A holistic and Scalable Solution for research, innovation and Education in Energy Transition

D1.3 ASSET ecosystem activities M16

Work Package	WP1 ASSET ecosystem and networking
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Executive Summary

ASSET - A holistic and scalable solution for research, innovation, and education in the energy transition - is an EU project funded under the Horizon 2020 programme.

The goal of the project is to create a sustainable and scalable community which brings together all energy transition and education stakeholders (companies from the energy sector, universities and training actors, authorities and policymakers and the society at large) to enable a continuous bottom-up creation of research, the development of research, innovation and educational (RIE) services and capacity pooling.

This document aims to review the activities carried out in tasks 1.2 and 1.3, the efforts of the consortium to engage the project stakeholders in ASSET community carried forward under the umbrella of the Public Outreach Strategy (POS) designed in T1.1, and the activities performed to put in place tools to foster the communication between industry and academia. It provides and overview of the activities performed during the whole project with a focus on the January 2020- August 2020 period. ASSET offers a platform where targeted actors collaborate and exchange resources to cultivate and better exploit the competencies required for the energy transition. For this purpose, the second, out of three, roadshow (workshop) was held in Madrid, Spain, gathering national and local stakeholders from industry and academia. The results from the roadshow will be used to better target stakeholders' needs and expectations, but also be provided as a reference in future project outcomes and its sustainability.

Following the selection of five relevant mobility mechanisms, 1) Industrial researchers as lecturers, 2) Industry-academia internships, 3) Collaborative doctoral education, 4) Bachelor/Master-Thesis, and 5) Joint industry/academia projects, this document will describe the implementation progress of those mechanisms through a set of reporting forms. The mobility support mechanism is essential to strengthening the two-way link between industry and academia.

In line with the objective of the ASSET project to address the need of both companies to up-skill and train their employees, and of individual engineers to improve their knowledge, skills, and competencies, academia-industry communication tools have been established. On the ASSET Platform, a marketplace, a forum, and a learning graph tool are present. The community forum allows Energy companies, policymaking institutes, University faculties, students and common citizens to post enquires on the topic of the energy transition and share insights and information about energy transition and competencies/skills requested. These questions will be answered by the ASSET community based on their expertise. The ASSET marketplace offers educational services at multiple EQF levels and with different learning styles and supports bottom-up programme creation.

Table of Contents

List of Tables

List of Figures

List of Acronyms

Abbreviation / acronym	Description
IPR	Intellectual Property Rights
KPIs	Key Performance Indicators
KSCs	Knowledge, Skills, Competencies
MOOCs	Massive Online Open Courses
NGOs	Non-Governmental Organisations
POS	Public Outreach Strategy
R&D	Research and Development
RIE	Research, Innovation, and Education
Rescoops	Renewable Energy Sources Cooperatives

1. Introduction

1.1 Purpose and scope

This deliverable falls under WP1 "ASSET ecosystem and networking" and reports on the activities carried out to extend ASSET energy transition network and enhance academia-industry dialogue during the reporting period. To measure the results of this work, this document reviews the achieved values of Key Performance Indicators (KPIs) and the implementation of the plan for mobility support mechanisms academia-industry designed in the project. . This ecosystem activity report is the second one and will be followed by a final report at the end of the project.

Within the scope of the ASSET project objective to create an ecosystem – community, gathering targeted actors and exchanging resources, two roadshows (workshops) have already been organized by the ASSET project consortium. These roadshows contribute to strengthening the network between industries, policymakers, universities, key societal actors, and allow them to experience the benefits of participating in the ecosystem. The outcomes of this deliverable are based on the Public Outreach Strategy defined in a previous deliverable (D1.1) to identify, attract and engage the targeted actors and create strong links between them.

1.2 Structure of the deliverable

Section 2 of this deliverable, therefore, reports on the background, purpose, outcomes of the second roadshow, the ASSET community and its ambassadors/ambassadresses, and the similar EU projects. The main results are emphasized aiming to draw recommendations, follow up actions, and provide takeaways for the following roadshow and the project itself.

Section 3 of the deliverable reports on the agreements for the implementation of the mobility support mechanisms. This section aims to review the commonly practiced mobility support mechanisms and to assess the progress in the implementation of these mechanisms.

Section 4 of this deliverable reports on academia-industry dialogue tools. The marketplace offers industrial actors a platform to search for courses and programmes developed by ASSET, and to make enquiries when their needs are not met. The Forum allows ASSET community members to exchange freely on different topics.

1.3 Relation to other work packages and tasks

The main objective of WP1 is to create the ASSET Community, an ecosystem where target actors can collaborate, exchange resources, and share the competencies required to support the energy transition implementation. The target groups include universities and research centres, industrial companies from the energy sector, social actors, and policymakers. It is in this work package where the appropriate means for the communication between all these actors are detailed. WP1 delivers valuable insights on industrial needs for Knowledge, Skills, and Competencies (KSCs) to guide the definition of training needs which take place in WP2.

This deliverable is linked with both Task 1.2 on the Energy transition network scalability and Task 1.3 on the Academia-Industry dialogue as it will report their outcomes. Relevant actions contribute also to *Campaign 1 Communication with businesses, public and private organizations and local/ regional/ national authorities and policymakers*.

This deliverable is a follow-up from D1.2 ASSET ecosystem activities which was published in M8 (December 2019).

2. Ecosystem activities

2.1 Report of Roadshow

2.1.1 Background and purpose of the roadshows

The ASSET project aims to create an ecosystem - community, where targeted actors could collaborate and exchange resources to cultivate and to better exploit all the competencies required for the energy transition. In particular, the ASSET consortium targets the relevant stakeholders, gathers them through workshops, exchanges their views, collects their feedback, and engages them in the project's future actions. The synergies created through the exchanges will be reflected in project outcomes and will serve directly for the future sustainability of the project.

The objectives of ASSET Roadshows are to address and engage different stakeholders such as industry, academia, researchers, policymakers at the EU, national and local level, to make them aware about project objectives, solutions, and outcomes, but also to gather valuable feedback to be used in the project implementation. The Roadshows are an important part of ASSET stakeholder engagement and communication activities as planned by the POS (Public Outreach Strategy). According to the strategy, there are some reasons why stakeholders' debate and engagement through roadshows are key for the project. First, the project aims to be of practical value. Stakeholders and relevant groups could bring national knowledge to the project and such knowledge can help industrial actors to assess the possible costs and benefits of energy transition within a country context and to identify the emerging challenges. For example, while industry or public sector representatives can voice their needs and expectations, academia and research can put forward the best available knowledge from academic sources or implemented actions; in this way, through interactions with stakeholders better options within the decision context of the country or region concerned can be assessed. Second, ASSET aims to explore how contextual factors, such as economic, social, and political, can shape a successful deployment and the diffusion of mitigation options in the energy transition. Stakeholders' inputs are crucial to understand the said contextual factors and identify appropriate measures to address them. Finally, to ensure that the main conclusions from ASSET are focused on the right groups of decision-makers in the appropriated forms, it is important that the project consults with stakeholders on communication and dissemination strategies at EU and national level and collaborates with them on ASSET implementation. This aspect of stakeholder engagement is dealt with in the POS strategy, but also through WP5 on communication and dissemination of project results. For example, 4 audience-targeted communication campaigns are foreseen to address different stakeholders' groups (businesses and policymakers, students & employees, energy citizens, universities, and training actors) through focused and targeted messages.

Overall, ASSET partners decided to organize three roadshows in different geographical areas by targeting relevant stakeholders that could be interested and engaged:

Roadshows	Date	Target groups
Italy	18 November 2019	Policymakers, industry, research and citizen representatives at national level
Spain	20 February 2020	Industry and academia representatives at the national level
Brussels	28 October 2020	Policymakers, industries, national/regional/local authorities at the national level and EU institutions (including European industry and research associations/networks),

Table 1: Roadshows planned in the lifetime of the ASSET project

2.1.2 First Roadshow

The first Roadshow of ASSET project was held in Italy on the 18th of November 2019 in Milan with the title "Energy transition know-how: map your needs, track your route, empower yourself", with an attendance of around 50 participants.

Supported by EASE, Ènostra organized the event together with other Italian project partners (Logical Soft and Università degli Studi Federico II di Napoli) and in collaboration with Politecnico di Milano and Ridef.

As the target audience groups were policymakers, industry, research, and citizen representatives at the national level, it was decided to have this event in Italian to ensure a better understanding of all the participants.

The objective of this first roadshow was to present the ASSET project, its scope, its ongoing activities, and to showcase the tangible and valuable benefits of being involved in the ASSET Community. The event gathered policymakers, industry, research, and citizen representatives at the national level with the aim to exchange on relevant topics, create close links, and engage them throughout the project.

Following a plenary session presenting the project, participants were divided into 2 parallel sessions focussed on the following topics:

- Market role & policy rules for a top-down approach to energy transition;
- The empowerment of energy citizens for a bottom-up energy transition.

Finally, a last plenary session was organised to share the outcomes of the previous discussions.

Following this Roadshow, the main outcome was the necessity of a new type of professional profile. "**Energy community *facilitators* and *mediators"*** who would have the responsibility of promoting and supporting the creation of new energy communities in different social and territorial contexts.

More elaborate and detailed presentation of the first Roadshow can be find in the previous deliverable **D1.2** that is accessible on the ASSET website [1].

2.1.3 Second Roadshow

After the first project roadshow in Milano (Italy), the second project roadshow took place in Spain, in Madrid on 20th February 2020. As explained earlier, the goal was to engage multiple stakeholders providing different insights into the energy transition at the national level.

2.1.3.1 **Preparatory steps**

The roadshow was organized by Atos in collaboration with another Spanish ASSET partner - Universidad Politécnica de Valencia. To get closer to the community and facilitate the exchange of ideas and information the language of the event was Spanish.

Although the event in principle covered all project target groups (companies, policymakers, universities and training actors, societal actors, and energy citizens), the main roadshow objective was to provide the opportunity to industry and academia representatives to discuss how they are addressing the challenge and the vision of the energy transition. This approach was chosen due to the fact that the expertise of the partners organizing the event lies in industry, research, and education sectors.

2.1.3.2 Structure and set up of the roadshow

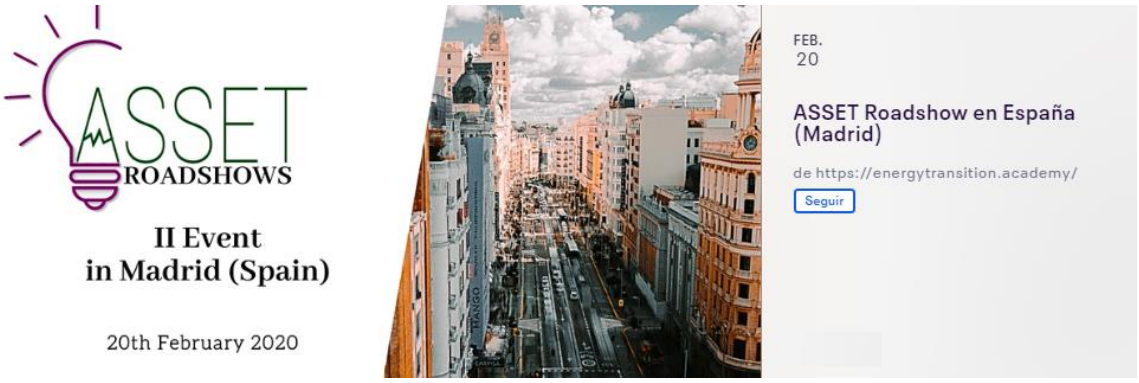

Figure 1: ASSET Madrid roadshow invitation

The invitations and the agenda were sent individually to the selected contacts via email, including a link to Eventbrite, an event management website, where the invitation and the agenda were published.

More than 40 people registered for the roadshow, including representatives of the following organizations: Siemens Gamesa, Fundación Repsol, Red.es, Applus, Virtual Ware Group, Rioglass, Aditum, Aeioluz, Grupo Imedes. Universidad de Comillas, Universidad Carlos III, Sistena, Grupo ETRA, Reddes, UPV and Atos.

The event was widely publicized through Atos Iberia magazine, MyNews, ed. 136 (31st January – 7th February) reaching more than 5000 Atos employees, and through Atos Research & Innovation Newsletter which is distributed to around 200 people. A pre-campaign was launched one month before the event publicizing the event through Atos LinkedIn and Atos Spain twitter accounts. Later the roadshow was announced on ASSET social media channels and website.

In accordance with the explanations provided in the previous paragraphs, the participants registered for the roadshow belonged mainly to the following three groups of project stakeholders:

- Universities, Research centers, and training actors
- Companies from the energy sector
- Energy citizens

Guidelines for the moderator of the co-working session were prepared with the ultimate intention of creating a favourable environment for discussion. A set of questions were formulated to encourage the discussion and the exchange of ideas:

- What is the role of industrial companies in the energy consumption/transition scenario?
- What are the main social challenges related to the energy transition?
- How to raise awareness about energy transition issues?
- How can cooperation between Industry and Academia be facilitated?
- What are the new required professional qualifications?
- What is the role of policymakers and regulators?
- What is the role of research?

A holistic and Scalable Solution for research, innovation and Education in Energy Transition

TRANSICIÓN ENERGÉTICA: CREANDO UNA VISIÓN DE FUTURO JUNTOS

Evento organizado por el Proyecto ASSET

Madrid, jueves 20 de febrero, 2020, 10:00-15:00hs

Atos Spain, Madrid
Calle Albarracín, 25 – Madrid (28037) Atos Auditorio Principal

Hora	Actividad	Presentador/a
9:45-10:00	Llegada de los participantes	
10:00-10:15	Bienvenida, objetivos del evento	Malena Donato, ASSET Manager de innovación y sostenibilidad, Atos Spain
10:15-10:30	Energía ahora y futuro. ¿Cómo está enfocando y ayudando la industria en el nuevo panorama energético?	Javier Valiño, director de la Unidad de Energía y Transporte en Atos Investigación e Innovación, Atos Spain
10:30-10:45	Otras formas de compartir energía, una visión desde el punto de vista de la investigación (I+D)	Aurelio Lázaro, Grupo Etra I + D
10:45-11:00	Una visión desde la universidad sobre la transición energética y las futuras profesiones del sector	Elisa Peñalvo, Universidad Politécnica de Valencia
11:00-11:15	Presentación del proyecto ASSET	Sara Diez Mínguez, Coordinadora del proyecto ASSET
11:15-11:45	Pausa para el café	
11:45-13:00	Sesiones de co-creación	
13:30	Comentarios de las sesiones, conclusiones y cierre	
14:00	Almuerzo	

Organizado por:

Atos

Con la colaboración de:

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

ESCANÉAME

Proyecto financiado por el programa Horizonte 2020 de la Unión Europea en virtud del acuerdo de subvención con el número de contrato 837854

https://energytransition.academy/

Figure 2: Roadshow agenda in Spanish

2.1.3.3 Content of roadshow

The agenda of the event was structured into two blocks:

Block 1: After a welcoming speech provided by Malena Donato from Atos, through which the context and the objectives of the roadshow were introduced, three presentations illustrated the participants on how industry and research are addressing the energy transition. All the presentations followed the same structure: **context, projects and activities, and lessons learned.**

The presentation of the ASSET project concluded this block. Next a summary of the contents of the presentations is given:

A. The first presentation "Creating a future vision together from the industry perspective"

Javier Valiño, director of the Energy and Transport Unit in Atos Research and Innovation, talked about the three main current lines of research and development in electrical networks: digitalisation, decentralisation and decarbonisation. He also explained the existing trends shaping today's energy market which mainly are:

1. Optimisation of the energy networks through super grids and micro-grids
2. Application of artificial intelligence and big data to improve energy networks efficiency
3. Clients empowerment
4. Spread of renewable energies
5. Energy communities and islands
6. Privacy, confidence, and federated data.

He concluded with his vision of the future focusing on the basic steps of the energy value chain: production, transmission, distribution, and trading.

B. The second presentation "Creating a future vision together from the research perspective"

Aurelio Lázaro Chueca, of ETRA I+D, a high-tech industrial group based in Valencia and innovative in the areas of mobility, energy, and security, presented the investigation lines ETRA group is currently addressing:

1. Decarbonization of energy supply opportunities utilizing energy islands and the Optimal integration and control of all the energy vectors
2. New organic redox flow batteries suitable to work at high temperatures
3. Grid integration of variable and intermittent renewable energy sources. According to the ETRA group, the future of the energy lies in the Hydrogen, which is an environmentally friendly alternative to fossil fuels and whose use disadvantages are being overcome.

C. The third presentation "Creating a future vision together from the University perspective"

Elisa Peñalvo, a professor at the Institute for Energy Engineering of Polytechnic University of Valencia (UPV) provided the point of view of the University. UPV offers courses at the graduate and postgraduate level (masters and doctorates) on energy transition. They work on the delivery of an education and training programme with the objectives of increasing SME's energy efficiency and providing tools for monitoring and measurement. They are also committed to the development of sustainable Mediterranean cities-based on nearly zero-energy buildings.

The first block was closed with a presentation of the ASSET project by the project coordinator, Sara Diez Minguez from Atos. She introduced the ASSET project, funded by the H2020 Framework programme of the European Union, the context of the project, the objectives, and the expected benefits to ASSET target groups. This last presentation served as a starting point for the discussions.

Throughout the first part of the session, many questions were raised about the changes the electricity grid and current industry must undergo to meet the needs of the energy transformation process and how to prepare ourselves for a greener future. Regarding this last question one of our speakers considered hydrogen as the future fuel, it can be produced from renewables and there is a rapid advancement of innovations in this field.

Block 2: After the coffee break a moderated discussion session took place. Although two parallel sessions were foreseen and since all participants shared similar areas of interest and expertise, it was finally decided to carry out just one session. Particular attention was paid to create a friendly environment for debate and open discussion.

2.1.3.4 **Main discussion points and findings**

Which is the role of companies in the energy consumption/transition scenario?

- An important need identified and a barrier to the energy transition is that employees in main Spanish electric energy transport and distribution companies, specifically senior executives, are still used to manage electric networks on a hardware basis while future efficient smart grids management will be based on software solutions.
- The management of energy and distribution companies is often in the hands of electrical engineers, not in the hands of software engineers. A change of mindset is needed in high-level managers, they are quite rigid and reluctant to changes.
- In Spain, there is no available information about the aggregated consumption of electricity in some geographical areas because electric companies are reluctant to share information and publish the data.

- The application of software technologies such as artificial intelligence and big data are needed to produce reliable data and the efficient management of grids and microgrids.
- There is also a huge lack of knowledge among companies of all sizes, about the return of investment, clean energy investment is perceived as a burden rather than an opportunity. There is a need to build/improve managers financial competencies related to the energy transition
- An appropriate and consistent regulatory framework is needed to drive the use of renewables. Regulators might need training on the topics they are regulating to be able to properly accomplish their tasks.

What are the main social challenges?

- Fair and inclusive transition, new employments for the energy transition
- Training and updating courses for professionals currently holding traditional energies jobs on low carbon technologies.
- It is necessary to raise citizenship awareness regarding the new energy models. Energy transition concerns to all of us, all of us are responsible for the efficient use of energy. The energy transition is not easy and will require a certain effort. It will be necessary to change our mindset, a change in the energy consumption culture. Everybody has the right to get access to the energy but to exceed a certain limit of consumption is not a right, is a privilege. The responsible and efficient use of energy is an obligation.
- The immediate challenge is training and education. Local and regional authorities must involve themselves in the process. There is a new role in some local governments "the change manager", this figure is key to lead the energy transition process at the local level.
- Citizens must be more responsible in the way they consume and produce waste, buy electric cars if possible, reduce the use of plastic, reuse bags, exchange products, etc.
- Society cooperation (and being informed) plays a major role to prevent the situation from worsening. There are different legislations about recycling and the recycling process is different from country to country. Standardized procedures across countries could be very useful to not make mistakes when separating waste (plastic, food, bottles, etc.).
- Regarding transport, the use of public transportation, bikes, walk more, foster carpool initiatives, or rideshare. These new habits will help to reduce CO2 emissions and traffic in towns.
- Citizens can cut down on fossil fuels using renewable energy by installing solar or joining an energy community or simply by using less electricity.

How to raise awareness about energy transition issues?

- It might be necessary to create a new concept in the energy sector: R+D+i+e (Research, development, innovation, and education): education is the best way to raise awareness among citizens.
- Social networks spread information about energy transition that on many occasions is not reliable and could harm the energy transition process. There is a large flow of information about climate change, but the approach is not always positive, most of the information is about ecological disasters and problems. A more positive approach should be adopted, information about solutions and the steps every one of us can take to support the change should have a more prominent role in the information flows.
- The change of attitude towards energy can make our lives more complicated but without change, our lives are going to get complicated.
- Share with all people (through any available channel) exactly how we must recycle and be conscious of all "the R's" that are key in this process such as refuse, reduce, reuse, recycle.

How can Industry-Academia cooperation be facilitated?

- There is a certain rigidity, grown in a context of institutional rigidity, in university professors regarding the collaboration with industry. Currently, at universities, professors are evaluated based on the published papers, but a trend towards evaluating them also on the basis of their participation in research and in cooperation with industry is emerging.
- There is also a need for an attitude change amongst industry managers. When Industry collaborates with University in a certain project, they are usually interested in a very specific result, difficult to apply to other areas or organizations and they always request confidentiality.
- In large industrial companies, there is a figure known as "Business Transformation Manager" whose mission is to change the company business model. This figure could facilitate Industry-University collaboration.

Which are the new required professional qualifications?

- Engineer profile with competences on electrical networks and cyber-security. The management of new grids and micro-grids requires new technologies skills: big data, artificial intelligence, and cybersecurity to ensure the protection of systems and networks, from digital attacks.
- Currently, there are specialists in specific technologies or energy sources but some "bridge" grades, encompassing mixed skills are required.

Which is the role of policymakers and regulators?

- Policymakers and regulators must provide long term regulations. Changes in the energy sector regulations and renewables energies regulations constitute a major obstacle to the growth of the sector.
- Policymakers and legislators should legislate regardless of the big energy lobbies. Revolving doors between policymakers and the private energy sector should be banned.
- There should be more initiatives based on bottom-up approaches to shape the long-term regulations engaging citizens in their process, for example, "Madrid Decide" -a platform where citizens vote the best options. Citizen's participation could be useful.

Which is the role of research?

- Research is about spending money to gain knowledge; innovation is about spending knowledge to gain money.
- Research is a long-term business, while the time horizon for innovation is five years.
- The transformation process undergone by the entire electricity system in Europe has been based on the 3D's: Digitisation - Decentralisation – Decarbonisation but we agree that however, these 3D's are located on 3 different plans. The goal is decarbonisation. And the means to achieve this is digitisation. The decentralisation of generation is an option. The fundamental changes that are needed on the electrical grid are based on digitising the grid and making it smarter. This transformation is grounded in research results. It is crucial to invest more in innovation projects. Innovation is needed to achieve the change of paradigm in the energy transition, to achieve the digitisation of equipment and systems. Digitisation will entail cost reduction.

2.1.3.5 Post roadshow activities

The day of the event, news about the project and the roadshow were published in the social media accounts: Twitter 7, Facebook 2, LinkedIn 2;

In total more than 4000 impressions on Twitter and 120 total engagements.

Next, we present the analytics of the results for one of the top tweets:

ASSET EnergyTransition @Project_Asset
Live from ASSET **#RoadShow** in Madrides

Co-creation sessions speaking on issues related to energy in **#innovation** , **#technology** and **#industry**

Follow us for more news
https://energytransition.academy/ pic.twitter.com/FpfwxlTCW7

Impressions times people saw this Tweet on Twitter	1,298
Total engagements times people interacted with this Tweet	56

In the days following the event a note of appreciation was circulated to all the participants via email inviting them to complete a project questionnaire to collect information to understand the current state of the energy transition process in Europe. The email also invited them to join the ASSET community.

2.2 Main recommendations and future challenges

Following the discussions in both roadshows, here is a summary of some findings on the social energy transition challenges:

Overall challenges

- Energy Transition is a complex process and needs to be tackled through a multidisciplinary and holistic approach, integrating different disciplines and different stakeholders; know-hows, without self-referential attitudes
- Access to appropriate education and training opportunities shall be offered to all the involved stakeholders: students, citizens, officers, employees
- Trustworthy information sources are needed to tackle misinformation
- Universities can be guarantors of the reliability of the educational contents
- New professional profiles (energy transition mediators) are needed, provided with interdisciplinary competencies and extensive communication skills and conflict resolution abilities

Social actors

- All the **social actors** must be involved in the energy transition, from EU institutions and national governments to local administrations, including companies, academic institutions, and citizens.
- The needed energy revolution requires some changes (reduction of energy consumption, behavioral changes), but encompasses also many benefits (economic, environmental, social) and this needs to be better highlighted
- Investment in research and innovation are needed to foster the transformation of the entire energy system (electricity system) and increase its efficiency.
- There is a need for an attitude change in industry management and university researchers regarding collaboration
- Policymakers and public administrations should play a guiding and supporting role for bottom-up energy transition initiatives and cannot represent an obstacle due to the lack of appropriate competencies or political opportunistic choices; there is a need for a new ruling class: trained, qualified, available to listen and determined in tackling the new challenges and achieving concrete results.

Knowledge sharing

- Employ an interdisciplinary approach;
- Contribute to the creation and spreading of a common energy transition vocabulary.
- A need to have a fair and inclusive energy transition and understand the scenarios for the new employments, profiles, and needs in terms of knowledge for the energy transition
- Each citizen needs to be aware of the ongoing energy transition process and should take part in it, by bringing changing instances in their training or working places and thus triggering a chain reaction, an energy revolution, so it is necessary to raise citizenship awareness regarding the new energy models. All of us are responsible for the efficient use of energy – do we know our carbon footprint? How can we know that?
- It will be necessary to **change our mindset**, a change in the energy consumption culture: have more conscious use of resources, and for that, we need training and clear hints for reducing the human impact on the environment and for supporting this change).
- Citizens, with the help of public authorities, governments, local councils' cooperation etc, should be responsible in the way they consume energy and produce waste, reduce the use of plastic, reuse bags, exchange products, foster a circular economy habit (whenever possible) etc. At the same time there's a need for setting standardised procedures across countries (not only in Europe, but worldwide) could be very useful to avoid making mistakes when separating waste (plastic, food, bottles, etc.).
- There's a lack of widespread knowledge that can help younger generations approach the energy transition in more innovative ways.

Sustainable mobility

- **Sustainable mobility** should be considered instead of just electric mobility for example by using public transportation, bikes, walk more, fostering carpool initiatives, or ridesharing. These new habits will help to reduce CO2 emissions and the flow of vehicles through urban regions.
- Citizens can cut down on fossil fuels use by increasing renewable energy production, such as installing solar panels, joining an energy community or simply by reducing their consumption of electricity.
- Society cooperation and being informed at different levels (in simple ways so population understand the needs and their role) play a major role in avoiding worsening the situation

The COVID19 situation

As the rapid spread of the COVID since February 2020, many things have been changed and we have had to adapt our everyday routines, working schemes, the overall economic and productive system of the major part of EU member countries, as well as of many other countries all over the world. The ASSET project, which includes both on-line courses focused on the energy transition and innovative tools to support the community of teachers and learners, can now display all its valuable potential and benefits. In addition, the ASSET project can help people who are facing the risk to lose their job, due to the unprecedented health and economic crisis. The possibility to acquire new knowledge and skills in an expanding sector like the green economy represents a promising chance to find a new job in this area of growing employment.

In line with this situation, as a mitigation measure, it was decided that the ASSET Brussels roadshow planned for Autumn 2020 will probably be an online event. This will allow ASSET to have more attendees both from the participants and the speakers sides, thus resulting in a higher quality event.

2.3 ASSET Ambassadresses and Ambassadors

The function of ASSET Ambassadresses & Ambassadors has been further described in the updated version of D1.1. They are the professionals involved in the energy transition process and challenges, sharing ASSET's scope and objectives, and decided to endorse the project. They have been selected on the basis of their acknowledged working experience and their personal commitment. Each partner of the project has the responsibility to appoint 1 or 2 Ambassadresses & Ambassadors. At the moment 13 Ambassadresses and Ambassadors have been appointed from Italy, Spain, Greece, Germany, Denmark, and Austria.

They are volunteers who support the ASSET project by giving visibility to ASSET within their professional networks and by supporting the dissemination of news and information related to the project activities and results.

On May 7th 2020, one Ambassador from Italy, Antonio Disi, was involved in a webinar [2] organized by ASSET on the theme of Green Jobs, the new competencies at the heart of the transition.

While during the 1st year of the project, the role of the Ambassadresses & Ambassadors was mainly to increase the visibility of the project by sharing on their social media platforms the intention of the project for the second year is to define a plan to involve them more closely in the dissemination of the project.

2.4 ASSET Community

The ASSET community's goal is to connect the different actors across the EU, creating a European wide network. This network will offer target groups a substantial knowledge support to accelerate the energy transition in terms of policies implementation, development of innovative models and design of new products and services, through an overall enhancement of the social and collaborative dimension of learning. On the website, once one person has registered to the ASSET Community, she/he can access the ASSET community forum and the project tools: marketplace tool and learning graph tool.

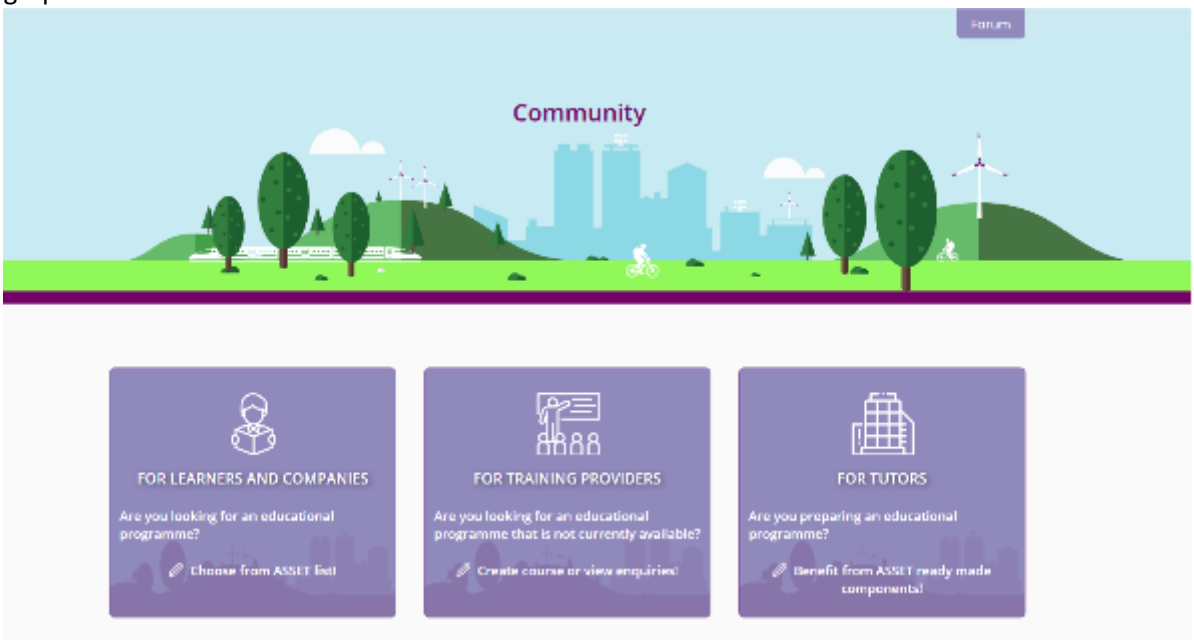

Figure 3: The ASSET Community

2.5 Collaborations with other similar EU funded projects

To strengthen the network of ASSET and reach a wider audience, ASSET has identified a number of EU projects with which a synergy could be created. Collaborations between projects mostly were done in 2019, where ASSET has attended various workshops and seminars, however, after March of 2020, there has been no ongoing activity, as many events have been put on hold. The previous collaborations are addressed in the latest report (D1.2). For future collaborations, participants of the projects listed below will be invited to the upcoming Roadshow, as well as, the ASSET project will actively participate in events organized by these projects in relevance to the topic. The result of the further activities will be addressed in the following report (D1.4). All these projects have a link with the ASSET project either through their topics (i.e. energy transition, education) or their stakeholder targets (i.e. energy citizens, policy makers, universities).

The following table shows the list of those projects.

Project Acronym	Title	Description
COMETS [3]	Collective Action Models for the Energy Transition and Social Innovation	**COMETS** is filling the knowledge gaps around citizen engagement in the energy transition to renewable sources by investigating and quantifying the aggregate contribution of Collective Action Initiatives (CAIs) in the energy sector at both national and European levels. COMETS overall objective is to investigate Collective Action Initiatives (CAIs) as the main driver of Social Innovation in the energy sector.
PROSEU[4]	Prosumers for the energy union	**PROSEU** is an EU-funded research project, bringing together eleven project partners from seven European countries (Universities, research institutes and consultancies, non-governmental and non-profit organisations). It aims to enable the mainstreaming of the Renewable Energy (RE) prosumer phenomenon into the European Energy Union. Prosumers are active energy users who both produce and consume energy from renewable sources.
SMART EDGE [5]	Sustainable Metropolitan Areas and the Role of The Edge City	**SmartEdge** will address the potential for greenhouse gas emission reductions that lie in the development of smaller cities within metropolitan areas. Edge cities are an integral part of the existing metropolitan fabric and may be laboratories for smart, green, economic solutions and have the opportunity to play a crucial role in the low carbon economy. The overall objective of the project is to improve low carbon economy policies in edge cities and their metropolitan regions.
ASSIST [6]	Support Network for Household Energy Saving	**ASSIST** is a European project funded by the European Commission under the H2020 programme. Its aim is to fight energy poverty by actively engaging consumers in the energy market, generating a positive change of behaviour in relation to energy consumption and to influence the design of energy poverty-oriented policies. ASSIST offers a two-way approach to energy poverty: active engagement of consumers in the energy market, and a

		positive change of behaviour in relation to energy consumption and to influence design of policies at all levels.
SCORE[7]	Supporting Co-Ownership of Renewable Energies	The aim of **SCORE** is to facilitate co-ownership of renewable energies for consumers first in three pilot regions in Italy, Czech Republic and Poland - and later also in various other follower cities across Europe. The approach is to apply Consumer Stock Ownership Plans, utilising established best practice renewable energies projects updated by inclusive financing techniques. As the particular focus of the project lies in vulnerable groups affected by fuel poverty that are as a rule excluded from renewable energy investments, effective and innovative engagement actions are tailored to their needs.
SMAGRINET [8]	Empowering Smart Grid Expertise in Europe	Providing services to European universities, municipalities, and industries to enhance their capacity in energy research and innovation to tackle the smart grid energy transition. The **SMAGRINET** Hub will bring together smart grid experts, energy workforce, university students, policy makers and other key actors in several activities and will develop several tools (in the form of services) for them.
BRIDGE initiative [9]	Gathers all EC projects related to energy	Cooperation group of Smart Grid, Energy Storage, Islands and Digitalisation H2020 projects. BRIDGE is a European Commission initiative which unites Horizon 2020 Smart Grid, Energy Storage, Islands, and Digitalisation Projects to create a structured view of cross-cutting issues which are encountered in the demonstration projects and may constitute an obstacle to innovation.
H2020 – PHOENIX [10]	PHOENIX aims to offer a cyber-shield armour for the European electrical power energy systems (EPES).	The PHOENIX project is a European Union funded collaborative project improving the cyber security of the European electrical power energy systems (EPES), i.e. the so-called Smart Grid. PHOENIX aims to offer a cyber-shield armour to European EPES infrastructure enabling cooperative detection of large scale, cyber-human security and privacy incidents and attacks, guarantee the continuity of operations and minimize cascading effects in the infrastructure itself, the environment, the citizens and the end-users at reasonable cost.

Table 2: Other related EU funded project

3. Mobility support mechanisms

3.1 Introduction

One of the key aims and objectives of the ASSET project is to foster the interconnection between industry and academia. Mobility support mechanisms can play a very crucial role in achieving this objective. This chapter is therefore dedicated to the mobility support mechanisms that will be piloted under the umbrella of the ASSET project. The experiences and the lessons learned from these piloting activities will allow the identification of key recommendations for useful mobility implementations in the future. In the last version of the ecosystem activities report D 1.2 (December 2020), we discussed the need for mobility support mechanisms and their role in bridging the gap between industry and academia. Based on the desk research, dialogue among the ASSET consortium members consisting of industrial and academic actors, we identified some of the commonly practiced mobility support mechanisms. Further, through the dialogue, the success frequency of the implementation, and the experience of the involved actors, we selected five mechanisms to be implemented within the project lifetime. In this chapter, we will highlight the role of selected ASSET mobility support mechanisms in strengthening the two-way link between industry and academia. Further, we will provide the details of the contributions planned by each partner for the implementation of these supporting mechanisms, using their internal and external resources. To monitor the implementation progress of these mechanisms, we have prepared a set of reporting forms which are included in this chapter. These forms contain the details of their implementations including the type of mechanism, contributing universities and industries, and the covered topics for the energy transition as discussed in the subsequent subsections of this chapter.

3.2 Overview of ASSET Mobility Support Mechanisms

As discussed in the last version of this deliverable (D1.2), we identified a set of commonly practiced mobility support mechanisms based on desk research and the experience of our academic and industrial partners. We shortlisted five mechanisms due to their proven effectiveness and possibility of implementation/exploitation within the project duration. These mainly include:

- Industrial researchers as lecturers in the Universities
- Collaborative Bachelor-/ Master-Thesis
- Collaborative doctoral education
- University Student internships in the industry
- Joint Industry/academia Projects

Out of these mechanisms, only doctoral education programs cannot be completed within the project duration, as in general throughout Europe and globally, the doctoral education duration is more than three years. However, based on the progress of the implementation, we will be able to report the findings for all of these pilot implementations by the end of the project in the updated version of the deliverable D1.4 ‘ASSET ecosystem activities report’ due by April 2021. After the application of these mechanisms and feedback from the partners, we will outline the set of recommendations including obstacles, sustainability, repeatability, and the possible way forward for an effective implementation. The initial set of recommendations for the stated implementations were presented in detail in D1.2, however, they are also briefly summarized below for the quick recap.

3.2.1 Industrial researchers as lecturers in the Universities

Experienced personnel from industry, consulting agencies, research, and development (R&D) departments of the companies will be invited to deliver lectures, seminars, and full-semester courses in the university to share their first experience with the students. This way, students will be introduced to the practices adopted in industry, to the knowledge gap between industrial practices and university teaching, and more particularly to the key skills, knowledge, and competencies required from the industry’s perspective.

The major challenges for the implementation of this mechanism involve the flexibility in the curriculum scheme such that industrial lectures may align their experience with the curriculum requirements. The availability and interest of experienced researchers is another challenge that needs to be systematically sought through close ties between industries and universities. The active participation in industry seminars and conferences can provide such venues to discuss mutual interests and resource sharing with an objective-based approach. For ASSET implementation, the ASSET ecosystem will capitalize its direct links to companies and company associations and support (both from the organizational and financial point of view i.e. travel expenses) industrial researchers to teach at ASSET participate universities. The details of the industry lectures under the ASSET project are discussed in the reporting forms presented in the subsequent subsections.

3.2.2 Collaborative Bachelor-/ Master-Thesis

As a part of the thesis in the Bachelor or Master degree programme, a student may work on a research topic related to the energy transition in consultation with an energy company. The topic and requirements are generally co-defined by the university and industry supervisors, with an intent to solve the practical problem at the industry's end. This mechanism has challenges: it requires resources for its implementation and the major resources include the availability of clearly defined tasks, the willingness of industry supervisor, the willingness of university advisor, and the coordination among them to track the thesis progress. The main recommendations for a successful implementation require active participation in the forum where students, industry professionals, and university professors can discuss the ideas, challenges, and requirements for the collaborative actions. The details of the collaborative thesis research conducted by the ASSET project are discussed in the reporting forms presented in the subsequent subsections.

3.2.3 Collaborative doctoral education

In a Collaborative doctoral education, a doctoral candidate is supervised not only by a university but also from the industry. The implementation of this mechanism ensures that the research conducted by doctoral students is of industrial relevance and doctoral students are better prepared for employment outside academia. It also ensures that the developments within the industry and companies involve the state-of-the-art research and innovation. However, the major barriers to the wide adoption of this model include the management of intellectual property rights (IPR), and the loosely coordinated mechanisms for its implementation. For a successful implementation of this mechanism, doctoral students must be trained on IPR management and various methods to ensure its implementation. The details of the collaborative doctoral education programmes placed carried out under the ASSET project are discussed in the reporting forms presented in the subsequent subsections.

3.2.4 University Student internships in the industry

This is the most common mode of industry-academia mobility at all levels of education, from undergraduate to postgraduate levels. Through the implementation of this mechanism, the student will learn about the applicability of their curriculum in real-time industrial environments, which not only helps them building insights about their existing curriculum but also stimulates them to advance their career in that particular area instigating new research and development. The feedback of the internship students can help university lecturers to update their curriculum and benchmark their courses according to the industry requirements.

The main barrier to apply this model is the absence of any systematic support for matchmaking between the available positions and the students' interests. ASSET community forum can be used for the discussion among the interested students and the industry partners of the ASSET community for internship seeking opportunities. ASSET will leverage its ecosystem population and direct interactions to establish multiple agreements between companies and universities. The details of the internships carried out through the ASSET project are discussed in the reporting forms presented in the subsequent subsections.

3.2.5 Joint Industry/academia Projects

Joint industry/ academia projects are the key mechanism for harmonising the synergies of industry professionals, participating students, and university professors. The main challenge with this scheme is the absence of systematic mechanisms for task management and progress monitoring. These challenges can be overcome by defining the task for the students and setting some milestones for their research with the industry to achieve the desired objectives. The monitoring of progress and the achieved milestones will be a key factor in the successful implementation of these projects.

3.3 Planned Contributions from ASSET Partners

Table 3 has been created in the previous report (D1.2) and shows various mobility support mechanisms planned within the ASSET framework and coordinated by different members of the ASSET ecosystem. These mechanisms are planned such that the desired KPIs can be achieved through the pilot implementations. Through the experience of the pilot implementations and the feedback gathered from the contributing partners, the recommendations presented in the previous report (D1.2) will be considered in this report and later updated in the upcoming version of the deliverable. D1.4 covering the ecosystem activities by M24 (April 2021) will summarize the overall lesson learned throughout the project life and comprehensive guidelines for mobility support implementation as well as possible tailoring schemes to enhance their effectiveness.

No.	Industry-Academia Mobility Support Mechanism	University Partners					Company Partners			Total	Target KPIs
		RWTH	AAU	UPV	UWA	UNINA	ATOS	ENOSTRA	ECOPOWER		
1	**Industrial researchers as lecturers**	0	2	1	2	0	0	0	3	8	>5
2	**Bachelor-/ Master-Thesis**	2	0	2	2	1	1	0	2	10	>10
3	**Collaborative doctoral education**	1	1	1	1	1	0	0	0	5	3
4	**Student internships**	1	0	2	0	1	1	1	2	8	>5
5	**Industry/Academia Joint Projects**	0	0	0	2	0	10	1	1	14	3

Table 3: Mobility Support Mechanisms planned during the ASSET project lifetime

3.4 The mechanism for monitoring the progress of pilot Implementation

To monitor the progress of the pilot implementations, we have prepared the reporting forms for each of the mobility support mechanisms mentioned above. These reporting forms include the details of the contributing industry and academic actors, along with the details of topics and their relationship to the energy transition. In the current version of this deliverable, the reporting forms are used as a mechanism for monitoring the status of the pilot implementations. Each contributing partner has filled in the information that is sufficient for reporting the progress of implementation monitoring, and the

duly filled reporting form samples are included in section 3.5. To establish the guidelines and recommendations for future implementations of the mobility support mechanism, a closely monitoring of the progress of each pilot mechanism implementation will be carried out. Another set of recommendation forms will be collected from the partners at a later stage and the compact guidelines based on the feedback of implementation monitoring will be drafted in the updated version of the deliverable D1.4 'Ecosystem activities report'due in April 2021.

3.5 Mobility support mechanism's implementation monitoring

The duly filled reporting forms are included in this section to present the details of implementation under each category of mobility support mechanisms. Some of the mechanisms have been already deployed, e.g. industry researchers as lecturers, while others are still in the phase of implementation. A few others are also in the planning phase and will be reported in the upcoming version of the deliverable. The sample reporting forms from each category are given below.

3.5.1 Industry researcher as a guest lecturer reporting

The details of industry researchers as a guest lecturer are included in the forms below. Each form contains the details of the industrial lecturer including the department and area of specialization details. It also contains the details of the host institution and the topics to be covered in the lecture. For the sake of privacy and following GDPR, the name and other details of the lecturer is not included in the form. The contributions from various partners are sequenced based on the topic of the lecture.

3.5.1.1 New technologies in power generation, transmission and distribution products

Details of the University and Department
University Name: University of West Attica
Department: Industrial Design and Production Engineering
Degree Program: Undergraduate of all departments of engineering faculty (Cross department lecture)

Details of the Industrial Lecturer
Department/industry details: R&D in Raycap
Area of Specialization: Production of arresters and power distribution systems

Details of the Lecture
Course/ Lecture Title: New technologies in power generation, transmission and distribution products **Start Date:** October 2020 **Expected Date of Completion:** November 2020 **Description/Main highlights:** • Overview of power generation, transmission, and distribution products • New technologies in power systems • Challenges faced by engineering • Challenges faced by product designers.

Table 4: New technologies in power generation, transmission and distribution products

3.5.1.2 Introduction to Ecopower, a renewable energy cooperative.

Details of the University and Department
University Name: Karel de Grote Hogeschool **Department:** N/A **Degree Program:** Immersion week 'smart & sustainable cities'

Details of the Industrial Lecturer
Department/industry details: Ecopower cv **Area of Specialization:** Communication

Details of the Lecture
Course/ Lecture Title: Introduction to Ecopower, a renewable energy cooperative. **Start Date:** 24/04/2020 **Expected Date of Completion:** / **Description/Key highlights:** Ecopower: introduction • Cooperative for renewable energy • 3 main goals: investing, supplying and energy-saving → contribution to the energy transition

Ecopower: Brief history • °1991, hydropower turbine Rotselaar • Milestone 1: Eeklo • Milestone 2: Electricity supply • Pellets factory: what & why? Ecopower today • Key figures: Investment in renewable energy sources, reduced CO_2 … Cooperatives & the ICA-principles • What's a cooperative/REScoop? • How does Ecopower fit the ICA-principles?

Table 5: **Introduction to Ecopower, a renewable energy cooperative**

3.5.1.3 Ecopower as a cooperative: how cooperative entrepreneurship can help the energy transition (Phase I)

Details of the University and Department
University Name: UC Leuven-Limburg (UCLL) **Department:** Bachelors management, health, and technology **Degree Program:** N/A (Get to know all types of companies)

Details of the Industrial Lecturer
Department/industry details: Ecopower cv **Area of Specialization:** Communication – csr
Details of the Lecture
Course/ Lecture Title: Ecopower as a cooperative: how cooperative entrepreneurship can help the energy transition **Start Date:** October 18th, 2019 Expected Date of Completion: October 18th, 2019 **Description:** • Cooperative entrepreneurship • International principles of the cooperative movement (International Cooperative Alliance) • ICA-principles adapted to Ecopower • Renewable energy is a common good. Therefore, it is best managed by cooperatives.

- The energy transition to energy democracy

Table 6: Industry researcher as a lecturer reporting form: how cooperative entrepreneurship can help the energy transition (Phase I)

3.5.1.4 Ecopower as a cooperative: how cooperative entrepreneurship can help the energy transition (Phase II)

Details of the University and Department
University Name: Karel de Grote Hogeschool Antwerpen
Department: Economy & management
Degree Program: Bachelor SME Management

Details of the Industrial Lecturer
Department/industry details: Ecopower cv
Area of Specialization: Communication – csr

Details of the Lecture
Course/ Lecture Title: Ecopower as a cooperative: how cooperative entrepreneurship can help the energy transition
Start Date: October 18th, 2019
Expected Date of Completion: October 18th, 2019
Description : • Cooperative entrepreneurship • International principles of the cooperative movement (International Cooperative Alliance) • ICA-principles adapted to Ecopower • Renewable energy is a common good. Therefore, it is best managed by cooperatives. • The energy transition to energy democracy

Table 7: Industry researcher as a lecturer reporting form: how cooperative entrepreneurship can help the energy transition (Phase II)

3.5.1.5 Innovation and digital transformation towards energy transition paradigm – skills and competences needs

Details of the University and Department
University Name: University of West Attica **Department:** Industrial Design and Production Engineering **Degree Program:** undergraduate of all departments of engineering faculty (Cross department lecture)

Details of the Industrial Lecturer
Department/industry details: Protergia **Area of Specialization:** Head of Applied Research and Development | Innovation | Digital Transformation at Protergia, MYTILINEOS S.A.

Details of the Lecture
Course/ Lecture Title: Innovation and digital transformation towards energy transition paradigm – skills and competences needs **Start Date: October 2020** **Expected Date of Completion: November 2020** **Description:** • Digital transformation and its relation to energy transition and industry 4.0 • From research to the market • Business perspectives of the energy transition

Table 8: Industry researcher as a lecturer reporting form: Innovation and digital transformation towards energy transition paradigm – skills and competences needs

3.5.1.6 High penetration of solar in utility networks and microgrids

Details of the University and Department
University Name: Aalborg University (AAU)
Department: Department of Energy Technology
Degree Program: Ph.D.

Details of the Industrial Lecturer
Department/industry details: Kenergy
Kenergy is an independent engineering and consultancy firm offering services within the energy sector. With a background from the utility sector working with research and development and business development, Kenergy has a huge experience in the energy technologies and systems of today and tomorrow.
Area of Specialization: Renewable Energy, Solar Photovoltaics, Energy Efficiency

Details of the Lecture
Course/ Lecture Title: High penetration of solar in utility networks and microgrids
Start Date: May 19, 2020 (postponed due to COVID-19 and will be rescheduled)
Date of Completion: May 19, 2020 (postponed due to COVID-19 and will be rescheduled)
Description: The invited lecturer based on more than 20 years of experience of the Kenergy with photovoltaics will discuss the impact and way forward (technological solution and business model) for high penetration of solar in utility networks/microgrids. The invited lecturer will also share the insights, challenges, barriers, and the lesson learned from national and international R&D projects focusing on-grid and utility integration on BIPV issues.

Table 9: **Industry researcher as a lecturer reporting form: High penetration of solar in utility networks and microgrids**

3.5.1.7 Connecting offshore wind power to the grid

Details of the University and Department
University Name: Aalborg University (AAU) **Department:** Department of Energy Technology **Degree Program:** Ph.D.

Details of the Industrial Lecturer
Department/industry details: WorldPower WorldPower has 20 years of comprehensive experience within and across the energy sector. WorldPower cooperates with investment companies, engineering consultancies, local communities, NGOs, global suppliers, and offer consulting services, for Strategic and Electrical Engineering Consultancy within large-scale wind power. **Area of Specialization:** Offshore Wind Power, Clean and Affordable Energy, micro-scale energy solutions

Details of the Lecture
Course/ Lecture Title: Connecting offshore wind power to the grid **Start Date:** May 19, 2020 (postponed due to COVID-19 and will be rescheduled) **Date of Completion:** May 19, 2020 (postponed due to COVID-19 and will be rescheduled) **Description:** The invited lecturer based on her 24 years of diverse experience in reputable energy organizations including Dong Energy, Whessoe Engineering Ltd, and world power, will discuss the needs of offshore wind energy markets with a focus on grid integration requirements and interconnections. The industry lecturer will also throw light on the topics including the followings: • Offshore wind to grid connection liaison, • NPV-cost optimization • Development and construction of large-scale Off-shore ASSETs

Table 10: Industry researcher as a lecturer reporting form: Connecting offshore wind power to the grid

3.5.1.8 Hydrogen as an Energy Vector

Details of the University and Department
University Name: Universitat Politècnica de València **Department:** University Institute for Energy Engineering **Degree Program:**

Details of the Industrial Lecturer
Department/industry details: H2B2 **Area of Specialization:** Hydrogen - Electrolysers

Details of the Lecture
Course/ Lecture Title: Hydrogen as an Energy Vector **Start Date:** Fall 2020 **Expected Date of Completion: --** **Description:** A part of the "Hydrogen as an Energy Vector" course is dedicated to electrolysis technology as a mean to obtain hydrogen from renewable energy. Alkaline and PEM electrolysers are described and an economic analysis is presented. H2B2 is an important company in the sector. They build and sell PEM electrolysers. Many of the company workforce come from Abengoa Hidrógeno where they worked in many hydrogen related research projects. The person who will come from H2B2 to give the lecture in the course will introduce the industry aspects related with this electrolysis technology to the students. PEM electrolysis is a key factor in the hydrogen energy storage from renewable energy sources.

Table 11: Industry researcher as a lecturer reporting form: Hydrogen as an Energy Vector

3.5.2 Collaborative Bachelor-/ Master-Thesis

The details of the BS/MS thesis are included in the forms below, and the contributions from various partners are sequenced based on the topic of the thesis.

3.5.2.1 Communicating the Energy Transition. energy companies to the test of social network

Details of the Student and University
University Name: University of Naples Federico II
Degree Program: Comunicazione pubblica, politica e sociale
Field of Studies: Institutional Communication
Semester: II semester, July 2020

Details of the Industry/University Supervisor
Department: Social Sciences
Area of Specialization: Political Science

Table 12: BS/MS thesis: Communicating the Energy Transition. Energy companies to the test of Social Network

Details of the Thesis Topic
Title: Communicating the Energy Transition. Energy companies to the test of Social Network
Description/Abstract:
This work attempts to explore the communication strategies of energy companies through social networks, highlighting the main themes and guidelines of their approach to energy transition, the ideas they have of circular economy and their communication choices from. After introducing the regulatory and theoretical framework of the energy field, case studies have been presented: a group of major energy companies - Eni, Enel and Edison – on one side and a group of bottom-up energy cooperatives: ènostra, Energyland and Positive Energy, which are currently the ones with most energy installation in Italy. In the last chapters, the research methodology for analysing the energy company communication strategy has been presented with the description of analytical phases and tools that will be managed for data retrieval from Facebook, Twitter and LinkedIn. This study, well aware of its limitations, highlights the opportunities that social networks offer in terms of listening to users and campaigning for social awareness over energy transition. This work is part of the activities foreseen by the ASSET project in order to involve students in interdisciplinary studies in the area of the energy transition.

3.5.2.2 Smart Grids, Smart Homes, Smart Everywhere- Limits of Managing Complex Socio-Technical Systems

Details of the Student and University
University Name: RWTH Aachen University
Degree Program: MS Electrical Engineering

Field of Studies: Electrical Engineering and Economics

Semester: January to July 2020

Details of the Supervisors		
	Internal Supervisor	**External (University/Industry) Supervisor**
Affiliation:	Institute for Automation of Complex Power Systems, RWTH Aachen University	Institute for Future Energy Consumer Needs and Behavior, RWTH Aachen University,
Area of Specialization:	Monitoring and Distributed Control for Power Systems	Energy economics, energy management, energy policy-making, energy consumer needs and behaviour, structural change in energy systems

Details of the Thesis Topic

Title: Smart Grids, Smart Homes, Smart Everywhere- Limits of Managing Complex Socio-Technical Systems

Description/Abstract:

Due to extraordinary achievements in technology and innovation, more sophisticated and advanced technologies have emerged in the field of Smart Grids and Smart Homes. The world is adopting Smart Technologies to make the day to day life better and easier, but there are complexities and limits of managing such smart technologies. It poses a significant risk of creating overwhelming complexities from both technical and economic perspectives. Although the Smart Homes and Smart Grids have their advantages in personal lives and different industries, the complexities which accompany such smart technologies have not been explored in detail from an economic perspective. This thesis focuses on exploring the limits of managing the complex socio-technical systems by discussing and analysing specific complexities and case studies in the field of Smart Homes and Smart Grids**.**

Table 13: BS/MS thesis reporting form: Smart Grids, Smart Homes, Smart Everywhere- Limits of Managing Complex Socio-Technical Systems

3.5.2.3 Communication as a catalyst for cooperative member engagement

Details of the Student and University
University Name: KU Leuven
Degree Program: Postgraduate in Cooperative Enterprise and Management
Semester: June, 2019

Details of the Thesis Topic
Title: Communication as a catalyst for cooperative member engagement
Description/Abstract:
Since 1991, the energy cooperative Ecopower has been uniting citizens to invest together in renewable energy. The cooperative project developer and energy supplier now has 57,000 shareholders. Ecopower, often referred to as a pioneer and success story, has conquered a small but permanent place in the Flemish energy market. This has been accompanied by an increase in scale, a geographical spread of members, and a decline in member involvement. Yet it is precisely the role and input of the members that make the company a cooperative: a value-driven company that unites citizens, achieves ecological and social impact, and uses the seven international cooperative principles as a guiding principle in its operations. These 57,000 individual co-operatives have chosen to become members based on their own highest motivations and are now more or less involved in Ecopower. One has a share because he can then be a customer, the other has twenty and hopes to earn a good return, a third invests to contribute to the environment and climate and yet another wants to offer a counterweight to profit-driven, capitalist companies through his cooperative choice. One hardly knows what a cooperative is, the other has not missed a single general meeting for the past 27 years. Through the right communication choices, tailored to the different profiles and the different and varying motivations, Ecopower can strengthen its identity, attract new members and motivate existing members to remain members and actively contribute to the success of their cooperative. Following an analysis of member engagement in cooperatives and at Ecopower, this study recommends using communication tools as a catalyst for consolidation and growth and to achieve Ecopower's social and ecological goal: a sustainable, decentralized, and democratic energy model.

Table 14: BS/MS thesis reporting form: Communication as a catalyst for cooperative member engagement

3.5.2.4 Project for a 13,366 MWp grid-connected photovoltaic park in Corregimiento de Paraiso (Los Santos, Panama)

Details of the Student and University
University Name: Universitat Politècnica de València **Degree Program:** MSc Industrial Engineering **Field of Studies:** Energy **Semester:** Second Semester 2019/2020

Details of the Supervisors		
	Internal Supervisor	**External (University/Industry) Supervisor**
Affiliation:	Institute for Energy Engineering	Aplicaciones Técnicas de la Energía
Area of Specialization:	Hydrogen Technology	Engineering Manager

Details of the Thesis Topic
Title: Project for a 13,366 MWp grid-connected photovoltaic park in Corregimiento de Paraiso (Los Santos, Panama) **Description/Abstract:** The project consists of the study, design and implementation of a 13,366 MWp grid-connected photovoltaic park located in Corregimiento de Paraiso, Pocrí District, Los Santos Province (Panama). For this purpose, a pre-feasibility study of the area will be carried out in order to establish an ideal configuration of the equipment (module, inverter, transformer, cell and sectioning centre) which will later be selected according to a series of criteria. The orography of the area will have to be taken into account to make an efficient layout of the park, in addition to the local legislation contained in the Network Code. A study of the plant's wiring will also be carried out. In addition, a simulation will be carried out with the PVSyst program to evaluate its energy efficiency along with its viability. The design of this project begins with the implementation of the electrical module, which captures solar radiation to convert it into direct current, and ends at the electrical substation, at the last point

before the final connection to the electricity grid where it will be supplied in the form of alternating current. This project develops knowledge in the area of photovoltaics, a renewable energy technology that is increasingly being implemented due to the impressive costs reduction recently achieved, so devoted to play a major role in the energy transition process towards a more sustainable future.

Table 15: BS/MS thesis reporting form: Project for a 13,366 MWp grid-connected photovoltaic park in Corregimiento de Paraiso (Los Santos, Panama)

3.5.2.5 Project of a photovoltaic installation of 7 mwp of power for self-consumption in the airport of Valencia

Details of the Student and University
University Name: Universitat Politècnica de València **Degree Program:** MSc Industrial Engineering **Field of Studies:** Energy **Semester:** Second Semester 2019/2020

Details of the Supervisors		
	Internal Supervisor	**External (University/Industry) Supervisor**
Affiliation:	Institute for Energy Engineering	Aplicaciones Técnicas de la energía
Area of Specialization:	Hydrogen Technology	Technical office and projects

Details of the Thesis Topic
Title: Project of a photovoltaic installation of 7 mwp of power for self-consumption in the airport of Valencia **Description/Abstract:** Royal Decree 244/2019 regulates the bases of self-consumption of electrical energy in Spain that will allow homes and industries to generate their own electricity and participate in the energy transition that will take place in the coming years. As airports have high electricity consumption and large areas of land, they are a potential location for the implementation of photovoltaic solar energy in their facilities. This project aims to study and design a photovoltaic installation for Valencia Airport. The activities to be developed are the following: - Selection of the optimal location for the installation, taking into account that it should not affect airport activities. - Design of the installation and selection of components among the main manufacturers. - Calculation of annual energy production using PVSyst software and the ratio of self-consumption that it will involve, taking into account the current energy consumption of the airport. - Selection of the self-consumption mode according to RD 244/2019 that best suits the installation. - Study of the economic viability and the savings that the implementation of photovoltaic solar energy would mean in the electricity bill.

Table 16: Project of a photovoltaic installation of 7 mwp of power for self-consumption in the airport of Valencia

3.5.2.6 Serious games for raising awareness of energy transition

Details of the Student and University
University Name: University of West Attica **Degree Program:** Industrial Design and Prodution Engineering

Field of Studies: Mobile apps- serious games **Semester:** 10th

Details of the Supervisors		
	Internal Supervisor	**External (University/Industry) Supervisor**
Affiliation:	UNIWA	Protergia
Area of Specialization:	Computer Networks	Digital Transformation

Details of the Thesis Topic
Title: Serious games for raising awareness of energy transition **Description/Abstract:** George is designing and developing a serious game which will be used by citizens to become aware of what energy transition means and its importance for the future of our Planet. This Master thesis is innovative and multi-disciplinary as it addresses both serious game development technologies (informatics discipline) and energy transition aspects (electrical engineering discipline). The emphasis will be on role playing games towards fostering competition with respect to energy efficiency.

Table 17: BS/MS thesis reporting form: Serious games for raising awareness of energy transition

3.5.2.7 Serious games for raising awareness of energy transition

Details of the Student and University
University Name: University of West Attica **Degree Program:** Industrial Design and Prodution Engineering **Field of Studies:** Mobile apps- serious games **Semester: 10th**

Details of the Supervisors		
	Internal Supervisor	**External (University/Industry) Supervisor**

Affiliation:	UNIWA	Protergia
Area of Specialization:	Computer Networks	Digital Transformation

Details of the Thesis Topic
Title: Serious games for raising awareness of energy transition **Description/Abstract:** Elida is designing and developing a serious game which will be used by citizens to become aware of what energy transition means and its importance. This Master thesis is innovative and multi-disciplinary as it addresses both serious game development technologies (informatics discipline) and energy transition aspects (electrical engineering discipline). Moreover, aspect such as societal acceptance will also be tackled.

Table 18: BS/MS thesis reporting form: Serious games for raising awareness of energy transition

3.5.2.8 Analysis of data-driven Volume Flow Sensor Models

Details of the Student and University
University Name: RWTH Aachen University **Degree Program:** Electrical Engineering, Information Technology and Computer Engineering **Field of Studies:** Electrical Engineering, specialization: Energy Engineering **Semester:** 8

Details of the Supervisors		
	Internal Supervisor	**External (University/Industry) Supervisor**
Affiliation:	**ACS RWTH Aachen**	**EBC RWTH Aachen, aedifion**
Area of Specialization:		**Building data analysis and energy optimization**

Details of the Thesis Topic
Title: Analysis of data-driven Volume Flow Sensor Models **Description/Abstract:** Climate change, due to ever-increasing greenhouse gas emissions, is an acute problem on global scale. To reduce the impact of energy productio and use on climate change, building optimization aims to reduce $CO2$ by optimizing building energy consumption. To analyze building energy consumption, the energy flow through the building is an important variable. Its calculation is based on volume flow measurements. However, the availability of volume flow measurement data in buildings is not very high due to missing volume flow sensors. The ability to estimate the volume flow in buildings where volume flow sensors are not present can provide critical information for building energy analysis, thus enabling building energy optimization without the need for retrofitting volume flow sensors. In the last decades, sensors and the availability of building monitoring data has grown rapidly within building energy systems. This enables the use of data analytics and data-driven modeling. Therefore, this thesis aims to investigate transferable, data-driven volume flow sensor models. Long-short term memory (LSTM) and feed-forward artificial neural networks (ANN) are used for volume flow estimation. As a foundation, an application-specific, data-driven volume flow soft sensor is studied and validated on real data to gain insight into core modeling questions.

Table 19: BS/MS thesis reporting form: Analysis of data-driven Volume Flow Sensor Models

3.5.2.9 Reinforcement learning for Demand Response in urban Energy systems

Details of the Student and University
University Name: RWTH Aachen,Germany **Degree Program:** Master of Science **Field of Studies:** Electrical Engineering,Information Technology and Computer Engineering **Semester:** 6

Details of the Supervisors		
	Internal Supervisor	**External (University/Industry) Supervisor**
Affiliation:	Institute for Automation of Complex Power Systems; RWTH Aachen	

Area of Specialization:	Energy Management Systems and Data Analytics	

Details of the Thesis Topic
Title: Reinforcement learning for Demand Response in urban Energy systems **Description/Abstract:** As the energy revolution progresses, weather-related power fluctuations in the electric grid are increasing. Local energy systems need to be more flexible in dealing with these fluctuations, which makes the optimal use of storage systems crucial. An obstacle for the implementation of strict optimization methods in building energy systems is the complex and error-prone, therefore expensive, modelling of the systems. Motivated by this, we investigate model-free algorithms, which can learn through direct interaction with the system to be controlled. The main objective of this work is to explore the potential of reinforcement learning as a control approach for building energy coordination and demand response. Since reinforcement learning is adaptive and can be model-free, it has a great potential as an inexpensive plug-and-play controller that can be easily implemented in any building regardless of its model and coordinate with other buildings for demand response and load shaping. Therefore, the focus is on the design of the reinforcement learning agents that are able to perform well in new and unknown environments, learn and adapt fast, and maintain reliable operation.

Table 20: BS/MS thesis reporting form: Reinforcement learning for Demand Response in urban Energy systems

3.5.3 Collaborative doctoral education

The details of doctoral education programmes and thesis are included in the forms below, and the contributions from various partners are sequenced based on the topic of the thesis.

3.5.3.1 **Microgrid Technologies for Future Offshore Wind Power Plants**

Details of the Student and University
University Name: Aalborg University **Degree Program:** Ph.D. **Field of Studies:** Offshore wind power plants and microgrids **Semester:** Spring 2020

Details of the Supervisors		
	Internal Supervisor	**External (University/Industry) Supervisor**
Affiliation:	Aalborg University, Denmark	Endoks, Turkey
Area of Specialization:	Microgrids, Wind Power	Energy Project Management

Details of the Thesis Topic

Title: MICROGRID TECHNOLOGIES FOR FUTURE OFFSHORE WIND POWER PLANTS

Start Date: 01-02-2020

Expected Date of Completion: 31-01-2023

Description: Due to a possible energy shortage and environmental concerns about global warming, increasing efforts have been devoted to the development of sustainable energy sources for electric power generation. Among all the renewable electricity generation technologies, wind power generation is increasingly becoming mainstream in the EU, and large-scale offshore wind power plants (OWPPs) are gaining more attention in recent years because of their increased power production capability and low environmental impacts. However, as the wind power penetration level increases, integrating large-scale OWPPs into the utility grid will pose a series of challenges in the realm of reliability and power quality. The extent to which large-scale OWPPs can be integrated into the utility grid without adverse influences on overall reliability and stability mainly depends on the technology available to deal with possible challenges such as power fluctuations of different time scales, overcurrent, and overvoltage caused by short-duration grid voltage disturbances, loss of synchronization for grid connection, and the risk of instability due to harmonics.

This Ph.D. project aims to develop new models, tools, and methods to improve the performance of integrating large-scale OWPPs into power systems. Complete models of OWPPs with variable-speed wind turbine generators and long transmission cables will be established for stability analysis and simulation validation. Besides, coordinated distributed and centralized control strategies will be investigated to improve the performance of network support under both grid-connected and islanded conditions, and special attention will be paid to realize smooth switching between these operation modes without any modification of control schemes. Moreover, filtering and damping strategies will be developed to mitigate instability problems in large-scale OWPPs, and harmonic current sharing methods will be proposed in a higher layer to adjust harmonic contents on each

wind turbine inverter terminal. A hierarchical control structure will be then designed to simultaneously include turbine-, convert- and farm-level control algorithms, and different layers will be defined to cope with OWPPs' framework, grid code requirements, and different operating conditions such as weak-grid conditions, islanded operations, black-start operations and grid fault conditions.

Table 21: Doctoral education reporting form: microgrid technologies for future offshore wind power plants

3.5.3.2 Development of a methodology for optimizing energy consumption through the discretization of electrical loads and application in the residential sector

Details of the Student and University
University Name: Universidad Politécnica de Valencia **Degree Program:** Industrial Engineering **Field of Studies:** Sustainable Development and Energies **Semester:** 2nd Semester

Details of the Supervisors		
	Internal Supervisor	**External (University/Industry) Supervisor**
Affiliation:	Institute for Energy Engineering	
Area of Specialization:	Sustainable Development and Energies	

Details of the Thesis Topic
Title: Development of a methodology for optimizing energy consumption through the discretization of electrical loads and application in the residential sector **Start Date:** October 2020 **Expected Date of Completion:** October 2024 **Description:** Study and development of a methodology to manage power loads in accordance with energy, economic or environmental criteria. Focusing on the domestic sector, data will be collected on electricity consumption per appliance and electricity generation through renewable energy

production systems. With the collected information, energy, economic or environmental optimisation will be carried out involving factors such as energy storage, current electricity rates and/or the possibility of injecting energy into the grid, using the hourly loads discretization. Finally, the demand side management and demand response strategies will be performed and evaluated through previously defined indicators.

Table 22: Doctoral education reporting form: Development of a methodology for optimizing energy consumption through the discretization of electrical loads and application in the residential sector

3.5.3.3 Polygeneration systems

Details of the Student and University
University Name: Università degli Studi di Napoli Federico II
Degree Program: PhD - Industrial Engineering
Field of Studies: Energy efficiency and renewables
Semester:

Details of the Supervisors		
	Internal Supervisor	External (University/Industry) Supervisor
Affiliation:	Università degli Studi di Napoli Federico II	SAMSØ
Area of Specialization:	Energy efficiency and renewables	Energy efficiency and renewables

Details of the Thesis Topic
Title: Polygeneration systems
Start Date: January 2018
Expected Date of Completion: December 2020
Description: Dynamic simulation and optimization of polygeneration systems based on hybrid combined heat and power/photovoltaic/thermal photovoltaic systems

Table 23: Doctoral education reporting form: Polygeneration systems

3.5.4 University students internships in industry

The details of internship programmes are included in the forms below, and the contributions from various partners are sequenced based on the emphasis of the internship and the involved companies.

3.5.4.1 Internship report Ecopower

Details of the Student and University
University Name: KU Leuven
Degree Program: Master of Applied Linguistics: Multilingual Communication (German, Spanish, Dutch)
Field of Studies: Applied Linguistics, Multilingual Communication
Semester: 1st semester

Details of the Industry/University offering internship
Name: Ecopower cv
Department: customer communication
Area of Specialization: Communication

Details of the Internship Topic
Title: Internship report Ecopower
Start Date: 13 January 2020
Expected Date of Completion: 7 February 2020
Description: Updating and standardizing the content and form of the customer letters in collaboration with the communication manager and customer service.

Table 24: **Ecopower internship reporting form**

3.5.4.2 Academic Internship Ènostra

Details of the Student and University
University Name: Wageningen University and Research
Degree Program: MSc International Development Studies
Field of Studies: Governance and Politics of Development
Semester: 1st semester

Details of the Industry/University offering internship

Name: ènostra

Department: energy policy

Area of Specialization: Italian transposition of the European Directive 2001/2018.

Details of the Internship Topic

Title: Academic Internship Ènostra

Start Date: 10/2019

Expected Date of Completion: 02/2020

Description: Ènostra aims to strengthen the activation of the members within the cooperative. In order to contribute to this objective, the intern will write a report on the ways to activate members of the cooperative, by conducting both literature and empirical research. In the report, the intern will identify a strategy from the literatures, and intern will propose successful examples from empirical cases. Moreover, the intern will contribute to the organization of the event with its members that will be held at the end of November. The main topic of the event will be the participation of the members to the cooperative life. Contribution will be made to draft the structure of the event and, possibly, interns will participate in the event and present an European cooperative case in terms of participation and activation of the members. The European case will be chosen after small empirical research.

- Ènostra wishes to soon develop the first energy community in Italy. To contribute to this goal, the intern will first map the regulation scheme on collective auto consumption of energy in Italy. To do so, the intern will conduct a document study and at least three interviews with ènostra lawyer, ènostra president, and a referent of the GECO project in Bologna. Lastly, if there will be an occasion, the intern will attend events on the topic. In the second place, possibilities and the gaps will be analysed by asking the following research question: How is the current regulation scheme hinder or promote the development of an energy community in Italy?
- In order to better fight energy poverty, Ènostra has the objective to redefine its energy education plan and to customize it on the needs of different vulnerable communities. To help them reach this objective, the intern will first follow the Home energy advisor (HEA) training promoted by Assist2020, a European project that aims to tackle energy poverty. In the second place, internee will help to draft the structure of the three modules of the

course, by using the knowledge acquired from the training (“becoming ConsumerActor”, “how to reach energy efficiency” and “Good practices for energy and resources savings in a household”). Moreover, internee will work on their content. To do so, internee will conduct empirical research and possibly, literature and grey literature review. In November, it will be held the first session of the educational series, organized for La Cordata, a social cooperative based in Cormano. For this occasion, internee will prepare the presentations of the three modules, based on the structure of the course.

Table 25: **Ènostra academic internship reporting form**

3.5.4.3 Hydrogen as an energy carrier: analysis of production, storage and distribution methods; applications and potential in Germany

Details of the Student and University
University Name: Universitat Politècnica de València **Degree Program:** Master Muteds **Field of Studies:** Master Industrial Energy **Semester:** Autumn 2019/2020

Details of the Industry/University offering internship
Name: Technische Universität Berlin **Department:** Institut Für Energietechnik **Area of Specialization:** Energie

Details of the Internship Topic
Title: Hydrogen as an energy carrier: analysis of production, storage and distribution methods; applications and potential in Germany **Start Date:** October 2019 **Expected Date of Completion:** April 2020 **Description:**

The current energy system based on fossil fuels and its consecutive global warming and climate change has created the urgent need of a radical change in the energy mix toward a deep decarbonization of the system itself. The aim of this process is to reduce greenhouse gas emissions by replacing fossil fuels reliant systems with low-carbon sources of energy, focusing on electrification, decarbonization of electricity and improvement of energy efficiency. The use of hydrogen as an energy carrier makes a vital contribution in this objective facilitating not only the decarbonization of hard-to electrify sectors like mobility, building and industry but also the integration of variable renewable energy sources in the energy system. There is a wide range of hydrogen production technologies using different resources -renewable and non-renewable- and chemical and physical methods. The main technologies considered in this project and their respective sources are: I. Steam reforming (natural gas and biogas) II. Gasification (coal) III. Electrolysis (wind and solar) IV. Gasification and pyrolysis (biomass) V. Thermochemical water splitting (solar and nuclear) VI. Photocatalysis (solar) VII. Dark fermentation (biomass) This project will analyse the previous methods by comparing the maturity and latest research of each technology, the environmental aspects such as global warming and acidification potentials, the production costs and the energy efficiencies. Furthermore, hydrogen has a promising potential for large-scale energy storage, which is a very important issue because of the rising share of variable renewable energy in the system. The following hydrogen storage methods are reviewed: Compressed gas storage or Liquid storage or Material-based storage or Underground storage or Pipeline storage. These methods are compared based on storage density, costs, environmental aspects and safety. The advantages and disadvantages of each method are compared. In addition, future trends and significant challenges of both production and storage technologies are studied. Afterwards, the delivery method and uses of hydrogen are analysed, focusing mainly on the hydrogen's role to decarbonise transport, building and industry sectors. In this part the project analyses the problems and challenges related to hydrogen transportation and pipelines, the potential of the use of underground storage of hydrogen for the grid integration of renewable energy and the hydrogen injection to the natural gas network taking a good look at the potential, limitations and difficulties of these issues. Lastly, the project discusses the potential that hydrogen has for supporting the German Energiewende goals, such as the increase in the share of renewable energy in final energy consumption to 18% by 2020 and to 60% by 2050, and the way to achieve these targets.

Table 26: **Internship reporting form: Hydrogen as an energy carrier: analysis of production, storage and distribution methods; applications and potential in Germany**

3.5.4.4 Modeling of a power-to-hydrogen system based on hydro energy

Details of the Student and University

University Name: Universistat Politècnica de València

Degree Program: Master's degree in Industrial Engineering

Field of Studies: Engineering

Semester: Autumn and spring

Details of the Industry/University offering internship

Name: Univerza V Ljubljani

Department: Faculty of mechanical engineering

Area of Specialization: Chair of power engineering

Details of the Internship Topic

Title: MODELING OF A POWER-TO-HYDROGEN SYSTEM BASED ON HYDRO ENERGY

Start Date: 20/02/2020

Expected Date of Completion: 21/06/2020

Description: Power-to-gas systems for converting surpluses of electricity into gaseous fuel as energy storage possibility are discussed in thesis. The case of the Brezice hydroelectric power plant was unused energy in the form of overflow of water is analysed for possible conversion to hydrogen with the use of polymer exchange membrane water electrolyser. A mathematical model in Matlab - Simulink has been developed based on the latest studies and scientific papers. Results obtained have been validated by comparing with the data provided by commercial electrolyser. Using the data provided by Brezice HPP operators, a simple model of the plant has been set up and the amount of excess power that could be produced with the bypass flow has been calculated. Finally, the annual amount of hydrogen that could be produced with the installation of an 8 MW and 11 MW PEMWE has been calculated. Results show that we could produce 328610 Nm^3 and 401570 Nm^3 per year, respectively.

Life Cycle Assessment (LCA) study is carried to compare the environmental impacts of 1 kg of H2 using different electricity sources with PEMWE technology with SMR technology. Results clearly

indicated that the case of electricity use from the HPP with PEMWE technology is the one that provides the hydrogen with the lowest environmental impacts (green hydrogen).

Table 27: **Internship reporting form: Modeling of a power-to-hydrogen system based on hydro energy**

3.5.4.5 Intern of Test Department

Details of the Student and University
University Name: RWTH **Degree Program:** Master **Field of Studies:** Automation of Electrical Engineering **Semester:** 7th

Details of the Industry/University offering internship
Department: Test Department **Area of Specialization:** Battery Management System Development

Details of the Internship Topic
Title: Intern of Test Department **Start Date:** 10,08,2018 **Expected Date of Completion:** 04,30,2019 **Description:** BMS Software development. New functionalities on the "Simba-View" (software interface of the battery simulator) for Mate-Control System by Java. Test program of HiL test bench development. (Design new test source code for "Simba" (battery simulator) and use it in Mate-Control System. Test source code is about controlling the battery status SOC/SOD.) Rebuild new end-of-line (EOL) test bench and get it running. (Using the original cable plan, I converted and tested the wiring diagram of the needle adapter to successfully test V6 slave boards and SDA slave boards)

Table 28: **Internship reporting form: Intern of Test Department**

3.5.4.6 Application of High-throughput Computing in Power System Simulation

Details of the Student and University
University Name: RWTH Aachen University **Degree Program:** Master of Science **Field of Studies:** Electrical Engineering **Semester:** 6th

Details of the Industry/University offering internship
Department: IEK-10 Energy System Engineering **Area of Specialization:** Methods for simulation of energy systems

Details of the Internship Topic
Title: Application of High-throughput Computing in Power System Simulation **Start Date:** 02. Mar. 2020 **Expected Date of Completion:** 03. Jul. 2020 **Description:** With the progress of energy transition, our energy network is becoming more and more complex. Therefore, development of advanced simulation techniques gains its importance. In contingency analysis, the most critical scenarios that need to be simulated is generally listed based on human experiences, which can be insufficient and subjective. Moreover, previous contingency detection was based on static criteria, e.g. Voltage violation, current violation, etc. For complex systems dynamic criteria are interested. As a result, tools that can perform dynamic simulation of power systems for contingency analysis within a similar time period as static simulation (e.g. power flow) is required. To develop such tool, in this internship the High-throughput Computing (HTC) techniques are applied.

Table 29: **Internship reporting form: Application of High-throughput Computing in Power System Simulation**

3.5.5 Joint industry academia projects

The details of joint industry/ academia projects are included in the forms below.

3.5.5.1 Web/mobile Application "Community Energy Transition ", to promote citizen-led solutions for the Energy Transition

Details of the University and Principal Investigators

University Name: University of West Attica

Area of Specialization: Information and Communication Technologies

Details of the Industry/University Partners

Name: Synelixis Solutions S.A.

Department: Research and Development

Area of Specialization: ICT, Data analytics and security for energy systems

Details of the Project

Title: Web/mobile Application "Community Energy Transition ", to promote citizen-led solutions for the Energy Transition

Start Date: 1/8/2020

Expected Date of Completion: 31/12/2020

Description: A Spanish-Greek-Italian expert consortium, present the project “Community Energy Transition” (CET). CET is an innovative web/mobile application aimed at accelerating the urban energy transition (ET). A transition to a more inclusive and sustainable energy system, through citizenship engagement and the reinforcement of local communities. On top of a wide database with reliable and interactive information about the ET, CET shows a map where people and groups are able to offer or to ask for services related with Energy Transition, and meet each other.

Thus, 5 main contest are envisaged: i) Information (definitions, infographics, examples, etc.), ii) Training (calendar of events, links to webinars, on-line contents…), iii) calculators (energy savings, Greenhouse gas savings, economic savings, etc.), iv) Suppliers (companies, public offices, NGO, etc.) and v) Community promotion (map, contact details, chat, etc.).

To start with, we will focus on 3 areas: Renewables Energy, Energy Efficiency and Right to Energy. Afterwards, we will enlarge our scope to global subjects such as Mobility, Food systems or Waste Management. A wide range of people can benefit from CET. Few examples: people looking for partners to collectively buy solar panels, NGO offering workshops to decrease energy bills, a home-insulation cooperative seeking to increase its visibility, or a council energy office that wants to spread green incentives to vulnerable households. Through geolocalisation, users can be easily aware of the people and the events (workshops, talks…) of their interest near them. With CET, any ET citizen-led initiative (Green open homes, repair cafes, shared equipment, or miles certifications…) can have an amplified impact by quickly reaching a sensitized

public. CET is open-source and easily replicable in any place.

The proposal for the above project was not finally accepted for funding.

Table 30: **Project reporting form: Web/mobile Application "Community Energy Transition ", to promote citizen-led solutions for the Energy Transition**

3.5.5.2 Biofeedstock - Development of Integrated Technological Platforms for the Valorization of Residual Biomasses

Details of the University and Principal Investigators

University Name: Università degli Studi di Napoli Federico II

Area of Specialization: Chemical engineering

Details of the Industry/University Partners

Name: ENI

Department: ----------

Area of Specialization: energy production and distribution, energy services

Details of the Project

Title: Biofeedstock - Development of Integrated Technological Platforms for the Valorization of Residual Biomasses

Start Date: July 2018

Expected Date of Completion: December 2021

Description: The Research Project aims to contribute to a wider exploitation of residual biomasses in biorefining processes; in particular, the main objective is to study the production of "sustainable biofuels" and bio-chemicals, through the integration of in situ pretreatment for the production of biogenic intermediates (biofeedstocks) and their final enhancement in biorefinery. The project

integrates study, experimental research and industrial demonstration activities for the development of support tools and for the realization of demonstration systems. The aim is to contribute to the removal of logistical and technological (and sometimes cultural) barriers for a more effective inclusion of residual biomass in advanced energy systems, coherently with the principles of the circular economy.

Table 31: **Project reporting form: Biofeedstock - Development of Integrated Technological Platforms for the Valorization of Residual Biomasses**

3.5.5.3 ATOS Academia/Industry Projects

In the present table we have gathered recent R&D projects where some partners of ASSET are involved, and many other European universities, industry, research centres are investigating together in energy transition topics. Some key topics are grid operation, big data, artificial intelligence or electric vehicles among others. All projects are related to energy evolution towards the "3-D phenomenon": digitalisation, decentralisation and decarbonisation.

Project Acronym	Topics covered	Description
BD4OPEM	Analytic toolbox (Big Data) & efficient business processes in the energy sector	Will develop an analytic toolbox based on Big Data techniques, providing tools for enabling efficient business processes in the energy sector. By extracting more value from available data, a range of innovative services will be created in the fields of grid monitoring, operation and maintenance, network planning, fraud detection, smart energy management for houses/buildings/industries, blockchain transactions and flexibility aggregation for demand-response in smart grids.
Edream [11]	Distributed Energy Sources (DRES) across Europe	Real-time control and supervision will play a crucial role in grid management and operation on all voltage levels. Moreover, the need for visionary decentralized approaches and architectures is widely recognized in the European Union, due to the rapid growth of Distributed Energy Sources (DRES) across Europe. eDREAM aims to the transfiguration of traditional market approaches and smart grid operations into novel decentralized and community-driven energy systems fully exploring local capacities, constraints, and Virtual Power Plants-oriented optimization in terms of local and secure grid nodes stabilization. eDREAM vision is for a novel near real-time Closed Loop optimal blockchain-based Demand Response, where DSOs and aggregators cooperate within a novel market framework, with a view to exploiting the potential flexibility of a large variety of third-party ASSETs while preserving the continuity, security, and reliability of supply.
ELVITEN [12]	Electric vehicles and urban	Demonstrates the usefulness of light electrified vehicles for urban transportation. Our focus is on bicycles, scooters,

	mobility in Europe	tricycles, and quadricycles (EL-VS). We work for more innovative, more sustainable, and more connected urban mobility in Europe. Throughout the life of the project, it has been possible to: Demonstrate the advantages of EL-Vs in six European cities. Integrate existing charging stations into a wide-open platform for users. Raise awareness of the use of EL-Vs for occasional and regular urban travellers through easy-access tools. Analyse trip and user data to make recommendations available to public authorities in other European cities
Flexigrid [13]	Distribution grid stability and management	The project aims to allow the power distribution grid to operate in a secure and stable manner when a large share of variable renewable electricity sources is connected to low and medium voltage grids. Concretely, partners will seek: to improve the power system flexibility; to increase the observability, controllability, and automation of the network systems; to mitigate short-term and long-term congestion in the distributed grid, and to ensure the interoperability and compatibility of the developed solutions with different platforms used by European DSOs (Distribution system operators).
INTERPRETER [14]	Efficient management of the electricity grid	Interoperable tools for an efficient management and effective planning of the electricity grid. The project will overcome limitations of existing tools through a modular grid management solution consisting of a set of 10 software applications for an optimal design, planning, operation and maintenance of the electricity grid – with a special focus on the distribution network – that will be offered to grid operators through an open-source interoperable platform.
MERLON [15]	Support energy management in energy islands	MERLON introduces an integrated modular local energy management framework for the holistic operational optimisation of local energy systems in presence of high shares of volatile distributed renewable energy sources. Optimisation in MERLON applies to multiple levels spanning optimal coordination of local generation as well as flexibility provision to facilitate maximum integration of renewable energy, avoidance of curtailment and satisfaction of balancing/ancillary grid needs. In this sense MERLON will also enable the realisation of novel business models, allowing local energy communities to introduce themselves in local flexibility markets, while assigning to local Distribution System Operators the tools for the provision of added value services to the overlay distribution grid.
INCIT-EV [16]	Charging infrastructures, technologies, and associated business models, ready to improve the	Aims to demonstrate an innovative set of charging infrastructures, technologies, and associated business models, ready to improve the Electric Vehicles (EV) users experience beyond early adopters, thus, fostering the EV market share in the EU. 5 demo environments at urban, peri-urban, and extra-urban conditions will be ready for the deployment of 7 use cases, addressing:

	Electric Vehicles (EV)	- Smart and bi-directional charging optimized at different aggregation levels - Dynamic wireless charging lane in an urban area - Dynamic wireless charging for long-distance (e-road prototype for TEN-T corridors) - Charging Hub in a park&ride facility - Superfast charging systems for EU corridors - Low power DC bidirectional charging infrastructure for EVs, including two-wheelers - Opportunity wireless charging for taxi queue lanes in airports & central stations
IELECTRIX [17]	Europe for Local Energy Communities grid integration of Renewable Energy Sources	Aims at increasing the role in Europe for Local Energy Communities (LECs) to speed up the grid integration of Renewable Energy Sources (RES), facing challenges as the lack of flexibility when planning cost-efficient LEC connections, and the lack of digitalization of the LV networks.
Integridy [18]	optimal and dynamic operation of the distribution grid	The project aims to integrate cutting-edge technologies, solutions and mechanisms in a framework of replicable tools to connect existing energy networks with diverse stakeholders, facilitating optimal and dynamic operation of the distribution grid, fostering the stability and coordination of distributed energy resources and enabling collaborative storage schemes within an increasing share of renewables. inteGRIDy follows a pilot-driven approach as its overall goal concentrates on the fulfilment of actual need and requirements. A set of innovative methods/mechanism integration will be targeted by inteGRIDy activities that will results to exploitable products with a high commercialization potential.
Wedistrict [19]	100% fossil free heating and cooling solution	Aims to demonstrate innovative 100% fossil free heating and cooling solutions for new and existing district heating and cooling systems. The solutions will integrate: - Multiple sources of renewable energy and excess heat from data centres - Advanced thermal storage to redistribute heat to buildings as needed - Smart technologies to increase the operational efficiency of the systems These technologies will be implemented in four real-scale projects in Spain, Romania, Poland and Sweden. The demonstration cases will present the best practices that can be replicated across different climate zones and building types, transforming the heating and cooling sector.

Table 32: **Project reporting form: ATOS Academia/Industry projects**

4. Academia-industry communication tools

4.1 Introduction

The digital tools facilitating the communication between academia and industry are mainly two: the ASSET marketplace and the ASSET forum.

4.2 ASSET Community forum use and assessment

The ASSET community forum is intended to serve as a discussion platform for all the energy transition drivers from diverse backgrounds to express their views about key issues related to the energy transition. The forum will also act as a channel for professional networking to support industry/academia mobility, including opportunities for internships, projects, thesis work, and collaborative research, between industrial and academic partners. Energy companies, policymaking institutes, University faculty, students, and common citizens can raise their queries regarding key energy knowledge, competencies, and skills. The active members of the forum will answer those queries based upon their expertise and exposure pertinent to the relevant energy issue.

The ASSET community forum has been in place and the same holds for the relevant monitoring tools. In the sequel, we first describe out activities relevant to its operation and then focus on the monitoring tools.

To work more efficiently yet altogether towards populating the forum we decided first of all to divide the forum into topic subsections, intended for different stakeholders' categories. The different topics given are:

- ASSET for Universities, Research Centres and Training Actors
- ASSET for Policy Makers, Authorities, Public Administrators and Regulators
- ASSET for Students (University) and New employees
- Welcome to ASSET Forum: An Introduction to our Community Vision and Objectives
- ASSET for Energy Citizens: Communities, Prosumers and Cooperatives
- ASSET for Social Actors: Associations and Trade Unions
- ASSET for Energy Sector Companies
- Energy Transition and COVID-19

Moreover, we decided to allocate partners responsible per topic to be more efficient. Each partner is responsible to edit posts and animate the debate in one or more of the forum sub-sections, based on its activity and expertise. The allocation is shown in Table 33.

Stakeholder Category	Responsible
ASSET for Universities, Research Centers and Training Actors	AAU, RWTH, UPV, UWA
Students (University) and New employees	AAU, RWTH
Energy Sector Companies	ATOS, EASE
Policy Makers, Authorities, Public Administrations and Regulators	Logical Soft, ECOPOWER, EASE
Societal Actors: Associations and Trade Unions	ECOPOWER, ENOSTRA
Energy Citizens: Communities, Prosumers and Cooperatives	UNINA

Table 33: Allocation of responsibilities of the topics

The community forum has been opened to the community in **June 2020**, previously it was only available for the ASSET consortium as the idea was to populate it before opening it to the community and also to have our first educational programmes in place so that the discussions will be around them.

With respect to the monitoring tools, an extract from the google analytics tools that have been integrated in the ASSET platform is shown in Figure 3. The results were taken for the period May 15-June 18 2020. The observed peak refers to the day of the workshop organized by UNIWA in Greece in the framework of the ITS conference.

Figure 3: Instance of google analytics relevant to the forum

The google analytics tools have been set up to enable the monitoring of the activity in each of the three sub-parts of the platform; namely the marketplace, the learning graph tool and the forum. The results for the same period are shown in Figure 4.

Marketplace	Pageviews	Unique Pageviews
	356 % of Total: 9.63% (3,697)	262 % of Total: 9.70% (2,701)

Learning Graph Tool	Pageviews	Unique Pageviews
	511 % of Total: 13.82% (3,697)	416 % of Total: 15.40% (2,701)

Forum	Pageviews	Unique Pageviews
	72 % of Total: 1.95% (3,697)	62 % of Total: 2.30% (2,701)

Figure 4: Split of page views per part of the ASSET platform

Additionally, the split of the visitors per country are captured and the distribution for the same period are shown in Figure 5.

Country	Users
	1,613 % of Total: 100.00% (1,613)
1. Greece	554 (34.35%)
2. Denmark	320 (19.84%)
3. Germany	208 (12.90%)
4. Italy	108 (6.70%)
5. Spain	74 (4.59%)
6. China	36 (2.23%)
7. India	28 (1.74%)
8. United States	25 (1.55%)
9. Brazil	16 (0.99%)
10. Netherlands	15 (0.93%)

Figure 5: Distribution of visitors in the countries

The tools presented here will be used to monitor the online activity and will allow us to take all necessary measures to ensure participation and increase engagement.

4.3 Marketplace and preliminary assessment

The ASSET marketplace as described in D1.2 has been implemented and populated with educational programmes in May 2020. Up to now, July 2020, we have not yet advertised the educational offer to the industry, as due to COVID19, currently the industry is in a very awkward situation trying to find their way of operation. For this reason, relevant efforts will intensify in September 2020. In the meantime, we took advantage of the ASSET workshop organised in the framework of ITS conference in June 2020, which attracted 50 people mainly from academia and training organisations to demonstrate the ASSET marketplace and gather feedback on its usefulness for them. A questionnaire was distributed, and the results are presented here.

The answer to the questions a) How easy it is to understand the concept and value of the ASSET marketplace? And b) How easy to use is the marketplace? Are shown in Figure 7.

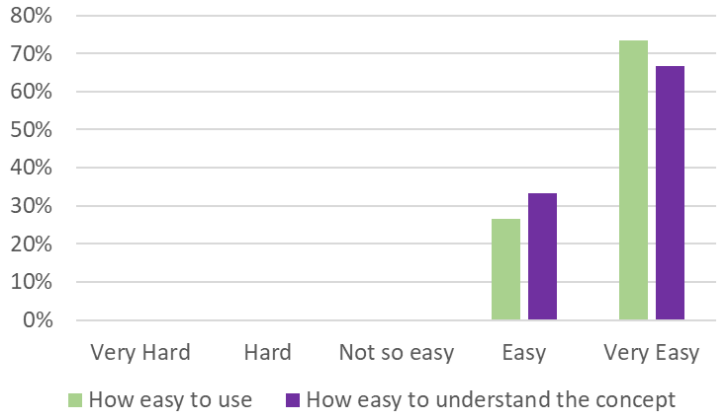

Figure 6: Responses to questions a) "How easy it is to understand the concept and value of the ASSET marketplace?" and b) "How easy to use is the marketplace?"

In the question "Do you consider it a valuable tool for your job?", 93% considered it to be useful as shown in Figure 7.

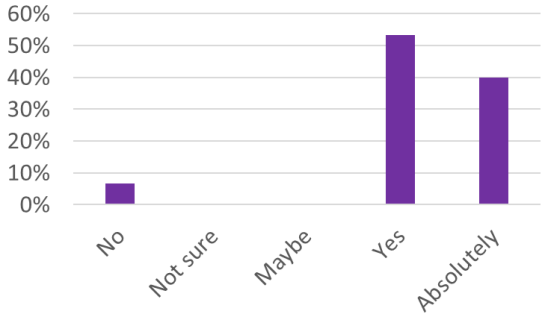

Figure 7: Answers to the question "Do you consider it a valuable tool for your job?"

When asked about the ASSET value proposition which includes all the ASSET tools and the value of the marketplace for their job, they were positive as shown in Figure 8.

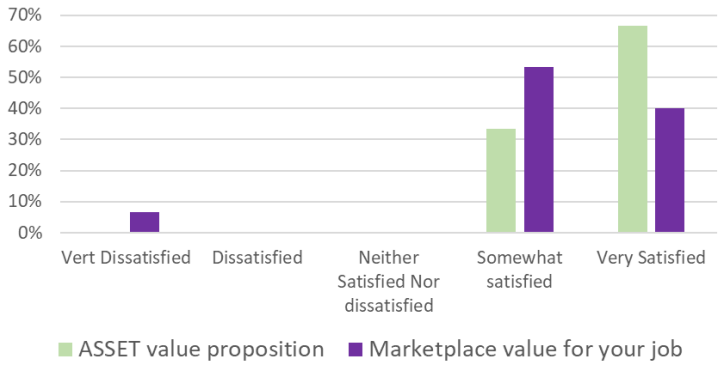

Figure 8: Response for ASSET value proposition and marketplace value

In the question, "how likely do you consider to reuse an ASSET course in your department of master programmes or other programmes that you deliver?", they were all positive as shown in Figure 9.

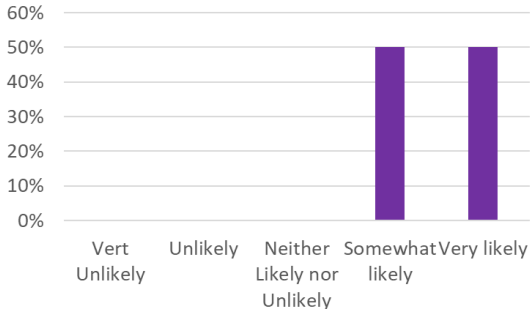

Figure 9: Statistics of answers to the question "how likely do you consider to reuse an ASSET course in your department of master programmes or other programmes that you deliver?"

In the question, "How likely do you consider to re-use a MOOC/face to face course", again positive answers were obtained as shown in Figure 10 with MOOC being more likely to be re-used.

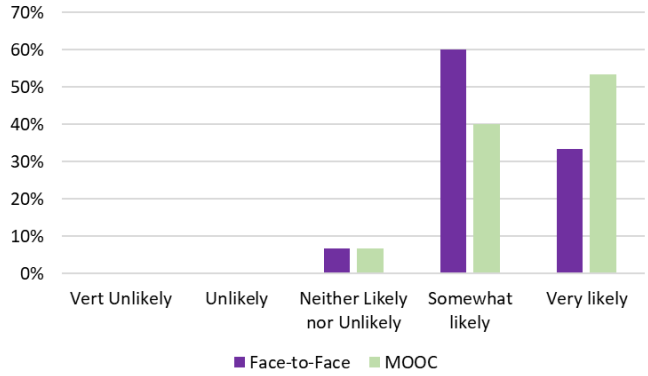

Figure 10: Answers to questions "how likely do you consider to reuse a MOOC/face to face course"

They were also asked to provide the three most important advantages of the ASSET marketplace. The responses included:

- It is easy to work and schedule,
- it has a great accessibility,
- is well designed and has flexibility,
- offers the possibility of sharing, creates a marketplace/network for developing collaborative dynamic lesson cycles,
- has breadth of covered fields,
- is user friendly and offers place inquiries for learning programmes,
- gives a chance to find courses of interest,
- promotes educational programme,
- offers ability for users to make enquiries,
- allows to search for already existing courses,
- publicizes courses and learning materials,
- updates most recent courses and training skills in accordance to the in market demand and realistically needed skills and competencies,
- enhances the collaboration between tutors and education organizations,
- speed up the creation time of any course,
- unites partners to deliver educational material,
- offers choice of the budget for the delivered educational material,
- makes it easy to create courses for distance learning

With respect to negative comments, when asking them to "define the three most important weaknesses of the ASSET marketplace", the responses were:

Not very easy first steps, needs a tutorial, Not 100% sure about the quality of the outcome, can share my courses with a subset of registered users.

5. Conclusion

This second ASSET ecosystem deliverable includes the summary report of the first two Roadshows, as well as the description of the mobility support mechanisms, and of the industry-academia tools. It is designed to be a comprehensive, living document that seeks to review the achieved values of academia -industry collaboration Key Performance Indicators and to identify and apply, whenever needed, any corrective action needed.

The outcomes of the second roadshow held in Madrid brought up several topics. In order to achieve a successful Energy Transition, the access to appropriate education and training opportunities needs to be offered to all the involved stakeholders: students, citizens, officers, employees etc. This education needs to come from trustworthy information sources to avoid misinformation. A point raised would be to appoint Universities as guarantors of the reliability of the educational contents and the necessity to create a new type of professional profiles (energy transition mediators) are also needed, provided with interdisciplinary competencies and extensive communication skills and conflict resolution abilities.

Concerning the mobility support mechanisms identified in Section 3, apart from the collaborative doctoral education programmes, all **the other foreseen KPIs have been reached**. Some of them like the Industry/Academia Joint Projects have *even more than quadrupled* the estimated target. For the collaborative doctoral education mechanisms, as previously stated, in general throughout Europe and globally, the doctoral education duration is more than three years so it would surpass the life of the project.

The academia-industry communication tools have been set up. To ensure that they will attract the audience to the forum, we have established different topics and assigned responsible partners for each one of them while for the marketplace we have performed initial advertisement in small groups of academia. All activities to attract all the targeted groups at the wider possible extent will intensify in the next months. The tools to monitor the activities are in place and enable us to closely follow the evolution. A first positive outcome has been achieved so far: users from the academia and training organisations have provided very positive feedbacks.

Following on the outcomes and recommendations are drawn out of these observations, the ecosystem activities will be refreshed at the end of the project and we'll be used to assert if ASSET reached its specific objectives and also identify sustainability paths. The relevant D1.4 will cover the ecosystem activities by M24 (April 2021) and will summarize the overall lessons learned throughout the project life and comprehensive guidelines for mobility support implementation as well as possible tailoring schemes to enhance their effectiveness.

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