

4. Dissemination Means and Channels

Dissemination activities aim at making the project results available to the scientific community, policy makers and industry, using scientific language and accurate statements.

4.1 Scientific Publications

It is an obligation and of interest to the consortium to widely disseminate the proposed new materials and technologies through qualified scientific publications. Scientific publications and conferences are important dissemination channels for sharing VIBES outcomes to academic and industrial target communities, creating knowledge impact and enabling other researchers and stakeholders to use the results in their own work. It is expected that academic and research partners will take up the leading role in drafting scientific articles, assisted by all relevant consortium members. At least 6 scientific publications have been planned, including at least 4 articles in scientific journals and at least 2 posters in scientific conferences. The targets have been reached and surpassed.

In particular, VIBES partners participated in publishing the following peer-reviewed scientific articles, relevant to the VIBES approach and technological developments:

University of Limerick:

- Maurice N. Collins, Mario Culebras, Guang Ren, “Chapter 8 - The use of lignin as a precursor for carbon fiber-reinforced composites”, peer-reviewed chapter in the book with the title “Micro and Nanolignin in Aqueous Dispersions and Polymers: Interactions, Properties, and Applications”, published by Elsevier, 2022, DOI: <https://doi.org/10.1016/B978-0-12-823702-1.00011-6>
- Rubio, M.C., Beaucamp, A., Stróżyk, M.A., Collins, M.N. (2022), “Lignin-based carbon fibers for high-performance Green Composites”, *Encyclopedia of Green Materials*, pp. 1–8, DOI: https://doi.org/10.1007/978-981-16-4921-9_155-1
- Beaucamp, A. et al. (2022) ‘Lignin for Energy Applications – State of the art, life cycle, technoeconomic analysis and future trends’, *Green Chemistry*, 2022, 24, pp. 8193–8226. DOI: <https://doi.org/10.1039/D2GC02724K>
- Stróżyk, M.A. et al. (2024), ‘Decreasing the environmental impact of carbon fibre production via microwave carbonisation enabled by self-assembled nanostructured coatings’, *Advanced Composites and Hybrid Materials*, 7(2). DOI: <https://doi.org/10.1007/s42114-024-00853-2>

AITIIP and the University of Limerick:

- Vidal, J. et al. (2023) ‘Use of covalent dynamic networks as binders on epoxy-based carbon fiber composites: Effect on properties, processing, and recyclability’, *Polymer Composites*, 44(11), pp. 7444–7456, Doi: <https://doi.org/10.1002/pc.27636>

AITIIP

- Vidal, J. et al. (2024) ‘Strategies towards fully recyclable commercial epoxy resins: Diels–alder structures in sustainable composites’, *Polymers*, 16(8), p. 1024, DOI: <https://doi.org/10.3390/polym16081024>

SPECIFIC POLYMERS

- Guggari, S. et al. (2023) 'Vanillin-based epoxy vitrimers: Looking at the cystamine hardener from a different perspective', ACS Sustainable Chemistry & Engineering, 11(15), pp. 6021–6031, DOI: <https://doi.org/10.1021/acssuschemeng.3c00379>.
- Malburet, S. et al. (2023) 'Biobased Epoxy reactive diluents prepared from monophenol derivatives: Effect on viscosity and glass transition temperature of epoxy resins', RSC Advances, 13(22), pp. 15099–15106, DOI: <https://doi.org/10.1039/D3RA01039B>
- Guggari, S. et al. (2024) 'Vanillin-based dual dynamic epoxy building block: A promising accelerator for disulfide vitrimers', Polymer Chemistry, 15(13), pp. 1347–1357, DOI: <https://doi.org/10.1039/D4PY00038B>

4.2 Participation in Scientific Conferences

Participating in scientific conferences is a unique opportunity to reach audiences with various scientific and industrial backgrounds that are relevant to VIBES. Throughout the duration of the VIBES project, partners have planned to participate in at least 3 scientific conferences, in which VIBES approach, methodologies and results will be presented to relevant international scientific forums.

The consortium partners have already participated in 33 scientific conferences and forums, presenting VIBES approach and methodologies. The total target of participation in scientific conferences has been reached and surpassed. The following table lists the scientific conferences and related events, in which partners have participated, presenting VIBES.

Table 9. Presentation of VIBES approach to scientific conferences & events

Partner	Date	Type of event/ Description	Type of audience	Countries addressed
ULIM	22/07/2021	Online presentation: “An abundant resource of biocarbon for advanced engineering applications” of the project at the International Conference on Resource Sustainability (icRS 2021)	Scientific community	International
DITF	15/09/2021	Presentation to Dornbirn GFC digital conference on “Low-cost carbon fibres: High-molecular weight Lignin combined with Low-Pressure Stabilization Technology”.	Industry	International
ULIM	15/09/2021	Presentation to a network seminar (virtual), organised by	Industry	UK

Partner	Date	Type of event/ Description	Type of audience	Countries addressed
		the University of Bristol/ Catapult UK, on “Sustainable Composite materials for Wind Turbine Blades; Development of Lignin Fibres for Energy”		
BCIRC	14/10/2021	“Innovative and sustainable solutions for the nautic sector” presentation at the “INTERNATIONAL NAUTICTECH FORUM” conference.	Industry	Spain
DITF	09/11/2021	Presentation to the “Aachen-Dresden-Denkendorf International Textile - ADDITC” on “Stabilisation of polyacrylonitrile precursors by low-pressure technology for low-cost carbon fibres” presentation.	Industry	International
ULIM	21/10/2021	Online presentation on “Lignin - An abundant bioresource for next generation sustainable advanced engineering composites, at the Institute of Materials Mining and Minerals (IOM3) International Conference on Manufacturing (ICMAC).	Scientific community	International
PLATA	29/11/2021	Presentation at “Instituto Ingeniería de España” conference.	Scientific community	Spain
AITIIP	02/02/2022	Reference to the VIBES innovation in the presentation of Mandala project at the “The European Biopolymer Summit 2022”.	Scientific community	UK
AITIIP	02/03/2021	Participation to “Webinar IA2”	Scientific	Spain

Partner	Date	Type of event/ Description	Type of audience	Countries addressed
		with the presentation “Cómo innovar en nuevos modelos de economía circular y envases/materiales más sostenibles”.	community	
AITIIP	17/02/2022	Participation to the scientific seminar of the International University Menéndez Pelayo and Polymers Institute with the presentation titled "Solid state polymers"	Scientific community	Spain
PLATA	03/03/2022	Presentation at "Desarrollo e innovación en Aeropuerto Internacional de Teruel" conference.	Scientific community	Spain
AITIIP	23/03/2022	Online participation to the “S3 - 4th European Eco-plasturgy Congress” with a presentation on Thermosets towards a circular economy: sustainable recycling technologies.	Scientific community	Europe
AITIIP	06/04/2022	Poster’s exhibition on the 11th R&D European Framework Conference aiming to analyse the first year of the Horizon Europe Programme and the Spanish participation.	Industry	Spain
BCIRC	13/10/2022	Participation to the “Sustainability in Composites challenges and opportunities”	Scientific community	Spain
AITIIP	26/10/2022	Presentation of VIBES to technical audience in the 2022 edition of EMPACK within the Mandala’s project Final Conference.	Industry	Spain

Partner	Date	Type of event/ Description	Type of audience	Countries addressed
AITIIP	14 - 16/11/2022	Presentation of VIBES to the European Summit of Industrial Biotechnology 2022 (ESIB 2022).	Industry	Austria
ULIM	8/03/2023	Participation to the SAMPE conference with “ Production of Lignin-based Carbon Fibers” presentation.	Scientific Community	Belfast, Northern Ireland
AITIIP	21-23/03/2023	Presentation of VIBES to the industrial audience of the eMobility Expo & World Congress.	Industry	Spain
AITIIP	27-31/03/2023	Presentation of VIBES to the Wake Up Spain Forum.	Industry, Scientific community, policymakers	Spain
AITIIP	28/03/2023	Presentation of VIBES to the industrial audience of the Excellence Forum Automotive Cluster.	Industry	Online
SP	23-27/04/2023	Participation of VIBES to the APME : 14th Advanced Polymers via Macromolecular Engineering.	Scientific Community	France
AITIIP	04/05/2023	Presentation of VIBES to the “ECP4 sustainable composites” conference.	Technical	San Sebastián
SP	14-18/05/2023	Presentation of VIBES to the EUPOC	Scientific Community	Italy
PLATA	15/05/2023	Presentation of VIBES to the Universitat Politècnica de Catalunya conference.	Scientific Community	Spain
F&D	20/05/2023	Presentation of VIBES to the 4th International Conference over	Scientific	Belgium, Gent

Partner	Date	Type of event/ Description	Type of audience	Countries addressed
		bio based and bio degradable textiles and polymers.	community	
PLATA	14-15/07/2023	Presentation of VIBES to the Antonio Gargallo University Foundation's conference for advances and development of the aeronautical and aerospace sector.	Scientific Community	Spain
LEITAT	13/09/2023	Presentation of VIBES to the Global Fiber Congress.	Scientific Community	Dornbirn, Austria
AITIIP	21/09/2023	Presentation of VIBES at the "Ippt-twin 1 International" conference.	Technical	Slovenia
AITIIP	23/10/2023	Presentation of VIBES at the "Polymer Connect" conference.	Technical	Valencia, Spain
AITIIP	31/10/2023	Presentation of VIBES at the Packnet conference: "Circular innovation in packaging: the road to a sustainable future."	Technical	Madrid, Spain
AITIIP	23/11/2023	Participation to the Quality Innovation Awards 2023 winning the "Innovation in Circular Economy and Zero Carbon Footprint" prize and presenting the VIBES lines of research.	Scientific community	Madrid, Spain
AITIIP	13/02/2024	Participation to the eMobility Expo World Congress with the VIBES presentation "New materials for the new vehicles".	Industry	Zaragoza
ULIM	30/04/2024	Presentation of VIBES project "Future opportunities for Lignin derived Advanced Materials" at the NOMATEN centre of	Scientific community	Poland

Partner	Date	Type of event/ Description	Type of audience	Countries addressed
		excellence in multifunctional materials for industrial and medical applications.		

4.3 Organisation of Events

In the frame of VIBES, several events have been and will be organised to serve the project's objectives and promote the project and its outcomes. In more detail, the following types of events are scheduled as part of the project's dissemination plan.

4.3.1 COMPOSIFORUM International Events

COMPOSIFORUM is the "Composites Forum for the Industry and Researchers", organised by AITIIP in collaboration with the University of Zaragoza, as part of the AITIIP Chair (AITIIP CATEDRA) that advises and defines the strategic lines of Research, Development and Innovation projects of mutual interest between the University of Zaragoza and AITIIP foundation.

COMPOSIFORUM gathers experts in plastic composites and takes place every two years. The 2022 edition took place in Zaragoza on 17th November 2022 and focused on sustainability and circularity as strategic axes of the new economy. Prestigious speakers from the science and industrial arena participated. A lecture slot was reserved specifically for the dissemination of the VIBES project in 2022.

Due to an internal decision at the organisational level of AITIIP, it has been determined that the 2024 edition of COMPOSIFORUM will not take place. However, as mentioned in section 4.3.2., AITIIP exploited other opportunities for organising workshops to disseminate VIBES approach and results, which were not initially planned.

4.3.2 Demonstration and other Workshops

The organisation of three (3) demonstration workshops has been planned, addressed to industry and other VIBES stakeholders, in order to get the necessary feedback and engagement in the technology and the soundness of the VIBES concept. The following two (2) workshops were organised:



Figure 16. Demonstration workshop in PLATA

- One 5-hour workshop was organised together with HELACS project and focused on dismantling, collecting, sorting and directing processes and composites waste manipulation. This workshop took place on 29th July, 2021 at PLATA premises in Teruel (Spain) with the participation of Airbus, PLATA and AITIIP. There were 12 participants (33% female) from the aeronautic sector, technology providers, dismantling and recycling companies. During the workshop different aspects of VIBES and HELACS, advanced materials, efficient manufacturing, circular

economy and digitalisation were treated with the aim of gathering feedback and engagement. The event allowed us to confirm that the objectives of VIBES are aligned to industry and stakeholders. They are interested in the results and think that they will be useful in their future processes. They also expressed their intention to participate actively in project's activities and in future initiatives.



Figure 17. Demonstration workshop in CIRCE

polyamide degradation processes and a visit to the lab in which the microwave solvolysis processes take place, which served as feedback for the green solvolysis process developed in VIBES. The event allowed us to confirm the alignment of the VIBES objectives to current research lines and the interest of the scientific community in its results.

- One 2-hour workshop was organised together with BIZENTE, polynSPIRE and LIFE RECYSITE projects on dealing with properties, industrial applications and end-of-life alternatives of thermoset composites. This workshop took place on 2nd July, 2021 at CIRCE premises in Zaragoza (Spain) with the aim of establishing synergies and interactions with

PolynSPIRE project. There were 6 participants (20% female) from research and innovation centres. The workshop included a technical discussion about

The third workshop will be organised during the fourth year of the project:

- One workshop will be dedicated to Extended Producer Responsibility (EPR) and material certification -ISCC as well as the policies required to regulate the use of VIBES products and technology to reach the market and the society. This workshop will be combined with the second roundtable mentioned in section 4.1.3, involving members of the VIBES Stakeholders Board.

In addition to the above planned demonstration workshops, four more workshops were organised, as part of other relevant activities, in which VIBES was presented:

- A workshop organised by AITIIP on 22/3/2022, in Zaragoza (Spain), in which VIBES was presented as part of a training course related to moulding and plastic injection and circular economy, addressed to industry.
- A workshop organised by AITIIP, with the participation of speakers from AITIIP and LEITAT, on 18/5/2022, in Capri (Italy) at the SUM Symposium, with the title "[Sustainability of thermoset materials](#)", addressed to the scientific community and exposing the different approaches that are being followed for the treatment of thermosets, including the VIBES approach.
- On 02/12/2022, the University of Limerick hosted a workshop for secondary school students, highlighting the research conducted on lignin as part of the VIBES project.
- On 23/11/2023, AITIIP organised a workshop titled "Course on recycling and waste treatment" presenting the VIBES project.

4.3.3 Roundtables

In addition to the workshops mentioned above, two roundtables have been planned by Q-PLAN as part of the VIBES Stakeholders Board activities. The roundtables are organised at key turning points of the VIBES

project, hosting the VIBES Stakeholders Board with the participation of project partners, in order to open debate, share different perspectives and get feedback to boost the VIBES concept and its implementation in real economy. The social changes and impact that VIBES may have in the society will be also explored.

The first roundtable event was held on November 29th, 2023 in a hybrid format at Disini Hotel, Montpellier, and online via MS Teams, bringing together crucial stakeholders and members of the VIBES Stakeholders' Board. Q-PLAN organised the event in detail, ensuring meticulous planning from tailored invitations to the distribution of pre-event materials. A total of 20 attendees, including 6 Stakeholders' Board members, actively participated in the discussions.

The overarching goal of the roundtable was to gather insights from external stakeholders, fostering a productive dialogue aimed at maximising the impact of project actions. Moderated by Dr. Eirini Efthymiadou, the event delved into key aspects of the project, particularly focusing on the design approaches of thermoset composites with intrinsic recyclability and their scale-up steps. These approaches encompassed biobased components, such as biobased bonding materials (BBMs), resins, and fibres. Expert presentations by leaders of Work Packages 1, 2 and 3 highlighted crucial milestones.

The interactive discussions explored the properties of innovative biobased materials, developed by the project, in relation to market needs and challenges for scaling up. Noteworthy topics included cost and supply chain dynamics, scalability issues, and the intricate nature of biobased materials.

Following the first roundtable, the second one is scheduled for November 2024.

The Communication, Training and Stakeholders Manager (Q-PLAN) collects feedback from the activities of the VIBES Stakeholders Board and will present them in a final deliverable D6.6 "Feedback on key points from stakeholders' panel activities" on month 36.

4.3.4 Final Conference

By the end of the project, the VIBES final conference will take place. All project partners will participate in the organisation of this event under the lead of one of the partners, to be decided when considering the highest impact to be achieved. The aim of the conference will be to spread the accumulated knowledge and exploitation strategies and present the final achievements to scientists, industry, policy makers and generally to all interested parties, with a view to fostering industrial and research utilisation of the project results, as well as contribution to standards. Major stakeholders will be invited to participate in this event, including also all the students taking part in the VIBES training programme, described in Chapter 5. Keynote speakers will be invited to attract more public audience and the industrial and scientific community.

The VIBES partners should contribute to further disseminate the final event through their personal networks. All activities implemented towards the organisation of this conference will be reported in the fourth and final version of deliverable D6.5 "Report on communication, dissemination and training activities – Update 3".

5. Training Programme

A training programme was aligned with the communication and dissemination strategy with the aim of providing knowledge and skills to potential industrial collaborators and stakeholders of the VIBES project and to science and engineering students. The Training programme in the project represents the strategic vision of the Consortium in view of sharing and therefore implementing the open knowledge that has been gathered and generated within the project, both by the science students and by professionals in varied industrial sectors.

The training activities also contribute to the dissemination and therefore exploitation of the project results, contributing to raising awareness and providing novel competencies in the current and next generation of professionals.

The Project Coordinator (AITIP) was responsible for designing, planning and organising the training programme, producing the deliverable D7.6 “Detailed content of VIBES skills for training: students & professionals”.

5.1 Training strategy

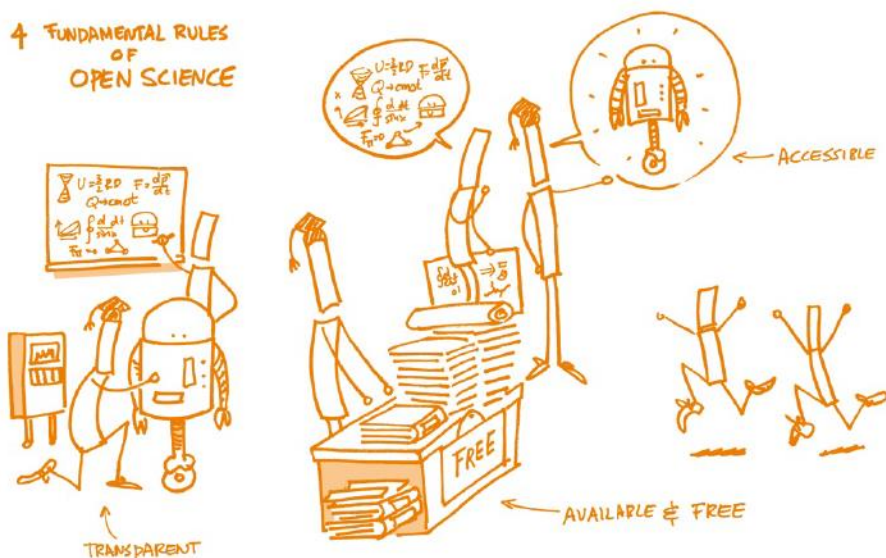
Training activities contribute to professional development, through advanced training of researchers and other key staff, science students, industry staff, and in general potential users of the knowledge generated by the project.

The complementary expertise of the partners within the project have a positive effect in generating cross-collaboration, a better capacity for training of young researchers and eventually fruitful staff exchange (e.g. between academia and enterprises).

The specific targets of the training activities are:

- **transfer** of knowledge within the participants including students, researchers and industrial staff.
- **spreading** of knowledge from both the academic and industrial professional within the project to researchers and students and to industrial staff outside the consortium, promoting S&T cohesion within the European research goals and so increase skills across Europe
- raising **awareness** of key stakeholders who are essential to successful exploitation and commercialization of the novel technology and products developed.

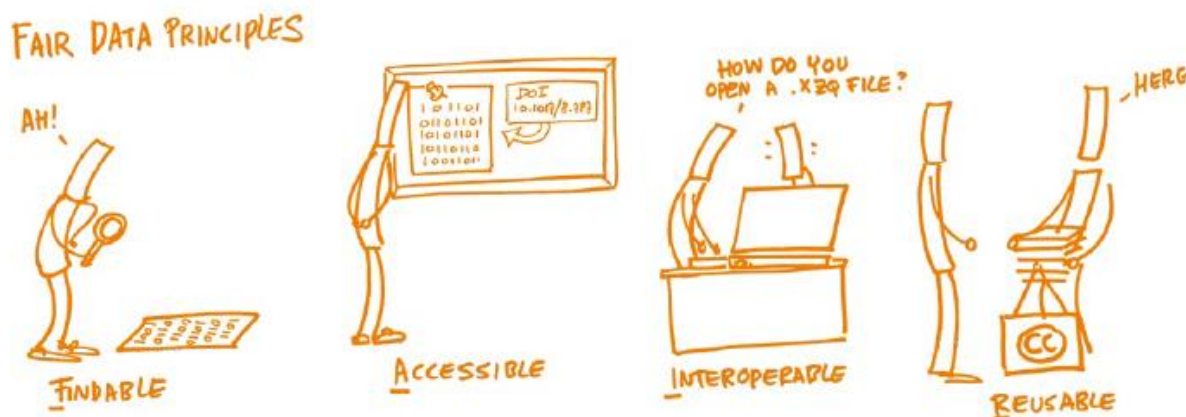
The approach used in the project is based on Open Science, focused on open dissemination and open materials.



It is generally accepted that Open Science leads to increased impact associated with wider sharing and re-use and could increase trust in science and in the reliability of scientific results.

In 2014, a core set of principles were drafted in order to optimise the reusability of research data, named the FAIR Data Principles. They represent a community-developed set of guidelines and best practices to ensure that data or any digital object are Findable, Accessible, Interoperable and Re-usable. This concept was used in VIBES in training design:

- **Findable:** The first thing to be in place to make data reusable is the possibility to find them. In VIBES cases, the training is available through an e-learning platform (aitemy learning)
- **Accessible:** The data can be retrievable by their identifier using a standardised and open protocol that guarantee a simple access. In this sense, the e-learning platform used, is intuitive and user-friendly.
- **Interoperable:** The data can be combined with and used with other data or tools.
- **Re-usable:** Ultimately, FAIR aims at optimizing the reuse of data. In this sense, VIBES created OERs (Open Education Resources) that could be used by other teachers and learners.



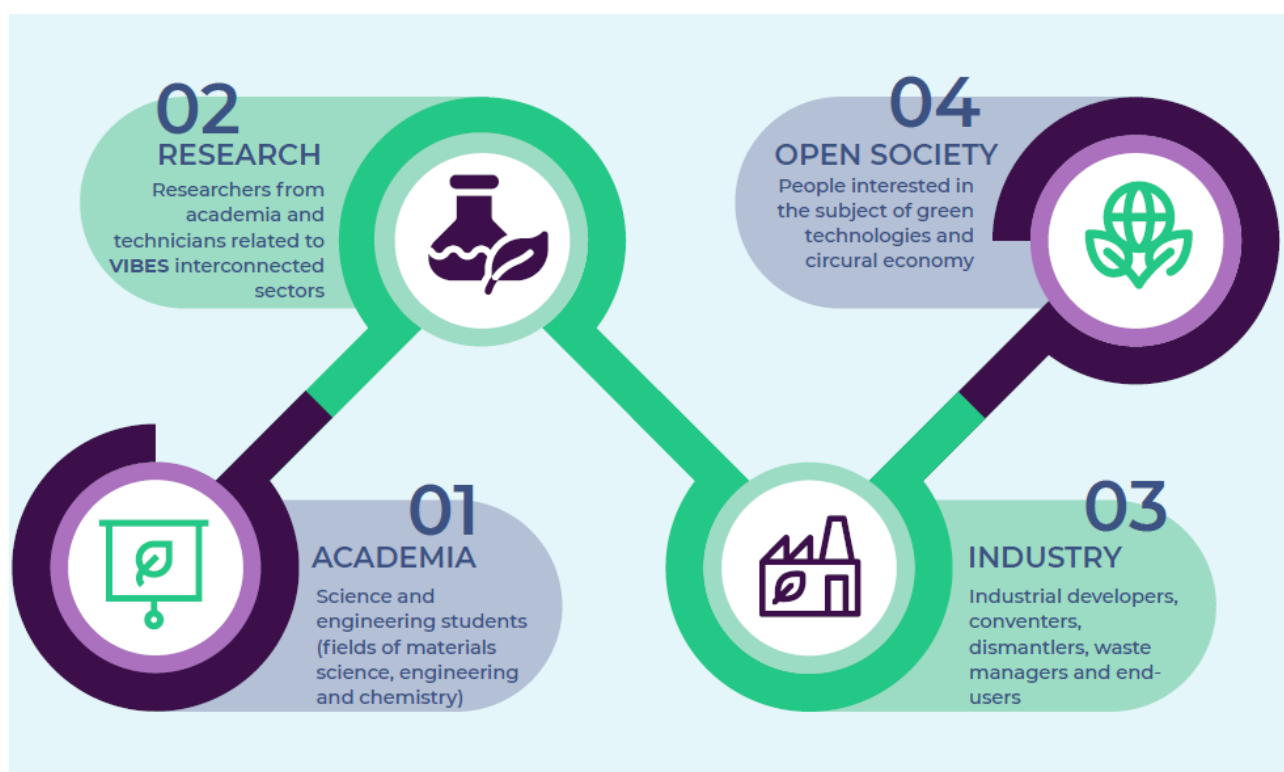
5.2 Objectives, Target Audiences and Themes

The training programme was designed and implemented with the aim of providing knowledge and skills on the topic of new recycling technologies for composite materials and the circular economy as well as to present and transfer the knowledge and results acquired during the project.

The training programme was promoted among the VIBES stakeholders that are included in the VIBES stakeholders' database as well as Universities and Education Centres and other relevant contacts of the consortium partners. The stakeholders' database was created by sharing relevant contacts and information among project partners using the "Contact List of VIBES Stakeholders" form (see Annex 1).

In particular, the training programme focused on the following types of stakeholders:

- Researchers from academia and technicians related to VIBES interconnected sectors (materials science, chemistry, chemical engineering, biotechnology, recycling and waste management)
- Industrial professionals who may potentially collaborate with and/ or be involved in the business that VIBES key exploitable results will generate (industrial developers, converters, dismantlers, waste managers and end-users).
- Science and engineering students (fields of materials science, engineering and chemistry), with the aim of creating a breeding ground of new talent for the creation of future jobs aligned with the new social and industrial needs.
- Anyone in the open society who is interested in the subject of green technologies and circular economy.



VIBES training is focused on some specific themes:

- Design and development of biobased materials
- Practical applications in industry
- Green technologies to recycle/reuse components.

VIBES validates a better use of resources demonstrating the high potential of the Circular Economy to implement a resilient energy union with forward-looking climate change policies. This validation is based on a technology evolution through scientific excellence (a first cost-effective recycling technology based on the development of smart BBM for the first time applied to composite thermoset plastic) which will equip the Chemical Industry to make Europe a stronger global actor and will use this knowledge to design and implement the training activities.

5.3 Training Methodology

The training activities were held in a variety of formats and methods, both in presence - workshops, technological breakfast and face to face courses - and remotely - online training. Certificates of attendance are envisaged for all the training sessions, both online and in presence after completing a test.

5.3.1 Face to face training sessions

Venues for the training events were selected carefully and minimum requirements were the availability of hardware (projectors/wide screens) and internet connection that allowed for interactive activities to engage the audience and of course to guarantee the necessary security of the audience (COVID pandemic is an example).

The training events have been organised in Spain and Ireland; to increase the engagement, local language is highly recommended for the national events.

Events occurring in presence allow for higher involvement of the audience and longer sessions of training that may deepen the participants' knowledge on specific topics addressed by the event.

5.3.2 Online training sessions

The advantage of online training is the wider coverage and the possibility to re-play and learn following a personal path and rhythm. Remote sessions however are usually less interactive and do not allow for a profound discussion of the thematic covered by the event.

In this case, the online training will be an e-learning course and a recording of the summer course. It is available to the public on **aitemy learning platform** (<https://aitemy-learning.com/gb/>) and through a link on VIBES website.

The online learning content allows trainees to undertake the course at their own convenience. Course material is offered via recorded video and presentation slides. Upon completion of the course, AITIIP can release certificates to those who passed the requirements.

A link was integrated with the VIBES website, allowing it to further become the single point of reference for VIBES trainees.

5.3.3 Evaluation

The course includes formative assessment. There are different types of exercises and can be automatically checked. There is also a questionnaire in the face-to face event to value the trainees satisfaction.

5.4 Training activities

The training is being articulated around the following channels.

1. Research workshops for researchers and technicians.
2. Summer course for students, replicated at the University of Limerick summer school.
3. Free access to training material, generated by the summer course, through AITIIP e-learning platform (aitemy), open for both students and society.
4. Technological breakfast and workshops at AITIIP facilities for industrial professionals.

In each course or workshop special care will be taken so that there is a gender equality among participants, a balance between male and female participants.



5.4.1 Research Workshops for researchers and technicians

Three research-oriented workshops will be organised for researchers and technicians and will gather researchers from academia and industry related to VIBES interconnected sectors.

These workshops focus on researchers and technicians' profiles mainly coming from Aragón and Spain. The three workshops will be organised following key milestones of the project, with the aim of transferring knowledge and gather feedback from peers.

A first workshop was held in February 2024 in PLATA facilities.



Tentatively, the rest of workshops will be organized in month 40 and at the end of the project.

It is expected that the partners responsible for the VIBES results take part as content developers and/or presenters.

5.4.2 Summer Training Course

The training for students is oriented towards undergraduate (first degree) or postgraduate (MSc) students in the fields of materials science, engineering and chemistry. It will include a summer course, covering 30 hours of training. The course curriculum includes latest cutting-edge science and engineering topics in the main scientific and technological areas related to the VIBES project. The VIBES consortium partners prepare the content of the training. The training was launched in May 2023. Twenty-four (24) hours were developed as an e-learning course, with a final face to face Summer Course in PLATA.

The contents of the course were:

- Design and development of biobased materials
- Practical applications in industry
- Green technologies to recycle/reuse components.

The following contents has been developed:

Module 1: Design and development of strategies to include thermoset plastics into circular economy (10 hours)

Explanation: development of CANs and biobased resins

- CANs general approach what are these materials → 1.5 Hour
- Supramolecular approach → 2 Hours
- Vitrimers approach → 2 Hours

- D-A approach → 2 hours
- Synthesis of bio resins → 1.5 Hour
- Use of green solvents → 1 Hour

Module 2: Biobased and improved fibres a key for the success of a composite (8 hours)

Explanation: manufacture and modify the structure and chemical properties of the textile reinforcements used in composite materials

- Linseed material: Possible configurations and potential → 1.5 Hour
- Carbon fibre and chemical modification of its surface to boost its properties and allow recyclability → 2.5 Hours
- Fabrication of biobased CF & Sizings development → 2.5 Hours
- Scaling up and fabrication of biobased CF → 1.5 Hour

Module 3: Application of VIBES materials and technologies in the industry (6 hours)

Explanation: Within this module different sectors explain the interest, potential and applications that the developments of the project will have in their market

- Applications in the construction sector → 1.5 Hour
- Applications in the aeronautic sector → 1.5 Hour
- Applications in the naval industry → 1.5 Hour
- Potential of solvolysis in the industry of composites (B-circ) → 1.5 Hour

Module 4: Face-to-face summer course (6 hours)

- Composites, recycling techniques and their market impact.
- Use of enzymes as a method of recycling composites.
- Covalent networks in thermoset composite.
- Cutting of composite parts for better dismantling and recycling.
- Redesign of materials to include in a circular economy - Reinforcement and matrix.
- Visit to the facilities.

Under the coordination of AITIIP, the partners collaborated in the creation of the contents from 18th month of the project. The practical session was done in PLATA facilities on 15th September 2023 during around 6 hours. 16 persons participated directly and one through online connection. An evaluation was done at the end of the course.

The summer course was organised in Teruel Campus, a rural area in south Aragon region that belongs to the University of Zaragoza and located next to PLATA facilities which was visited in order to familiarise future employees with the industry environment of vision, problem identification and solution implementation from the circular economy perspective.

took place with distinguished members of the audience (online and in person) from both industry and academia.

The participation included 30 people in person and 25 online. Two LinkedIn posts about this training activity generated well over 5k impressions.

The agenda was the following:

- A quick fatigue assessment method for fibre reinforced composites. Dr Akshay Hejjaji (UL)
- Carbon Fibre production and life cycle assessment. Dr Anne Beaucamp (UL)
- New Resins, BBMs and Recycling. Dr Julio Vidal (AITIIP)
- Modelling and composite design Dr Giovanni Zucco (UL, School Of Engineering)
- Future CFRP products and commercial directions (Dr Saul Buchanan (JUNOComposites)
- Integrating Composites with Diverse Materials for Automotive and Aerospace Applications. Dr Kashif Bangash (UL)
- Latest techniques for composite manufacture. Dr Ronan O'Higgins (Head of School of Engineering, UL)
- Final comments Prof. Maurice N. Collins (UL)









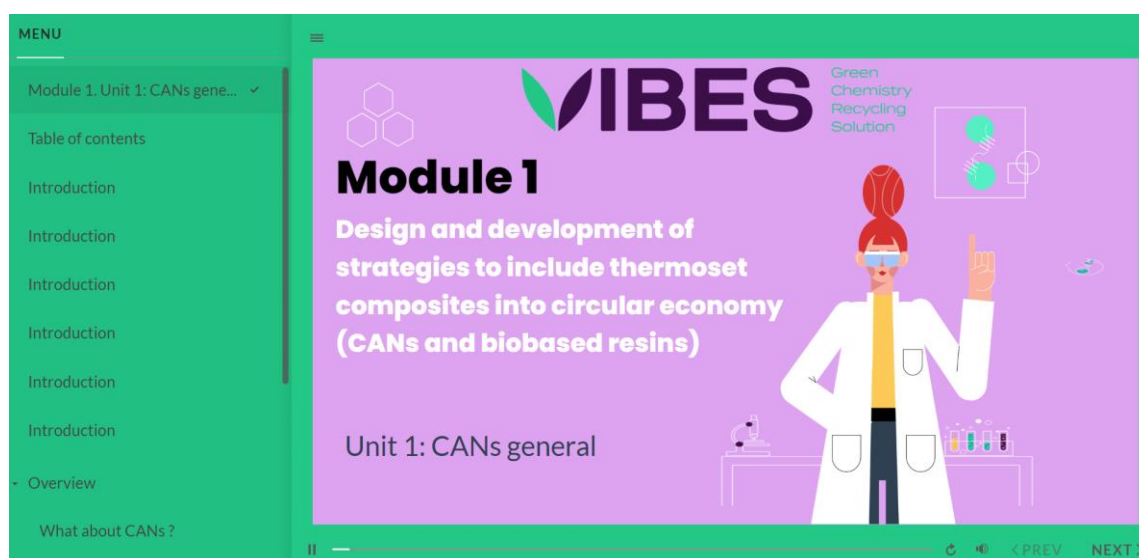
The visit to PLATA facilities can be replicated by ACCIONA and IDEC in their own premises.

In both cases, the course was in English to facilitate its implementation in each facility and encourage the participation of other students from any EU member-state.

In parallel to the above training, AITIIP and University of Limerick will extend the research results generated by the project by launching at least 3 MSc theses and 2 PhD theses.

5.4.3 E-learning

As it is mentioned previously, to develop the Summer Course online content was created that complements the practical activities.



The e-learning includes a menu so that the trainees can choose if they prefer a linear learning or their own path.

MENU

- Introduction
- Introduction
- Overview
- What about CANs? ✓
- What about CANs?
- What about CANs?
- What about CANs?
- This is an exercise ✓
- Conclusion
- Great!

01 Overview

What about CANs?

Dissociative mechanism

Diels-Alder

Loss of crosslink integrity

Abrupt decrease of viscosity

Loss of network connectivity

Diels-Alder adduct is one of the examples of dynamic bond with dissociative

2020 research and innovation and innovation programme and

VIBES

Great!

It also includes speech and subtitles.

MENU

- Introduction ✓
- Introduction
- Introduction
- Introduction
- Introduction
- Introduction
- Overview
- This is an exercise ✓
- Conclusion
- Great!

This is an exercise

What are the different types of CANs?

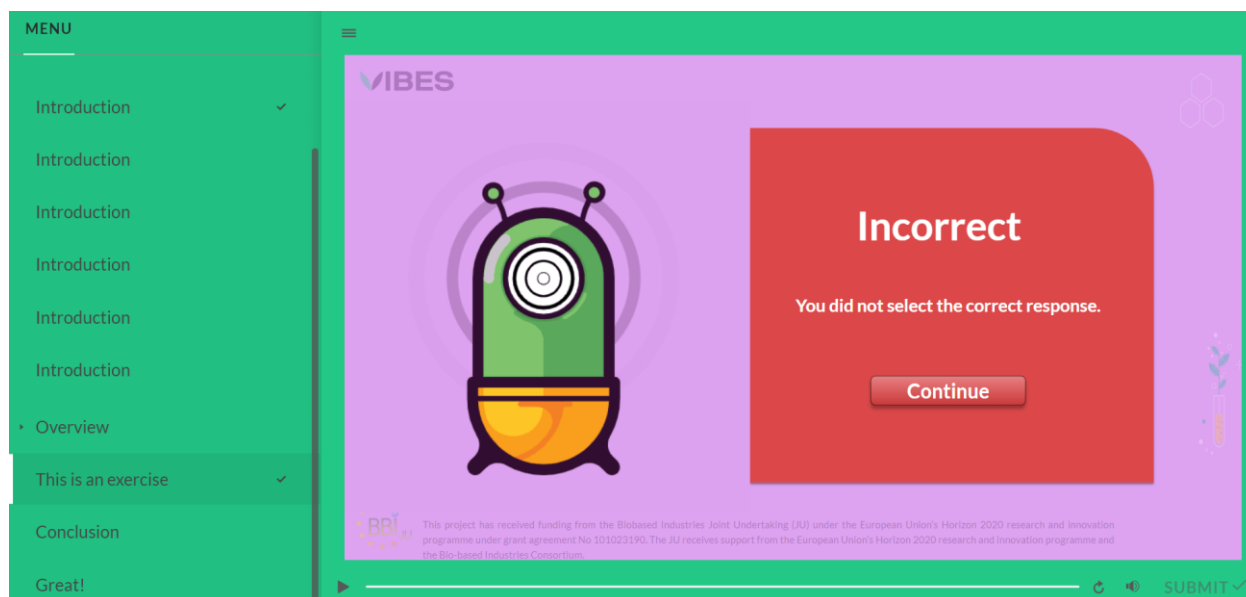
- ☒ Dissociative
- ☐ Alternative
- ☒ Cohesive
- ☐ Associative

BBiJU

This project has received funding from the Bio-based Industries Joint Undertaking (JU) under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101023190. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Bio-based Industries Consortium.

SUBMIT ✓

The interactive exercises allow the trainees to check their knowledge.



If their answer is wrong, the course informs the trainees, and they can decide if they continue or return to the exercise through the menu.

In order to ensure open access to the developed content and maximise the returns to society, the summer course was recorded. An open version for a wider student audience and the society in general has been uploaded and made free for use through AITIIP e-learning platform, aitemy: <https://aitemy-learning.com/gb/>, also shared in the [training section](#) of the project website.

The e-learning content was made available as soon as the summer courses in Teruel and Limerick took place.

The e-learning content is expected to reach at least 100 students and other stakeholders interested in the technological areas related to the VIBES project.

A certificate is handed to those having finalised the summer training course, described in section 5.4.2, and the open e-learning version of the VIBES training programme.

5.4.4 Training for Industrial Professionals

The training for industrial professionals will be organised by AITIIP.

At least 40 Spanish industrial professionals will take part in the event. International experts could be invited. The language of the event will be Spanish.

In addition, one workshop for industrial professionals will be organised at AITIIP facilities about eco-design using biobased materials. The duration will be half day. The language of the workshop will be Spanish, but the possibility to organise it in English will be evaluated if there is an interest from European industrial professionals to take part. The contents will be created by the VIBES consortium partners and will be taught by AITIIP in collaboration with other partners. In order to maximise its impact, this workshop will be organised together with other important event whenever possible.

Furthermore, professional visits to VIBES industrial partners (IDEC, ACCIONA and PLATA) have been also organised for potential stakeholders and open to industrial collaborators interested in the fields addressed by the VIBES project.

5.5 Training activities calendar

#	Date	Venue	Format	Description	Audience
1	M24	Online (aitemy platform)	Course	E-learning contents for design and development of biobased materials, practical applications in industry and green technologies to recycle/reuse components.	Academia, industry, open society
2	M27	Spain	Course	Summer school course. The practical training for students was oriented towards undergraduate (first degree) or postgraduate (MSc) students in the fields of materials science, engineering and chemistry. It included the e-learning contents, until covering 30 hours of training.	Academia, industry, open society
3	M33	Spain	Workshop	First workshop for researchers and technicians organized in PLATA facilities.	Academia, industry
4	M36	Ireland	Course	Summer school course. The training for students is oriented towards undergraduate (first degree) or postgraduate (MSc) students in the fields of materials science, engineering and chemistry. It will include a summer course, covering 30 hours of training. The course curriculum will include latest cutting-edge science and engineering topics in the main scientific and technological areas related to the VIBES project.	Academia, industry, open society
5	M40	Spain	Workshop	Workshop for researchers and technicians will be organised at ATIIP. The duration will be half day. The language of the workshop will be Spanish.	Academia, industry
6	M44	Spain	Lecture/seminar	Organisation of one technological breakfast for industrial professionals in the fields addressed by the VIBES project. International experts could be invited. The language of the event will be Spanish.	Industry
7	M46	Spain	Workshop	Workshop for industrial professionals will be organised at ATIIP facilities about eco-design using	Industry

#	Date	Venue	Format	Description	Audience
				biobased materials. The duration will be half day. The language of the workshop will be Spanish.	
8	M48	Spain	Workshop	Workshop for researchers and technicians will be organised at AITIIP. The duration will be half day. The language of the workshop will be Spanish.	Workshop

D6.4: Report on Communication, Dissemination and Training Activities – Update 2, 28/05/2024	Page 70
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7. Performance Indicators, Monitoring and Reporting

7.1 Performance Indicators and Monitoring

The implementation of communication and dissemination strategy is monitored on an on-going basis according to the level of realisation of the communication and dissemination objectives and outcomes that have been set up. The frequent evaluation of communication and dissemination activities allows to monitor and measure their impact and, if necessary, adapt them in order to increase the project's visibility and awareness. The Communication, Training and Stakeholders Manager has the overall responsibility of the monitoring and evaluation of VIBES communication and dissemination activities, although the project partners are also expected to help by continuously monitoring and evaluating the publicity and communication activities they carry out.

Analytical measures and Key Performance Indicators (KPIs) are used in order to monitor the implementation and assess the impact of communication, dissemination and training activities. A number of metrics employed for the monitoring and evaluation of these activities are provided in the following Table, together with their target values. Besides the quantitative metrics indicated below, qualitative data will be also gathered by eliciting feedback from stakeholders, on all occasions that allow direct contact with them (e.g. events organised or attended).

Table 10. KPIs and target values

Achievement KPI ⁸	Target Value	Current Status	Impact KPI	Target Value	Current Status
Number of Stakeholders Board Members	At least 10 (at least 30% female)	11 (55 % female)			
Number of pieces of news posted on VIBES website	N/A	43	Number of visits to the VIBES website	15,000 unique visitors by the end of the project (indicative)	3,400
Number of posts	N/A	138	Number of followers in	2,000 followers	250

⁸ The essential KPIs for monitoring the implementation of the communication, dissemination and training activities are marked in bold; they are those with target values that are specific and not indicative (specified in Annex 1 of the Grant Agreement). The rest of the KPIs are for assessing the impact of the communication, dissemination and training activities; they are considered as equally important, but their target values are indicative at this stage (unless they are specified in Annex 1 of the Grant Agreement) and may be later adapted based on the experience gathered.

Achievement KPI ⁸	Target Value	Current Status	Impact KPI	Target Value	Current Status
on VIBES social media accounts		(Twitter) 138 (LinkedIn) 138 (Facebook)	the VIBES social media accounts	(indicative) (Twitter, LinkedIn, Facebook, YouTube)	(Twitter) 615 (LinkedIn) 192 (Facebook) 11 (YouTube)
Number of project leaflets designed	2 (one in the beginning and one at the mid-end)	1	Number of distributed promotional materials	2,000 copies of leaflets distributed in project/external events (indicative)	935
Number of project infographics designed	1	1			
Number of project videos produced	2 (one in the beginning and one at the end)	1	Number of project video viewers	500 (indicative)	411
Number of e-newsletters	8 (2 per year, covering the activities developed every semester)	5	Number of subscribers to e-newsletters	500 (indicative)	267
Number of press releases (in English)	At least 6	6	Number of press release publications in local media	N/A	19

Achievement KPI ⁸	Target Value	Current Status	Impact KPI	Target Value	Current Status
			Number of citizens reached via media publications (press releases)	N/A	12,715
Number of radio or TV programmes that VIBES was communicated to	2	3			
Number of articles published in industry magazines	At least 4	3	Number of industrial stakeholders reached via media publications (industry magazines)		
Number of events /fairs/ info-days in which partners participated presenting VIBES	At least 6	32	Number of stakeholders (industry) reached via VIBES participation in exhibitions and trade fairs	1,500	4,053
			Number of participants (industrial stakeholders & policy makers) in events in which partners presented VIBES	500	1,292
Number of scientific papers published	At least 6 (at least 4 articles in scientific journals and 2 posters in conferences)	9			
Number of scientific	At least 3	33	Number of participants (scientific community &	3,000	3,123

Achievement KPI ⁸	Target Value	Current Status	Impact KPI	Target Value	Current Status
conferences in which partners participated presenting VIBES			industry) in scientific conferences in which partners presented VIBES		
Number of COMPOSIFORUM international events organised	At least 2	1	Number of participants in COMPOSIFORUM international events	100 participants (indicative) (at least 30% female - indicative)	80
Number of demonstration workshops organised for industry and stakeholders	3	2	Number of participants in the demonstration workshops	50 participants in total (indicative) (at least 30% female – indicative)	18
Number of other workshops organised	N/A	4	Number of participants in other organised workshops (industry and scientific community)	N/A	139
Number of organised roundtables	2	1	Number of stakeholders that participated in roundtables	10 per roundtable	20
			Number of participants in the Final Conference	At least 100 participants (indicative) (at least 30% female - indicative)	N/A
Number of summer training courses,	2	1	Number of participants in the summer training courses	30 students per course (at least 30%	16+1 (module 4)

Achievement KPI ⁸	Target Value	Current Status	Impact KPI	Target Value	Current Status
organised as part of the training programme				female - indicative)	
			Number of participants on e-learning platform: AITEMY	At least 100 participants (indicative) (at least 30% female - indicative) At least 100 (indicative) (at least 30% female - indicative)	45
Number of research-oriented workshops organised for technicians and professionals from academia and industry, as part of the training programme	3	1	Number of professionals (academia and industry) participated in training (research-oriented, technological breakfast, workshop)		
Number of training activities for industrial professionals, organised as part of the training programme	2 (one technological breakfast and one workshop)	0			
Number of MSc theses launched	3	N/A			
Number of PhD theses launched	2	N/A			

The target of reaching 100,000 citizens refers to more than one communication KPIs, including number of citizens reached through website visits, social media, video views, e-newsletters, published articles/press releases, digital channels etc. In total, it has been estimated from available data that at least **20,694 citizens** have been reached through communication activities. However, there are not enough data available, as reported by project partners' activities, which can be used to correctly estimate the total figure of citizens reached.

In particular, a corrective step has been implemented regarding the estimation of number of citizens and industrial stakeholders reached via media publications and participation to exhibitions and trade fairs, as these numbers are not directly available and are only based on the information provided by the media publishers and the event organisers.

In addition, certain strategic steps regarding online communication have been adapted to meet the corresponding targets:

- The number of VIBES social media posts has increased by posting twice per week in each social media account of the project; this approach has significantly increased the VIBES social media followers, in particular the LinkedIn followers.
- The e-newsletter subscribers have been linked to LinkedIn followers by publishing e-newsletters through VIBES LinkedIn account; this approach has had an immediate impact in significantly increasing the number of people that the e-newsletters reached.
- The VIBES social media posts have provided direct links to specific sections of the VIBES website with interesting content, such as news, video, training material, publications etc., leading to a significant increase of the number of visitors to the project website; we will continue to monitor the website and social media KPIs and if needed we may consider paid campaigns in June 2024.
- The communication with sister projects and other initiatives has been intensified, leading to an increase of reposts of our news and social media posts in their online channels, and vice versa; this approach has provided interesting material for our online channels while it has also had an immediate multiplier effect in reaching a wider audience.

In any case, it has been made evident that even though the number of unique visits to the VIBES website has significantly increased by following the above strategic steps, the corresponding target value may not be reached by the end of the project. However, based on the available information, different communication and dissemination activities have proven to be more effective in reaching and even exceeding this target, such as publication of articles and press releases in local press and industry magazines and participation to events such as exhibitions and trade fairs.

7.2 Reporting

Communication and dissemination reporting is essential for keeping track of all the communication and dissemination activities that are carried out. Therefore, the project partners are expected to continuously report all their relevant activities on a six-months periodic report and to contribute to the continuous monitoring of VIBES communication and dissemination activities.

In order to facilitate the reporting of each communication and dissemination activity undertaken, four reporting tools have been designed and shared with all partners, as shown in the following Table.

Table 11. Reporting tools for monitoring the communication and dissemination activities

Annex	Reporting Tool	Coverage	When
11	Communication and Dissemination Reporting Template	All communication and dissemination activities, which partners were involved in during every 6 months period.	Every 6 months
12	News Reporting Template	News about project developments which partners are involved with.	Throughout the project
13	Event Reporting Form	Every single event organised or event in which partners participated.	Within 30 days following the completion of the event
14	External Conferences and Events Template	Any external conference/ event identified by partners, which is considered relevant to VIBES and beneficial to attend.	Throughout the project

7.2.1 Communication and Dissemination Reporting Template

During each project semester, all partners are expected to complete the “Communication and Dissemination Reporting Template” (Annex 10) reporting all communication and dissemination activities that they carried out during the previous six months.

It is an Excel file that should be sent at the end of each project semester to Q-PLAN. All the information required must be provided. The European Commission collects all these data from the Communication, Training and Stakeholders Manager (Q-PLAN). Therefore, for each activity each partner should indicate the following information:

- Partner name
- Date of activity (in order of occurrence / earlier first)
- Place of activity (online or physical location)
- Type of activity (select from drop-down list)
- Title of publication or event (if applicable)
- Title of article or presentation (if applicable)
- Type of audience (select from drop-down list)
- Size of audience (number of persons per type of audience)
- Language used / countries reached out
- Role and description of partner organisation’s involvement
- Type of project promotional material used (e.g. leaflets, infographic, project presentations)

- Quantity of project promotional material handed out (number of copies distributed per promotional material)
- Other partners or external organisations involved
- Short description of the activity
- Evidence: URL, screenshot, photo (given that the target group has given its consent)
- Significant contacts made (if relevant)
- Other comments (if relevant)

7.2.2 News Reporting Template

Partners are expected to share news about important project developments, including project approach, methodologies and results, organisation of events etc, by completing the “News Reporting Template” (Annex 11). The news reporting template includes the following information:

- News title
- News main content / description (a couple of paragraphs)
- Key words / hashtags (for social media)
- Relevant picture (if available)

The completed news reporting template should be sent to Q-PLAN, in order to communicate the corresponding news on the project website and social media.

7.2.3 Event Reporting Form

For each completed event (workshop, conference, etc.), partners are requested to complete the “Event Reporting Form” (Annex 12) providing information regarding the event that they were involved in. This form should be sent to Q-PLAN within 30 days after the end of the event and the event should also be communicated to Q-PLAN, in advance, for promotional purposes.

It is a structured document that includes the following information:

- Event data (title, date, venue, organisers, type and number of attendees including % of female attendees, duration)
- Goals and relevance to the project
- Organisation of the event (if applicable)
- Dissemination activities within the event
- Structure of the event
- Outcomes of the event
- Evaluation of the event
- Annexes (list of participants, agenda, photos, presentations, if applicable)

7.2.4 External Conferences and Events Template

The “External Conferences and Events Template” is an excel file (Annex 13), that partners may complete each time they identify an event (e.g. conference, workshop, seminar etc.) relevant to VIBES and in which VIBES partners may be interested in participating to promote or present the project. Each partner should share this file with Q-PLAN, which will then be communicated to all project partners.

For each identified external conference or any other relevant event, each partner should indicate the following information:

- Event Name
- Thematic Focus
- Date and Location
- Registration Fees
- Specific requirements for participation
- Deadline for abstract submission (if applicable)
- Link to event website
- Name of partner

8. Conclusions

The current document constitutes the second update version of the “Report on Communication, Dissemination and Training Activities” of the VIBES project. It has been developed by Q-PLAN, in collaboration with AITIIP and input from all partners, under Work Package 6 “Communication, dissemination & training”.

With reference to the initial report elaborated in D6.2. and its first update elaborated in D6.3, this report describes the objectives and the defined framework of project’s communication, dissemination and training strategy and provides a second update of both the implemented and the foreseen communication, dissemination and training activities and corresponding channels, following the experience of the 36 months of the project’s implementation.

The project consortium has so far managed to create a consistent and recognisable visual identity and branding for the VIBES project and has made considerable efforts to reach out to the targeted stakeholder groups and relevant networks. Our communication, dissemination and training activities are focused on raising awareness about the project’s approach and development, through the project online media, activities, synergies, contribution with new knowledge and through participation in relevant events.

Our future efforts will focus on deepening the connections made and networks built in local and EU context, to maximize the visibility and outreach of VIBES. To this end, all partners should keep on actively contributing to the communication and dissemination activities through the exploitation of the defined dissemination tools and channels, promoting and multiplying publicity of the project’s aims and achievements and disseminating targeted messages to all relevant stakeholders.

By communicating and disseminating the project’s tangible and intangible assets through the most effective channels and tools to timely reach the targeted groups, VIBES will be able to not only go beyond its ambitious Key Performance Indicators (KPIs) but most importantly to lay the foundations for the successful rollout, replication and thus sustainability of its outcomes.