DELIVERABLE 6.11

Report on the liaison and cluster activities with other projects Version 3

USTRAT
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Summary

This deliverable reports on relevance of activities in which the consortium was engaged in for creating liaisons with relevant projects (national, European and international), industry, non-governmental and research organisations as well as with identified standardisation bodies from Month 29 to Month 45 of the project. The purpose of pursuing new and existing links is to contribute with regards to new guidelines, best practices, dissemination and exploitation routes. Specifically, the report details the objectives of each liaison activity, as well as the outcomes and follow-up actions of these activities. Liaison activities comprised establishing links nationally, across the EU and internationally, with external stakeholders, other projects, research institutions and standardisation bodies over the aforementioned period covering topics of energy efficiency, consumer behaviour and sustainability. The report details the findings of each and implications for the next steps of the project.

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List of Acronyms and Abbreviations

ACM: Association for Computing Machinery

AI: Artificial Intelligence

ASEW: The German Association of Municipal Utilities supporting Sustainable Resource Management

B2B: Business to Business

BEIS: Department for Business, Energy and Industrial Strategy

BPD: Business Plan Development

D: Deliverable

DoW: Description of Work

ESCO: Energy Service Company

IEC: International Electrotechnical Commission

IEEE: Institute for Electronics and Electronics Engineers

iESA: interactive Energy Savings Account

ICASSP: International Conference on Acoustics, Speech and Signal Processing

M: Month

MSCA: Marie Sklodowska-Curie Action

NILM: Non-Intrusive Load Monitoring

REA: Research Executive Agency

SEC: SEnerCon

SENS: Smart Energy Savings

SFU: Simon Fraser University

USTRAT: University of Strathclyde

UEKAT: University of Economics Katowice

UVP: Unique Value Proposition

WP: Work Package

Executive summary

The aim of this document is to report on Deliverable 6.11, which is part of WP6 Task 6.5 as per the DoW, for the period Month 29 to the end of the project, that is, February 2020 to June 2021. Specifically, the document will report on the liaison activities to identify and establish cooperation with relevant multi-sectoral stakeholder and impartial groups external to the project. For the reporting period of this deliverable, focus has been placed on making links with external projects and bodies, nationally, within EU, and internationally, for the purposes of shaping the Eco-Bot product offering in light of other energy management systems, its unique value proposition and the exploitation pathways, commercial and non-ommercial and final exploitation roadmap.

The methodology regarding the liaison and clustering activities was for individual consortium members to first identify external stakeholders, relevant projects and bodies that would meet the objective of this task. The next step was to organise or attend workshops/seminars/meetings with these external bodies to assess market potential and make links for post-project exploitation.

This report describes liaisons with external organisations or bodies and projects during this reporting period, lessons learnt, and actions taken to improve the Eco-Bot offering, following the launch of the large-scale pilot with energy end users. This deliverable is complementary to the project's dissemination activities for this period, reported in Deliverable 6.12.

1. Introduction

1.1. Purpose

The purpose of this document is to report on the various activities undertaken by the project consortium, during M29 to M45 of the project implementation, with the objective of making relevant liaisons with external bodies, such as stakeholders, governmental and non-governmental organisations, consumer bodies, standardisation bodies, research institutions, and other EU and international projects. The aims of these activities are to exchange knowledge pertaining to energy efficiency measures and how to maximise impact, meeting national, EU and international energy goals, consumer behaviour studies pertaining to energy consumption, existing research, trials and products to enhance consumer-offering and market potential of Eco-Bot.

We report on how the knowledge gained and liaisons made have improved opportunities for technical implementation, exploitation and dissemination throughout this reporting period and after the project completion.

The report is organised as follows. Section 2 summarises progress on follow-up actions from D6.10 on the cluster and liaison activities in the period M13 to M28 of the project. Section 3 describes all liaison and clustering activities in Months 29 to 45, pertinent to technical execution, exploitation and dissemination, focusing on the objectives and the findings for each activity. Section 4 summarises the findings from these activities. The final section concludes the report.

2. Progress of follow-up actions from previous cluster & liaison activities

Deliverable 6.10 reported on project liaison activities during the period M13 to M28 of the project. In this section, we elaborate on how findings and experiences gained through these activities supported the implementation of the project in the final deliverable reporting period (M29 to M45). We split the findings into those related to technical execution of the project, exploitation and dissemination.

2.1. Impact on technical execution of the project

Following cluster and liaison activities with other projects and stakeholders tackling NILM reported in D6.10, there was a follow-up action on USTRAT to rigorously assess Eco-Bot's 1-hour NILM models for the EYPESA pilot with no additional information besides smart meter data, in terms of complexity and reliability. This has been completed and reported in D4.5 for the small-scale validation, as well as D5.5 for the evaluation phase. Findings of low-rate NILM are also reported in a journal paper, published in Applied Energy in June 2020, as reported in D6.12. USTRAT also had a follow-up action, following links made with the NILM team at Simon Fraser University (SFU) in Canada, on exploring other datasets such as the North American SFU AMPds and RAE datasets, and Pecan Street Dataport, following linkages with

both teams, for creating transfer learning-based models suitable for Eco-Bot. This resulted in USTRAT augmenting the project's NILM capability during the first and second evaluation phases for residential pilots, with an additional heat pump model that is trained on the AMPds and RAE datasets.

Following feedback from the H2020 SocialRES Consortium and participants at the National Top Runner Initiative conference/forum "Product efficiency - more innovations for energy-efficient products", organised by the German Ministry of Economic Affairs and Energy, about stakeholders stressing the necessity that the bot is visually attractive and should include images/visuals to keep the user interested/engaged, as well as concern about where the NILM user data should be stored due to privacy concerns, there was a follow-up action on WP4 and WP5 to review the front-end and back-end platform designs in light of the above feedback. To this effect, in the final Eco-Bot package the NILM data is exclusively stored on the pilot servers, where users have given permission for their data to be stored, and nowhere else. Furthermore, the front-end chatbot interface has been improved to take this feedback into account. The details of the improved technical implementation are provided in D4.6.

Following linkages between Discovergy GmbH and SEC on the synergies of German Einsparzahler project and Eco-Bot project, there was a follow-up action on SEC for their participants to use Discovergy smart meters at reduced cost (the installation will be free of charge), with smart meters installed at participants' homes by electricians which are partners of Discovergy's network and Discovergy being responsible for the first level user support in case of smart meter problems and taking the role of the metering point operator forwarding user data to the billing company (utility) if the user agrees. An already existing API between Discovergy smart metering service and SEC's interactive Energy Savings Account (iESA) has been improved in order to transfer energy data of 10s intervals. On the other hand, the collaboration with Discovergy and especially user mailings to Discovergy's customer base and Eco-Bot posts in Discovergy's user forum has improved SEC's ability to recruit participants with smart meters and their engagement with the bot.

2.2. Impact on commercial exploitation

In D6.10 following on from liaison activities with participants at the National Top Runner Initiative conference/forum "Product efficiency - more innovations for energy-efficient products" organised by the German Ministry of Economic Affairs and Energy, the following opportunities for the Eco-Bot offering were identified: detection of energy consumption of individual appliances, supplement to personal advice and added transparency on magnitude of energy consumption. There was a follow-up action on WP7 to review these in light of the Eco-Bot package offering. This was taken under consideration when drafting the Eco-Bot package Unique Value Proposition (UVP), which is reported in D7.3

After the exploitation workshop under Task 7.1, adelphi was tasked to evaluate if additional exploitation support from the EC is necessary and apply for the booster program to complete the final business plans and models. This was indeed deemed to be valuable for WP7 hence adelphi submitted an application for the Horizon Results Booster programme in May 2020 and received a positive response in June 2020. The Business Plan Development (BPD) service officially started at the end of 2020 whereas bilateral discussions between adelphi and the exploitation expert already took place in September/October. The Booster support

helped to finetune and evolve with the exploitation strategy hence increasing the chances for successful commercial exploitation of KER 1 (Eco-Bot).

Following interest by some of the SocialRES stakeholders (e.g., Lake Constance Foundation, Power Parity Cooperatives, I-Ener and Abundance) during last period's liaison activities led by adelphi, for the Eco-Bot as a whole, but particularly for NILM, there was a follow-up action on the consortium to determine a suitable mechanism to share Eco-Bot's learnings or key exploitable results with the project and determine the best approach to enable stakeholders to get in touch with various responsible parties for exploitable results of Eco-Bot. adelphi has approached these energy cooperatives to share key learnings of the pilot evaluation and discussed pricing of the Eco-Bot package. The consortium in general has formally been communicating key exploitable results to Twitter followers (Eco-Bot project and beneficiaries') and newsletters to key stakeholders with pointers to contacting the consortium via the project website, and email forwarded by the website administrator to the responsible beneficiary to address the queries.

Following linkages between Discovergy and SEC on the synergies of German Einsparzahler project and Eco-Bot project, it was suggested that Discovergy send an e-mail to their already existing Einsparzähler customer base (around 100) to promote the Eco-Bot project and ask for participation. In return, Discovergy and SEC will be in frequent exchange on results of both projects, especially on NILM evaluations and on the use of the chatbot technology and personalized user advice which is not yet part of Discovergy's services and could be interesting in future. This resulted in a mailing to Discovergy's power test users (150 users) and posting a call for participation to Eco-Bot in Discovergy's user forum and were thus able recruit around 10 participants out and rousing the interest of new Discovergy customers in the Eco-Bot package. Details of a potential business relationship between Eco-Bot joint venture/SEC with Discovergy are provided in D7.3. In D7.4, an Eco-Bot offer for Discovergy is detailed due to their interest in our Eco-Bot product.

In D6.10, during the annual DEXMA Days event, DEXMA was successful in gathering feedback from its partners to get a better understanding of the business needs of Energy Service Companies (ESCOs). The follow-up action was to explore more ways to tune the Eco-Bot offering for purposes of exploitation and opportunities for dissemination. This was implemented through contacting key stakeholders, including building managers, to shape Eco-Bot's UVP and pricing for B2B users.

In D6.10, EYPESA consulted with the electricity retailer Mercator (a retailer in the same company group as EYPESA) to identify impact of legal limitations on the project's large-scale pilot by EYPESA and explore possibilities for further exploitation of Eco-Bot with Mercator's insights and experience with client needs. This has resulted in Mercator supporting EYPESA defining the eco-bot use cases and the narrative content. Finally, during the whole piloting phase Mercator helped preparing all the recruitment and engagement communication contents towards their common clients.

In D6.10, UEKAT made links with participants of the 3x20 Cluster Association, an entity focused on the promotion, implementation and dissemination of the EU's energy policy objectives in Poland, including representatives of the Smart EPC company looking for solutions that use a virtual network, electricity and cold storage to make the most effective

use of energy mainly from local production in renewable sources. UEKAT's follow-up action was to maintain contact with stakeholders for potential exploitation of Eco-Bot.

Of relevance to Eco-Bot are standardisation activities pertaining to smart metering protocols, communications and security, as well as emerging smart grid big data analytics. Following liaison activities reported in D6.10 in this respect, there was a follow-up action on USTRAT to keep abreast of developments on how the protocols for smart metering influence national roll-outs and in turn the sampling rate of the data available to the residential sector, the trade-offs between high and low sampling rates with respect to data security and privacy, storage and communications bandwidth. In this reporting period through linkages with standardisation bodies such as the IEEE and utilities in UK and Europe, it was identified that low sampling rates of the order of 15-60 minutes are still the most widespread across the majority of Europe, with some smart meters releasing data at about 10 -60 second resolution for trading off privacy and utility. The impact on exploitation is that it makes the Eco-Bot NILM offering still very relevant for large-scale adoption.

Following USTRAT's linkages with the UK government Department for Business, Energy and Industrial Strategy (BEIS) to explore the additional benefits of smart metering besides energy feedback through the Smart Energy Savings (SENS) programme of BEIS aiming to encourage long-term energy savings through innovative products and services (beyond a smart meter and In-Home Display) as part of UK's Clean Growth Strategy, there was an action on USTRAT to keep up with SENS findings, and feed back towards Eco-Bot final exploitation deliverable in WP7. Findings of the SENS government project indicate that products that drive behaviour change include gamification, nudges, near real-time social comparison, showing households how they use energy, personalising the style and tone of advice and feedback, targeted periods of change (for example when bills are higher than usual), advanced feedback and diagnostics, advice which focuses on easy-to-change or longer-term behaviours, integrating energy use data with other technology in the home (for example heating controls), matching advice to householders' motives and circumstances so they are more likely to act and tailoring advice to the customer or home. Most of the features that have been indicated are present in the Eco-Bot offering, therefore making it timely and following the trends in the innovation market.

In D6.10, USTRAT made links with utilities worldwide that were interested in the value of NILM for improving their customer service and experience with a view towards exploitation. These are: Scottish Power Retail in UK, OSS Norge which is a subsidiary of Glitre Energi in Norway, Rainforest Automation in Vancouver, Canada, which carries out work for BC Hydro and other utilities in the USA. USTRAT currently has signed NILM evaluation licences with all these three companies, with a view to exploit NILM results.

2.3. Impact on non-commercial exploitation

Following liaison activities by USTRAT during the MSCA AI Cluster event in Brussels organised by the REA to find out more about the EC's future strategy regarding AI and Energy in Europe, there was a follow-up action on USTRAT to explore the possibility of exploiting Eco-Bot's findings for future EU projects in the AI landscape. This has indeed proved beneficial with some of the beneficiaries in the consortium jointly submitting proposals to the commission and some being awarded, for example:

- CHIST-ERA 2019 call on XAI (Explainable AI), which included USTRAT and UEKAT. Whilst not awarded, this proposal has positioned us for future CHIST-ERA calls and making new collaborations for further non-academic exploitation.
- H2020-LC-SC3-EE-2019 Energy call: two proposals were submitted, SMARTSITES and ENERGISIVE, involving USTRAT, RISA and PLEGMA. Whilst not successful, new collaborations were made paving the way for future calls.
- H2020 MSCA ITN: USTRAT and PLEGMA are involved in this GECKO project on Explainable AI for Smart Homes and Sustainability. The project started in Jan 2021.

In D6.10, USTRAT made links with members of the research team at Amazon, Informetis Europe and Verv at ICASSP'19 to exchange knowledge on the value of energy feedback and NILM within smart home technologies with a view towards maintaining contact with these stakeholders for potential exploitation of Eco-Bot. Amazon has agreed to be part of the advisory committee of the MSCA ITN GECKO project, following interest in the results of Eco-bot. USTRAT jointly organised the International NILM 2021 workshop with Verv contacts, who have now moved on to Austin Consultants and LiftUp Leaders.

2.4. Impact on dissemination

In D6.10, following liaisons made with Net2Grid at the NILM workshop in Greece in 2018 and 2019, technical partners of the consortium considered the NILM workshop as a relevant dissemination venue. This has resulted in USTRAT being part of the organising committee of NILM 2020 workshop and two papers pertinent to the NILM findings of the project presented at the workshop and published in the relevant conference proceedings, as detailed in D6.12.

In D6.10, UEKAT made links with the Polish Association of Environmental and Resource Economists (http://psesizn.pl/en) in order to explore opportunities to participate in scientific conferences organised by the Association and to disseminate the Eco-Bot project.

In D6.10, adelphi made links with the GIZ Project Coordinator on Energy Efficiency in Public Buildings in Turkey, keeping them updated about the project results. Building on these initial efforts, during exploitation activities in WP7, a larger crowd made out of consumer organisations/utilities/utility associations were identified to receive information material about Eco-Bot that they could then spread among their peers.

3. Cluster & liaison activities

This section summarises the various liaison and cluster activities carried out for the period M29 to M45 of the project by various beneficiaries in the consortium. This is organised by anticipated impact on technical improvements to the Eco-bot offering, exploitation potential and dissemination potential in the following subsections.

3.1. Liaison activities with potential impact on technical improvements to the Eco-bot offering

Liaisons were made as part of WP7 to evaluate some functionalities of the Eco-Bot platform. These liaisons included the Facility managers from DEXMA's customer base and ASEW webinar on chatbots for German utilities and Greek utilities in 2021. These helped draft the post-project technical roadmap for Eco-Bot until December 2023. Details of the technical roadmap are presented in D7.3. The technical improvements revolve around improving scalability of the backend, allowing direct and secure integration of smart meters from other vendors into the backend, integration with mobile devices, translation of the bot to additional languages, preparing a user manual for IT vendors, widening the NILM offering and scalability for more appliances and geographical regions and reducing requirement of user input for the behavioural model.

Furthermore, we had extensive discussions with the Digital Transformation Officer of Cognity SA on potential integration of Eco-Bot solutions with other existing platforms of their portfolio.

There were also fruitful discussions with the innovation team of ARIS Group on business collaboration and potential roll out possibilities of the Eco-Bot system or subsystems.

3.2. Liaison activities with potential impact on commercial exploitation of the project

The following liaison activities with potential stakeholders were made to support exploitation of the project, in particular the unique value proposition of Eco-Bot and pricing models.

- In October 2020 - April 2021, there was an Eco-Bot Webinar and a number of bilateral exchanges with the Support Service provider to Energy consultants & companies that want to introduce energy management systems (DenBag), interested in including Eco-Bot within their database for energy consultants as service offer for their clients.
- In late 2020, SEC, adelphi, RISA and ERRA held several workshops with Discovergy, the Consumer Association of North-Rhine Westphalia and ASEW (association of German utilities) helped widen the potential customer base of Eco-Bot post-project.
- Facility managers from DEXMA's customer base, via interviews and email feedback in 2021, also helped shape the UVP for the B2B model.
- In April 2021 RISA, ERRA and PLEGMA held four workshops with Greek electricity producers and resellers (Protergia, Elpedison, WATT+VOLT, HERON).
- In April 2021 PLEGMA and RISA held a workshop to present Eco-Bot to the directors of technology of two international consulting companies, namely PWS and Deloitte.
- In May 2021 RISA and ERRA held a workshop to present Eco-Bot to one of the largest international Real Estate Companies (BARNES International Realty) and discussed collaboration opportunities over sustainable development, and a series of follow-up discussions have been held since then.

- In June 2021 RISA and ERRA organised a webinar with a group of Facility Managers working at Piraeus Bank of Greece.

3.3. Liaison activities with potential impact on non-commercial exploitation of the project

Liaisons described in Section 2.1 will be reinforced to facilitate revised submissions of energy related proposals to the EU programme.

ERRA and RISA have participated in the proposal phase for the H2020 projects RESTRUCT, ASSESS, AUTOMAINT, RESRAIL that concern critical infrastructure protection and participates in the funded H2020 project YADES, where ERRA will follow up on the development of its platform. At a national level, under the Operational Programme Competitiveness, Entrepreneurship and Innovation (B Cycle), ERRA submitted proposals for the projects BSAF, OrThOP3Dics, RateOpt, ΕΥΠΟΛΙΣ, ΙΑΣΩ (progressing the chat bot to health monitoring), ΙΚΑΡΟΣ (funded), and ΠΟΛΥΜΝΙΑ.

Contacts with organisations like ASEW raised interest in adelphi which has led to a collaboration between ASEW and adelphi in two other projects (one national and one European). Exploitation knowledge has already been applied in the H2020 SocialRES project in which adelphi is also involved and in a national project call of the BMWi "Energiewende und Gesellschaft", for which adelphi was invited to submit full proposals for two project ideas.

A liaison was made with academic colleagues from universities in Malta in 2021, resulting in a joint proposal involving USTRAT, RISA and PLEGMA with University of Malta being submitted in June 2021 to the Energy and Water Agency Research and Innovation Call in the Fields of Energy and Water managed by the Government of Malta, building upon some of the findings pertaining to the technical execution of Eco-Bot.

RISA is currently participating in a new EU funded project called HEART (HEAlthier Cities through Blue-Green Regenerative Technologies: the HEART Approach), exploiting its knowhow and expertise on chatbots obtained in the context of Eco-Bot.

3.4. Liaison activities with potential impact on dissemination of the project

Following liaisons with Simon Fraser University, USTRAT was invited to co-organise the EU NILM workshop organised as part of the large ACM BuildSys conference in 2021, resulting in a joint virtual event with larger audience of 337 attendees for wider dissemination of NILM-related findings from Eco-Bot.

The following liaisons, carried out primarily via online workshop formats due to travel restrictions imposed by the ongoing pandemic, helped identify the target users for whom newsletters and promotional videos would be disseminated to and helped shape the content of the newsletters and videos. Dissemination material is discussed in more detail in D6.12.

- In November 2020, a webinar with the Association of German utilities (ASEW) confirmed that Eco-Bot videos should be shown to all their interested members.
- In February 2021, liaisons with Discovery GmbH contributed towards the planning of a dissemination strategy for Discovergy customers.

4. Conclusions

During liaison activities in this period, the consortium successfully followed up on opportunities and created additional liaisons pertaining to the technical execution of the project during and mostly as part of the technical roadmap post-Eco-Bot, the commercial and non-commercial exploitation of the project as well as academic and non-academic dissemination of the project by the pilots for marketing. In particular, the chatbot functionality for commercial and residential pilots was improved based on liaisons with the Facility managers from DEXMA's customer base and various online activities involving utilities in Germany and Greece. The Eco-Bot Webinar in April 2021 was used to liaise with various energy management stakeholders that helped refine Eco-bot commercial exploitation strategy. The Eco-Bot partners were involved in discussions with academic and non-academic institutions to explore potentials for non-commercial exploitation. As a direct outcome of these discussions, the Eco-Bot offerings to support ongoing and future national and international research projects have been developed. Finally, the liaison activities have supported broadening dissemination routes and developing concrete steps to reach various academic and non-academic groups potentially interested in exploiting Eco-Bot results.