal data as described in this Data Protection Policy.

It is important that you read the Policy to learn how, why and for what purpose we use your personal information in the Project.

This Project has been co-funded by the European Commission under the programme "H2020-EU.3.3.1.-Reducing energy consumption and carbon footprint by smart and sustainable use", in compliance with the "Grant Agreement No. 767625".

Who controls the data?

The data collected by means of measuring equipment is always the property of the end customer. This data is stored on the DEXMA platform and managed by both the partner and DEXMA through its DEXMA Analyse platform.

The end customer has signed an agreement authorizing access, storage and use of data within the framework of the Eco-Bot project for the following purposes:

- Create a baseline to assess the impact on energy savings through the use of the chatbot.
- To carry out research, analysis and technological development within the framework of the Eco-Bot project.

This authorisation is also extended to the consortium partners participating in the Eco-Bot project in the aforementioned analysis and development.

What happens with my personal data?

The data shared with the Eco-Bot Consortium is in no way personal data, all the data will be anonymized and will not include the name of the end customer, e.g., access mail or any other personal data. Only the type of establishment, the postal code where the end customer is located, the m2 of surface area and the energy consumption data will be shared.

Indirectly, anonymous data will be shared with the European Commission in the corresponding scientific and technical reports of the Eco-Bot project to demonstrate and justify the project and provide scientific data to support technological developments and new knowledge.

What is the legal basis behind the data processing?

As indicated above, it is not foreseen, within the framework of the Eco-Bot project, to access or process any personal data of the end customer outside of what is already foreseen and regulated within the commercial framework between DEXMA, the partner and the end customer already established for the use of the DEXMA Analyse platform and the access authorization agreement.

However, in the event that it is necessary for the execution of the Pilots the processing of personal data by DEXMA, in accordance with the provisions of Article 12 of Law 15/1999 on the Protection of Personal Data ("LOPD") and other applicable regulations (and those that replace it, such as the General Regulation on Data Protection), the end customer will authorize DEXMA to access and process certain personal data included in a file owned by it and duly registered with the Spanish Agency for Data Protection.

How long will my data be used?

This collaboration is expected to last 18 months (until 31/12/2020) during which time the Pilots will be carried out, extendable for a maximum of 3 months.

What should I do if I want to stop participating in the Eco-Bot project?

You can ask us to suspend all the data that has been shared within the framework of the Eco-Bot project when, for example, you have stopped participating in the Project or you consider that it is no longer necessary for the purpose for which it was collected.

In this case, we recommend that you contact DEXMA's support team at the following email address: support@dexma.com.

Thank you for taking the time to read this Data Use Consent Form.

We hope you enjoy the Eco-Bot chat!

ANNEX D: Pilot agreements DEXMA

Pilot agreement 1

Autorización de uso de datos

Empresa Cliente: ……..
Fecha: ……..

Antecedentes

A. En el marco de un proyecto de I+D denominado "XXX", en el que participan las empresas YYY y DEXMA Sensors SL, YYY ha instalado su hardware en la Empresa Cliente, recopilando determinados datos energéticos y poniéndolos a disposición de la Empresa Cliente tanto en su plataforma ZZZ como en la plataforma de DEXMA Analyse (comunicados por sistema seguro Cloud2Cloud).

B. DEXMA, previo consentimiento de la Empresa Cliente conforme la presente autorización, desea usar dichos datos energéticos fuera del proyecto MODEM para los siguientes fines descritos a continuación.

C. Dexma participa en otro proyecto de investigación europea denominado "ECO-BOT" ("*Personalised ICT-tools for the Active Engagement of Consumers Towards Sustainable Energy*" – el "***Proyecto***"), junto con otros miembros del Consorcio indicados en el Anexo 1

D. ECO-BOT es un proyecto en el que se pretende desarrollar una herramienta de tipo Chatbot que cuenta con una desagregación de la energía consumida mediante el uso de datos procedentes del contador inteligente a baja resolución con el objetivo de cambiar el comportamiento de los usuarios hacia la eficiencia energética. Esta herramienta asistirá a los proveedores de servicios de eficiencia energética (*facility manager*, Partners Dexma) para ayudarles a gestionar mejor la energía en edificios industriales y comerciales, y ofrecerá además una serie de recomendaciones personalizadas que permitirán ayudar al usuario (vía el Chatbot) a conocer mejor sus consumos y las medidas que puede tomar para que reducir su coste energético al mínimo.

E. DEXMA tiene como responsabilidad, dentro del Proyecto, realizar la prueba y demostración de las tecnologías Eco-Bot, implantadas en entidades de tipo "Enterprise" (no domésticos).

F. La Empresa Cliente está interesada en participar en las pruebas ECO-BOT, poniendo a disposición conforme las condiciones del presente Autorización, los datos que provienen de diversos edificios de la Empresa Cliente, recogidos por la empresa YYY y disponibles tanto en la plataforma de YYY como en la plataforma de DEXMA .

Con relación al mencionado proyecto ECO-BOT, la Empresa Cliente autoriza el uso por DEXMA de los datos recogidos indirectamente a través de la plataforma YYY, conforme las siguientes condiciones:

1. **Titularidad**

Los datos de la Empresa Cliente recopilados por YYY para el Proyecto XXX (los "***Datos***") y transmitidos a DEXMA serán en todo caso titularidad de la Empresa Cliente.

2. **Recopilación y almacenamiento**

Los Datos serán almacenados en la Plataforma DEXMA (transmitido entre YYY y Dexma mediante conexión cloud to cloud) y gestionados por DEXMA a través de la plataforma *DEXMA Analyse* de Dexma.

3. **Autorización**

La Empresa Cliente autoriza el acceso, almacenamiento y uso, dentro del marco del proyecto ECO-BOT, de los Datos para las siguientes finalidades:

a) Crear la línea de consumo base (baseline) a partir de la cual se evaluará el impacto en el ahorro energético de la implantación del sistema Eco-Bot.
b) Realizar la investigación, análisis y desarrollo tecnológico (algoritmos) dentro del proyecto Eco-Bot.

Dicha autorización se extiende, respecto de (a) los socios del Consorcio ECO-BOT participantes en el Proyecto ECO-BOT para el mencionado análisis y desarrollo. Los Datos compartidos con los Socios ECO-BOT serán anónimos y en ningún caso se compartirá el nombre del establecimiento ni su titularidad, así como ningún dato de carácter personal. Se compartirá, por tanto, solamente el tipo de establecimiento, el código postal donde se encuentre el edificio, los m2 de superficie (por zonas, si procede) y los datos de consumo energético del mismo.

Asimismo, los Datos (anónimos) podrán ser compartidos con la Comisión Europea en los correspondientes informes científicos y técnicos a los efectos de demostrar y justificar el proyecto ECO-BOT y aportar los datos científicos que fundamentan el desarrollo tecnológico y el nuevo conocimiento adquirido.

Socios del proyecto Eco-Bot:

- RISA Sicherheitsanalysen GmbH,
- Estabanell Y Pahisa Energia SA
- Botego Bilgi Teknolojileri A.S.
- Adelphi Research Gemeinnutzige GmbH
- SEnerCon GmbH
- Dexma Sensors SL
- University of Strathclyde
- Plegma Labs Technologikes Lyseis Anonymos Etairia
- Uniwersytet Ekonomiczny W Katowicach

Firmado por la Empresa Cliente

Pilot agreement 2

Research Pilot Collaboration Agreement

Between
Dexma Sensors S.L. ("**Dexma**") whose registered office is at Napols 189 Baixos E, 08013 Barcelona with Corporate ID B-64461270, represented by Mr Joan Pinyol, Managing Director
And

PARTNER (hereinafter **"Partner"**), domiciled at XXX, Post Code XXX, [City, Country] and with Corporate/Tax ID, represented by its [Director] XXX,

And

XXX (hereinafter "PILOT ENTITY"), domiciled at XXX, Post Code XXX, [City, Country] and with Corporate/Tax ID, represented by its [Director] XXX,

Each of DEXMA, PARTNER and PILOT ENTITY henceforth will be called individually a "Party" and collectively "the Parties".

RECITALS

A. DEXMA has developed its own proprietary software, communications, instrumentation and control platforms, including DEXCell Energy Management Software, provided as software as a service, and Gateway devices for the purpose of energy management, monitoring of environmental parameters, control and automated meter reading of installations and premises of PARTNER's clients.
B. Dexma is a member of a consortium (the "Consortium") that carries out a European research project called "ECO-BOT" ("Personalized ICT-tools for the Active Engagement of Consumers Towards Sustainable Energy the "Project"), along with other members of the Consortium indicated in Annex 1.
C. ECO-BOT is a project in which it is intended to develop a Chatbot type tool that *has a breakdown of the energy consumed by using low resolution data from the smart meter in order to change the behavior of users towards energy efficiency.* This tool will assist energy efficiency service providers (facility managers, Dexma Partners) to help them better manage energy in industrial and commercial buildings, and will also offer a series of personalized recommendations that will help the user (via the Chatbot) to learn more about their energy consumption and the measures they can take to reduce their energy cost.
D. DEXMA has the responsibility, within the Eco-Bot Project, to carry out the test and demonstration of the Eco-Bot technologies, implemented in enterprise premises (non-domestic premises).
E. Partner is a business partner of DEXMA for the commercialization and implementation of energy management solutions, among others based on DEXMA's DexCell technologies. Partner is interested in participating, along with DEXMA, in the trial deployment, testing and demonstration of the Eco-Bot technologies, in conjunction with the DexCell platform; and PILOT ENTITY, client of the partner, is interested in participating in the tests by making available, according to the conditions of this Agreement, various buildings and data of PILOT ENTITY.

THEREFORE, The Parties enter this agreement for carrying out the pilot tests on the following

TERMS

1. OBJECT

The purpose of this Contract is to establish the terms and conditions that regulate the execution by DEXMA, Partner and the PILOT ENTITY of the demonstration pilot tests of the ECO-BOT technologies (each location for the tests, is a "Pilot Test") , the processing of data and information that come from these Pilots and knowledge generated within the Pilots.
For clarification purposes, this Agreement regulates the relationship between the three Parties for conducting the ECO-BOT tests. It does not affect commercial relations initiated prior to the date of this contract between Partner and the Pilot Entity and Partner and Dexma (in particular, but not limited to, the use of the DexCell platform), which are still in force and regulate bilateral relations between Parties.

2. DURATION OF THE CONTRACT AND PILOT TESTS

2.1 This collaboration has an expected duration of 18 months (until 03/31/2021) during which pilots will be carried out. Therefore, this Contract will come into effect on the date of its signature and will last for 1.5 years; without prejudice to ongoing obligations derived from those Pilots that are not completed at the end date, in which case this Contract shall extend its effects with respect to each of said Pilots until the date when all obligations of the Parties relating to the Pilots are completed.

2.2 Duration of each Pilot Test: Each Pilot Test will start on the date agreed upon by the Parties according to the project plan, and will have the duration specified in the plan or, if no date is indicated, until the date on which the testing of the Eco-Bot technologies and the analysis of the data associated with this location are completed.

3. TERMINATION.

3.1 Any Party may terminate the Agreement immediately for material breach by another Party, if such breach has not been cured within fifteen (15) days of receiving written notice of the same.

3.2 In addition, any Party may terminate this Agreement, on giving notice in writing to the other, if any of the other Parties is subject to the appointment of a receiver, administrative receiver, administrator over all or part of its undertaking or asset or shall pass a resolution for winding up (otherwise than for the purpose of a bona fide scheme of amalgamation or restructuring) or a court of competent jurisdiction shall make an order to that effect or if the other enters into any voluntary arrangement with its creditors.

3.3 Upon termination of this Agreement for any reason:

a) Each party shall return all confidential information to the other.
b) Sections 7 to 14 shall remain in full force and effect.

4. PERFORMANCE OF THE PILOT TESTS AND COORDINATION

4.1 For the execution of the Pilots, the ECO-BOT technologies are proposed to be tested in XX installations or locations of the PILOT ENTITY, which will be determined in the Pilots' planning document (the "Plan").

4.2 In general, the Pilots will be developed according to the following schedule to be defined in the Plan.

1. Data collection (July 2019) to ensure that the maximum historical data is provided prior to the chatbot demonstration, with the aim of defining a baseline of energy consumption.
2. Installation and configuration of the chatbot and initial tests (January 2020)
3. Test of the chatbot in the pilot buildings (February 2020 - August 2020)
4. Evaluation of the results obtained (September 2020 - March 2020)

4.3 All Parties will appoint and make commercially reasonable efforts to maintain Pilot Contacts for the term of this Agreement, the first of which are set out in Annex 1. A Party may change a Pilot Contact by notice in writing to the other. Pilot Contacts shall be responsible for managing the relationship between the parties, and attempting at first level to resolve any conflict or dispute hereunder.

5. RESPONSIBILITIES OF THE PARTIES WRT THE PILOT TESTS

With respect to Pilots, the Parties individually assume the following responsibilities:

5.1 Responsibilities of DEXMA

a) Provision and management of the DexCell Platform for the Pilot Entities, under the usual commercial terms.
b) Analysis of the data collected and the activity of the ECO-BOT chatbots

5.2 Responsibilities of Partner

a) Monitor the energy consumption of at least xx pilots, during the entire duration of the same.
b) Actively participate in the configuration, initial tests, test and evaluation phases of the ECO-BOT chatbot system developed in the Project

5.3 PILOT ENTITY responsibilities

a) Making available ….. buildings (indicated in the plan) for the installation of the Measurement Equipment.
b) Collaboration with Partner for the monitoring and testing.

6. ECONOMIC ASPECTS

6.1 DEXMA will cover the following costs related to the execution of the Pilots:

a) Its own internal costs (excluding the use price of the DexCell platform)

6.2 Partner will cover

a) Its own costs of commercial and technical management with the Pilot Entity

1.2 PILOT ENTITY will be responsible for

a) No cost associated in principle

The DEXCell Platform will be used according to the usual prices agreed between the Parties.

7. DATA MANAGEMENT

7.1 Ownership. The data collected through the Measurement Equipment in the course of the Pilots (the "Data") will be owned by PILOT ENTITY.

7.2 Collection and storage. The Data will be stored in the DexCell Platform and managed by Partner and DEXMA through this platform.

7.3 Authorization. PILOT ENTITY authorizes the access, storage and use, within the framework of the Eco-Bot project, of the Data for the following purposes:

a) Create the base consumption line (baseline) from which the impact on energy savings of the implementation of the Eco-Bot system will be evaluated.
b) Carry out research, analysis and technological development (algorithms) within the Eco-Bot project.

This authorization extends, with respect to (b), to the partners of the Eco-Bot Consortium participating in the Eco-Bot Project for the aforementioned analysis and development. The data shared with the Eco-Bot Partners will be anonymous and in no case will the name of the establishment or its ownership be shared, as well as any personal data. Therefore, only the type of establishment, the postal code where the building is located, and the energy consumption data will be shared.
Likewise, the (anonymized) data may be shared with the European Commission in the corresponding scientific and technical reports of the Eco-Bot project in order to demonstrate and justify the project and provide the scientific data that support the technological development and the new knowledge acquired.

8. INTELLECTUAL AND INDUSTRIAL PROPERTY RIGHTS

8.1 Dexma and Eco-Bot Technologies

The DexCell Platform and the Eco-Bot technologies are the property of DEXMA and / or its ECO-BOT project partners. The use of the same is authorized to Partner and the PILOT ENTITY in accordance with the usual conditions of use of DexCell, established between Dexma and Partner and with PILOT ENTITY.

8.2 Know-how

The Know-How acquired or generated during the testing, demonstration, analysis and technological development phase of ECO-BOT technologies within the Pilot Tests will be owned by DEXMA and / or its partners of the ECO-BOT project.
7.3. Brands
In no case will the name of Partner and PILOT ENTITY be used during the dissemination activities of the project without the prior written consent of these Parties. However, the corporate names of Partner and PILOT ENTITY may be indicated in the scientific reports in order to carry out the scientific and technical justification of the project.

9. PERSONAL DATA PROCESSING

It is not envisaged, within the framework of the Pilots, to access or process any personal data of Partner or PILOT ENTITY beyond that which is already regulated within the commercial framework between Dexma, Partner and PILOT ENTITY for the use of the platform DexCell. In the event that DEXMA accesses any personal data under the responsibility of Partner and/or PILOT ENTITY through performance of the Pilot Tests, in accordance with applicable laws and regulations, Dexma shall**:**

a) Process this Data only on the basis of documented instructions from the Pilot Entity, including transfers of Data to a third country or international organization, unless otherwise required to do so under Union law or applicable Member State law; In such case, DEXMA will inform the Pilot Entity of that legal requirement prior to the processing, unless otherwise prohibited by such law or in the public interest.
b) Ensure that the persons authorized to process Data have undertaken to respect confidentiality or are subject to an obligation of confidentiality of a statutory nature.
c) Take all appropriate technical and organizational measures to ensure a level of safety appropriate to the risk of processing.
d) Respect the conditions for having recourse to another Data Processor, as established in the current legislation on protection of personal data.
e) Assist the Pilot Entity, taking into account the nature of the processing, through appropriate technical and organizational measures, whenever possible, so that it can comply with its obligation to respond to requests for the exercise of the rights of the data subjects, here the Gamers.
f) Assist the Pilot Entity in ensuring that Pilot Entity complies with its obligations, taking into account the nature of the processing and the information that is available to DEXMA.
g) At the choice of the Pilot Entity, either destroy or return all personal data once the processing services have been completed, and destroy any existing copies unless the retention of personal data is required under Union or applicable Member State law.
h) Make available to the Pilot Entity all information necessary to demonstrate compliance with the obligations established in herein, as well as to allow and contribute to the performance of audits, including inspections, by the controller or other authorized auditors for the Pilot Entity.
i) Process the Data placed at the disposal of DEXMA in a way that ensures that the personnel in charge follow the instructions of the Pilot Entity.
j) Ensure that the appointed Data Protection Officer (if applicable) or, in his / her absence, the Privacy Officer is involved in an adequate and timely manner in all matters relating to the protection of Data.
k) Adhere to any relevant Code of Conduct that is approved by the European Commission or other competent authority.
l) keep a record of processing activities in the case of processing personal data that may pose a risk to the rights and freedoms of the data subject and / or in a non-occasional manner, or which involves the processing of special categories of data and / or data relating to convictions and infractions.
m) Respond to the legal rights of data subjects established by applicable law even if these were originally addressed to the PILOT ENTITY.

10. WARRANTIES

10.1 Each of the Parties warrants that its agreement to perform its obligations under this Agreement does not violate any agreement or obligation between it and a third party.

10.2 Each of the Parties warrants that it will perform its obligations hereunder professionally and diligently, in accordance with industry standards.

10.3 All parties recognize that the Eco-Bot technologies are being researched and tested, and may have errors or not work according to specification. To the extent permitted by applicable law (and in particular not in relation to death, bodily harm, fraud, willful misconduct

or gross negligence), no party will be responsible for any direct or indirect damage suffered by another party or any action or omission hereunder.

10.4 The use and responsibilities regarding the DexCell Platform are regulated by the corresponding DexCell license.

11. CONFIDENTIALITY

11.1 Each party acknowledges that they may share confidential and proprietary information during the course of the Pilot Tests including but not limited to technical or non-technical data, formulas, patterns, compilations, source code, devices, methods, techniques, drawings and processes.

11.2 Each Party undertakes that it will use this confidential information solely for the performance of this Agreement and will take all reasonable precautions necessary to safeguard the confidentiality of such information. Except as expressly stated herein, each Party will hold in confidence and not disclose, reproduce, distribute or transmit, directly or indirectly, in any form, by any means, or for any purpose the confidential information except to those of its employees, agents, consultants or subcontractors who require access to the data in accordance with the terms of this Agreement.

11.3 No Party shall be restricted under this section 11 (Confidentiality) regarding information that it affirmatively establishes that (i) has or becomes generally available to the public other than as a result of an act or omission of that party or any of its employees, agents, subcontractors or consultants (ii) was in the possession of that party before receiving the information or material related to DEXMA Products and Services (iii) is independently developed by that party, or (iv) is required to be disclosed by law, court order or other legal process, provided that this party shall first provide the owner of the confidential information with prompt notice thereof.

11.4 For the avoidance of doubt, DEXMA may share the Pilot Data with the members of the Eco.Bot Project Consortium, under confidentiality obligations no less protective that those set out herein, and with the European Commission for justifying the Eco-Bot Project. In addition, aggregated and anonymised energy consumption data and related metadata relating may be released publically by DEXMA and the Eco-Bot project consortium.

12. GENERAL

12.1 **Relationship**. Nothing in this Agreement shall be construed as making the Parties partners, joint venturers, representatives or agents of each other, nor shall any party so hold itself out. Nothing in this Agreement shall oblige Partner or PILOT ENTITY to buy any additional service or product from DEXMA.

12.2 **Assignment**. This agreement and the rights and obligations hereunder may not be assigned, transferred or subcontracted by any party.

12.3 **Force Majeure**. No party will be held responsible for any failure, delay or interruption in the execution of the current agreement that may be caused by circumstances outside of its control, such as network failure, network connection failure, earthquake, flooding, strikes, embargos or acts of government.

12.4 **Modification**. The terms of this Agreement may not be modified except by a written agreement issued and signed by a duly authorized representative of all the Parties.

12.5 **Notices**. Any notice required by this Agreement or given in connection with it, shall be in writing and shall be given to the appropriate party by personal delivery or by certified mail, postage prepaid, or recognized delivery service, or digitally signed email with confirmation of receipt, to the addresses first set out above. All notices will be considered as delivered after twelve (12) hours after the remittance (if it has been made by platform or electronic mail).

12.6 **Severability**. If any provision of this Agreement is held illegal or unenforceable by any court of competent jurisdiction, such provision shall be deemed separable from the remaining provisions of this Agreement and shall not affect or impair the validity or enforceability of the remaining provisions of this Agreement. The Parties hereto agree to replace any such illegal or unenforceable provision with a new provision that has the most similar permissible economic or other effect intended in the original provision.

12.7 **Mandatory applicable law**. The present agreement does not intend to exclude nor limit any condition, guarantee, right or responsibility that may not be excluded nor limited in accordance with applicable law. Some laws do not allow the exclusion of certain guarantees or conditions nor the limitation of exclusions of responsibility for losses or damage caused by negligence, contractual non-compliance or non-compliance with implied terms or for incidental or indirect damages. Thus, only the limitations considered in the present agreement that adhere to applicable law will be applied, and the responsibility of DEXMA will be limited to the extent of said law.

12.8 **Export**. Partner agrees that it will comply with all export and import laws, rules, policies, procedures, restrictions and regulations of applicable competent jurisdiction, agency or authority, and not to export or import, or allow the export or re-export or import of any goods in violation of any such restrictions, laws or regulations.

12.9 **Applicable law**. This Agreement is governed by the laws of England and Wales. All disputes arising under or relating to this Agreement shall be resolved exclusively in the courts and tribunals of London, UK.

12.10 **Whole Agreement, no waiver**. This Agreement set forth all rights for PARTNER in respect of the subject matter hereof and is the entire agreement between the parties. These terms supersede any other communications with respect to the sale and license of DEXMA Products and Services. No provision hereof shall be deemed waived unless such waiver shall be in writing and signed by DEXMA or its duly authorized representative.

IN WITNESS WHEREOF, the Parties sign the Agreement, in duplicate and a single purpose, at the place and date specified in the header.

For Dexma

For Partner

For PILOT ENTITY

Annex 1 - ECO-BOT Partners

- RISA Sicherheitsanalysen GmbH,
- Estabanell Y Pahisa Energia SA
- Botego Bilgi Teknolojileri A.S.
- Adelphi Research Gemeinnutzige GmbH
- SEnerCon GmbH
- Dexma Sensors SL
- University of Strathclyde
- Plegma Labs Technologikes Lyseis Anonymos Etairia
- Uniwersytet Ekonomiczny W Katowicach