COMP-ECO

PROJECT DELIVERABLE

D3.5 Report and Materials from Workshop on SUSTAINABILITY

LEAD BENEFICIARY:	TU DELFT
AUTHOR(S):	Otto Bergsma, Nan Tao (Delft)
CONTRIBUTOR(S):	Anna Zmiievska (TPF)
DATE OF ISSUE:	31/03/2025
DISSEMINATION LEVEL:	PU

https://www.comp-eco.eu/

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101079250

COMP-ECO

DOCUMENT HISTORY

Version and date	Changes
1.0 – 23/3/2025	Draft version, developed by Nan Tao (TU Delft)
1.1 – 24/3/2025	Reviewed by Otto (TU Delft)
1.2 – 28/3/2025	Edited by Nan Tao (TU Delft)
2.0 – 31/3/2025	Reviewed and final version created by Anna Zmiievska (TPF)

DISCLAIMER

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101079250

CONTENTS

1. INTRODUCTION

1.1. ABOUT THE COMP-ECO PROJECT

The COMP-ECO project is aiming at improving the research excellence of the Polish Mazovia region-based ecosystem in the field of Fibre-Reinforced Polymer (FRP) multifunctional composites and smart structures. The ecosystem is formed by 3 organizations: Technology Partners Foundation (TPF), Air Force Institute of Technology (AFIT) and Warsaw University of Technology (WUT). These 3 Polish partners will be supported by two leading EU universities: Delft University of Technology from the Netherlands and Technische Universität Dresden from Germany.

For 3 years the COMP-ECO partners jointly implement exploratory research work to develop a technology for a permanent on-line non-destructive quality assessment of composite structures. For this purpose, 2 possible innovative sensing capabilities are being developed: (1) self-diagnostics capabilities through the introduction of electroconductive carbon nanotubes in the composite's matrix during the manufacturing process and (2) self-sensing capability through embedding PZT sensors, encapsulated in a thermoplastic fibrous material (veils), in the composite structure.

In addition to the research work, the project will organize technical workshops aimed on raising the research profile of Mazovian composite community, and management and administrative training workshops to strengthen research management capacities and administrative skills of the Polish partners' administrative staff.

The COMP-ECO activities will establish and strengthen a regional competence hub formed by TPF, AFIT and WUT, whose increased science and innovation capacities will lead to more ambitious collaboration with top EU research organisations and industry, higher participation in Horizon Europe, and a more attractive educational offer for students and young researchers.

1.2. SCOPE OF THIS DELIVERABLE

The scope of this deliverable is to provide a comprehensive overview of the organised workshop focused on Sustainability: Climate Fresk that took place at TU Delft on October 15, 2024. The report encompasses three main areas: Workshop preparation, presentations, and outcomes.

Section 1 details the planning and organization process, including the identification of key objectives, target audience, and themes.

Section 2 focuses on the report and materials delivered during the workshop. It provides an overview of the topics covered. The main content of the workshop is summarized, highlighting key insights shared by the speakers.

Section 3 describes the actions taken to disseminate the outcome of the workshop and provide open-access training material to researchers interested in sustainability.

2. WORKSHOP PREPARATION

2.1. OBJECTIVES

The COMP-ECO project aspires to enhance the scientific knowledge and skills of Polish young researchers. A series of technical workshops are organised to provide an insight into the state of the art in multifunctional composites and smart structures based on a sustainable, holistic approach covering the whole product life chain, starting with the design of materials and structures, through appropriately used advanced methods of their production, testing of their properties, in-service aspects and finally reuse and recycling. The objectives of the workshops are not limited to knowledge sharing but aspire to promote open discussion with the participants in an effort to trigger brainstorming activities will enhance their problem-solving, idea generation and creativity capabilities.

2.2. COURSES TO BE COVERED

The fourth workshop for research staff and students of Polish partners was held in Delft on October 15, 2024. The Workshop (Climate Fresk) was delivered by Dr. Irene Fernandez Villegas (Associate Professor – Sustainability of Composite Materials) from TU Delft's Faculty of Aerospace Engineering and covered the following contents, which have been changed and modified accordingly to the Grant Agreement:

- **Understanding Climate Science** – Participants uncovered the scientific principles behind climate change through collective intelligence.
- **Creative Exercise** – A hands-on activity encouraged creative thinking and collaboration.
- **Action Brainstorming** – Discussions centered on actionable steps, both as professionals and within the framework of the COMP-ECO project.

The final session emphasized identifying strategies that align with COMP-ECO's goals to promote sustainable practices in the composites sector.

2.3. WORKSHOP AGENDA

To cover the above topics, the following half-day programme (Table 1; first part of the workshop) was proposed by Delft, which was responsible for the organisation, and approved by the other

partners during the regular consortium meeting in October 2024. In detail, the workshop consisted of two main sessions (Session 1: Deep Dive into Climate Science – 1h30; Session 2: Creative Solutions and Action Planning -1h30), in total lasting 3 hours, and included both hands-on activities and interactive discussions.

TABLE 1: WORKSHOP PROGRAMME: FIRST PART

	Tuesday 15th October, 2024 (on site)
14:00	Welcome
14:10	Understanding Climate Science: Exploring and uncovering the scientific principles behind climate change.
15:30	Creative Exercise: A hands-on activity engaging creative thinking and collaboration.
16:30	Action Brainstorming: Discussions with a focus on actionable steps, both as professionals and within the framework of the COMP-ECO project.
17:00	Recap of the workshop

A continuation of the workshop (Table 2; second part of the workshop) was also delivered for the next round of researchers from COMP-ECO Polish partners, which was held on March 26th, 2025 (13:30-17:00). It was held online and provided an opportunity for more participants to dive deep into the creative and action-oriented components of the Climate Fresk. Apart from Zoom, the participants were using the collaborative platform Mural during the workshop. In general, this follow-up (second part of the workshop) covered the same courses as in the previous Climate Fresk workshop in October, 2024 (first part of the workshop). The programme of the second part of the workshop was slightly different from the first part as it was adapted to fit the online format.

TABLE 2: WORKSHOP PROGRAMME: SECOND PART

	Wednesday 26th March, 2025 (online)
13:30	Introduction to the Climate Fresk and to Mura
13.45	Understanding the physics behind Climate change through collective intelligence
15.15	Break
15.25	Personalizing of the Fresk.
15.55	Climate mitigation and adaptation actions (discussion)
17:00	Recap of the workshop

2.4 TARGET AUDIENCE

The workshop was organised in the framework of WP3, which aims to provide state-of-the-art training to young researchers from the Polish consortium partners. To meet the requirements, both the contents and the activities were adapted to the level of knowledge and potential of the graduate and PhD students from different backgrounds. It is worth noting that the WUT and TPF participants have a strong background in materials science, composite recycling and CNT sensing, while AFIT members have a broader range of studies and consist mainly of mechanical and aerospace engineers.

3. WORKSHOP MATERIAL

3.1 WORKSHOP CONTENTS

Within the section a brief description of each activity taken place on the framework of the workshop is given. This workshop offered an engaging exploration of climate change and sustainability which comprised two main sessions:

- **Deep Dive into Climate Science – 1h30**

In session 1, the participants embarked on a journey through the complexities of climate science. Through interactive and collaborative card game consisting of 42 cards, they learned about the causes and consequences of climate change. They gained a clear understanding of how human activities impact the environment and what this means for our planet's future but also for all living beings. By visualizing the interconnectedness of various factors, they can develop a comprehensive view of the climate system and the urgent need for action.

- **Creative Exercise and Action Planning - 1h30**

The session 2 was on creative exercise, focusing on solutions and action. Here, the participants worked with their peers to brainstorm and design innovative strategies to combat climate change. This is a valuable chance to think outside the box and come up with creative ideas that can make a real impact. They also learned about practical steps they can take both in their daily life and in their professional life to reduce their carbon footprint and inspire others to do the same. By the end of the session, they came up with a clear idea of actions that aligned with them and their work, empowering them to further contribute to a sustainable future.

A continuation of the workshop (online Climate Fresk on March 26th, 2025) was delivered for the next round of researchers from COMP-ECO Polish partners. This follow-up provided an opportunity for more participants to dive deep into the creative and action-oriented components of the Climate Fresk.

3.2 PARTICIPANTS LIST

Five participants took part in the Workshop in Delft (October 2024; in person) and six participants took part in the follow-up online workshop (March 2025). They represented research staff of the Polish partners of COMP-ECO: WUT, TPF and AFIT. The list of participants is presented in Appendix 1 in an anonymized form.

4. DELIVERABLES AND DISSEMINATION

To effectively disseminate the workshop's outcomes and facilitate access for engineers, scientists, and researchers an open-access repository is established on the COMP-ECO webpage: https://www.comp-eco.eu/open-repository .

This repository will serve as a comprehensive platform for sharing state-of-the-art knowledge, not only among the participating partners but also with researchers around the world. The presentations and supplementary video materials from the workshop on Design are published in the Repository via this link: https://www.comp-eco.eu/workshop-on-sustainability

These valuable resources are readily available and easily accessible to a diverse audience seeking to enhance their understanding in the field. By uploading this content to the repository, we aim to foster knowledge exchange and contribute to the advancement of the scientific community on a global scale.

5. SUMMARY

This section summarises the materials and knowledge generated during the workshop and also summarises achievements from the workshop.

This workshop was organized at the Faculty of Aerospace Engineering, TU Delft on 15th October 2024 (Part 1, on site) and was held on 26th March 2025 (Part 2, online). It was fourth of the series of technical workshops covering climate change and sustainability. 11 scientists participated in the Workshop (5 on-site and 6 online). During the workshop the participants acquired specific knowledge, namely:

1). Exploration and uncovering on climate science. The participants acquired knowledge on the scientific principles behind climate change.

2). Hands-on creative exercise session on how to influence the driving force behind climate change. The participants learned and understood ways to go forward in climate control and what possible consequences this has on society**.**

3). Interactive discussion and action brainstorming session on actionable steps and strategies. The participants were engaged in promoting open discussion with a focus on triggering sustainable practices in the composites sector.

Achievement:

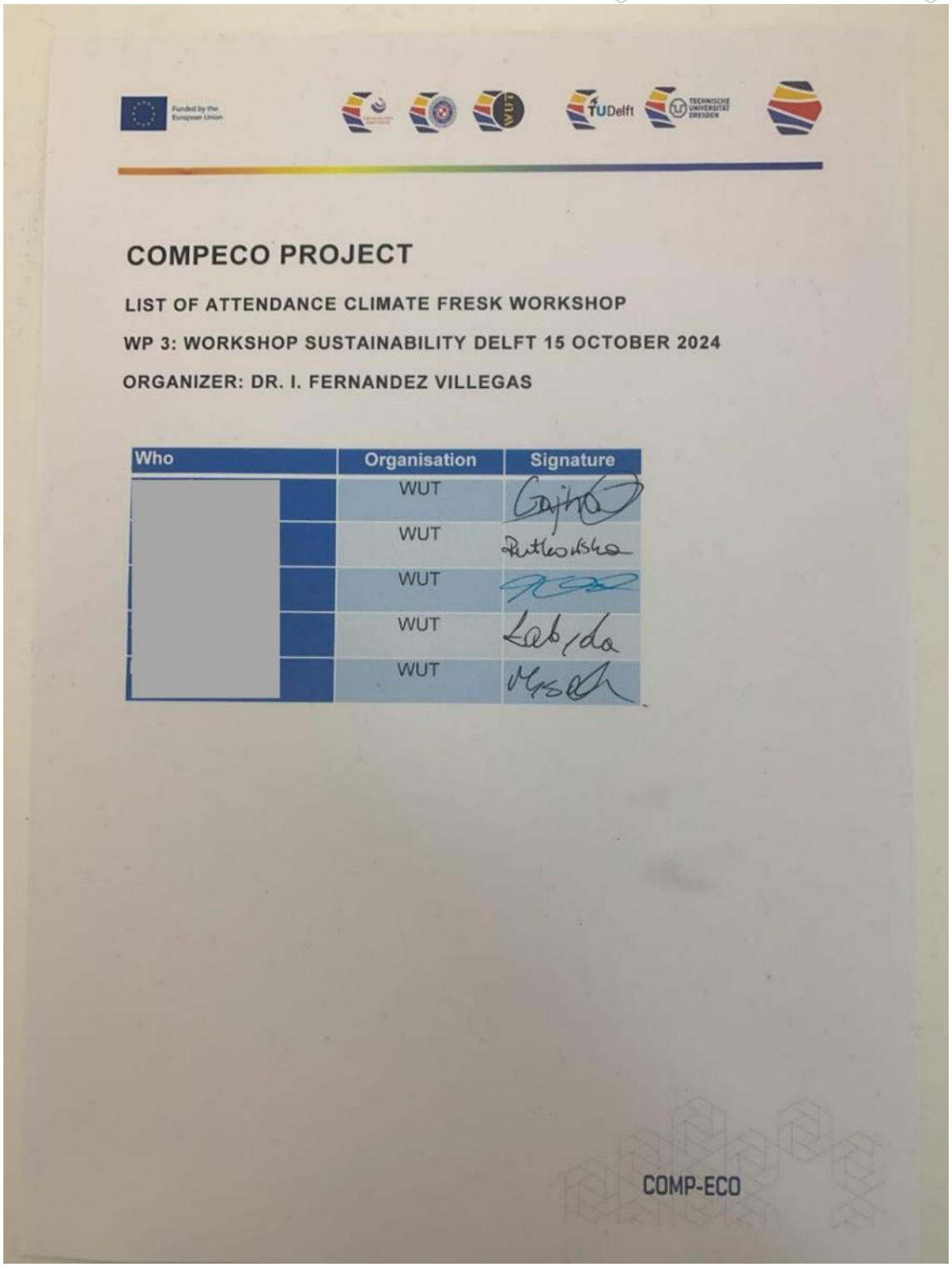
The participants have been motivated to learn more about the topic, some extra information/homework has been made for them after the workshop:

- The 1st step: measure the carbon footprint: this allows participants to identify what they can change in their everyday life to reduce CO2 emissions.
- To make real changes to their everyday life, they have been encouraged to consult this website or this article, written in 2000, available on Jancovici's website.
- Learn more about the climate breakdown and current policy:
    - The IPCC Report Summary for Policymakers 2019. 6th AR here.
    - Have a play around the MIT online climate simulator to find out what's needed to keep the world 2 degrees above pre-industrial levels.
    - Nine propositions to decarbonise Europe by the Shift Project.
    - Climate Primer: Climate Science, Risk & Solutions - Climate Knowledge for Everyone! Post Carbon Institute provides individuals and communities with the resources needed to understand and respond to the crises of the 21st century. (Watch the "300 Years of Fossil Fuels in 300 Seconds" video!)
    - Carbon Pulse: a website that gathers news and intelligence on carbon markets, greenhouse gas pricing and climate policy.
    - CarbonBrief, a UK-based website covering the latest developments in climate science, climate policy and energy policy.

Finally, they are encouraged to get trained as a Climate Fresk facilitator and help rapidly spread the Climate Fresk in the world. And to keep spreading the word, they are inspired to share their impressions from the workshop with as many colleagues/peers as possible and encouraged them to participate.

APPENDIX 1 – LIST OF PARTICIPANTS

Physical participation (14:00 to 17:00, October 15, 2024)



COMPECO PROJECT

LIST OF ATTENDANCE CLIMATE FRESK WORKSHOP

WP 3: WORKSHOP SUSTAINABILITY DELFT 15 OCTOBER 2024

ORGANIZER: DR. I. FERNANDEZ VILLEGAS

Who	Organisation	Signature
	WUT	
	WUT	
	WUT	
	WUT	
	WUT	

COMP-ECO

Online participation (13:30 to 17:00, March 26, 2025)

Attendance Report – March 26

Attendance Count • Number of attendees who were present	6

Participant Name	Participation Time
[redacted]	13:30-17:00
	13:30-17:00
	13:30-17:00
	13:30-17:00
	13:30-17:00
	13:30-17:00