

An aerial photograph showing a large body of water on the left, a road with a white car on the right, and a dense green forest in the background. The image is used as a background for the title slide.

FOREST

ADVANCED LIGHTWEIGHT MATERIALS FOR ENERGY-EFFICIENT STRUCTURES

Project Introduction



FOREST is a European Union research project under the topic of **Advanced lightweight materials for energy efficient structures** funded by the European Union's Horizon Europe research and innovation programme.

The **FOREST** project will contribute to the decarbonisation of the transport sector by developing and implementing innovative bio-based polymers & additives and recycled carbon fibres. The goal will be achieved by combining three key drivers: **Reduce, Recovery, and Reshape.**

START: December 2022

END: May 2026

DURATION: 42 months

GOALS

REDUCE

FOREST will reduce the structural weight of vehicles by providing light components made of carbon fibre-reinforced plastic. In this way, less fuel and energy consumption will be necessary to cover the same distance. And will develop new chemistries based on high-biobased content for polymers and additives. In this regard, the fossil sources dependency will be reduced.

RECOVERY

FOREST will implement efficient methods to recover 100% of carbon fibre waste to develop high-quality semi-finished materials for valuable transport applications.

RESHAPE

FOREST will research the influence of the multifunctional properties on the biocomposite. Therefore, combine the biobased, recycled, and multifunctionality material nature to obtain sustainable solutions for the bus, aeronautic, and automotive sectors.



CONCEPT

FOREST will develop novel lightweight multifunctional biocomposites as a competitive alternative to conventional composites.

New chemistries will be developed based on bio-based materials (reactive and nonreactive polymeric systems and fire-retardant additives) in combination with fully recycled carbon fibre and EMI particles.

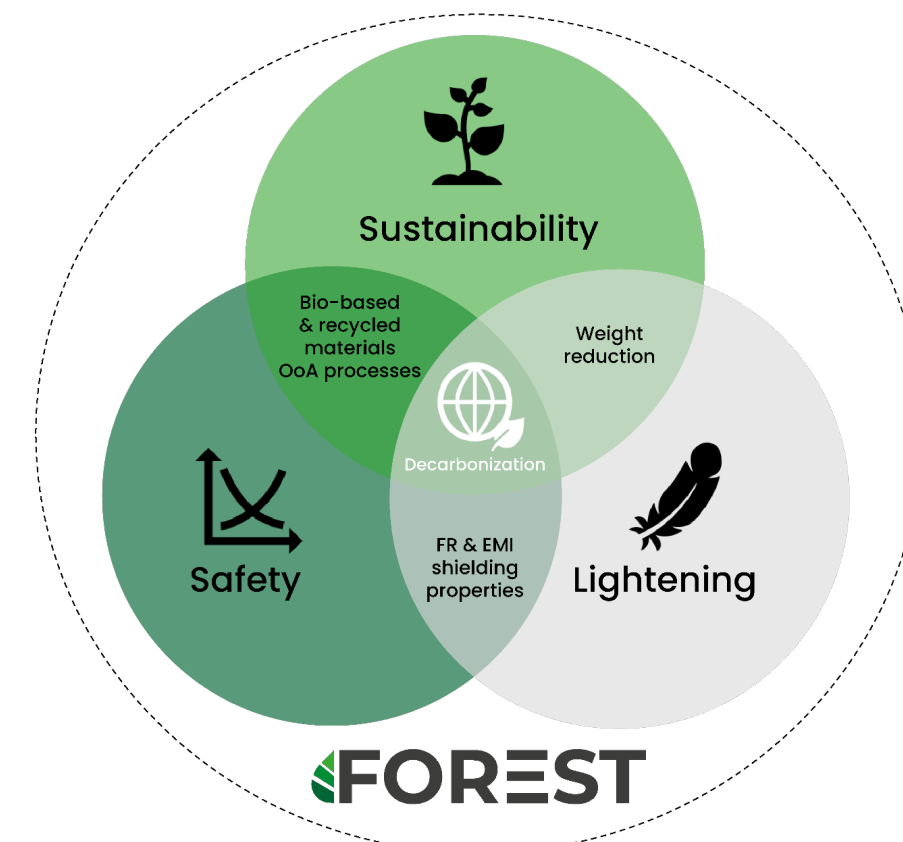
These biocomposite candidates will be obtained using one-shot manufacturing techniques, involving Out-of-Autoclave (OoA) processes to build and test prototypes (TRL5) with improved multifunctional properties (mechanical resistance, fire-retardant, EMI-shielding) for transport application.



FOREST

FOREST will increase the focus area on the sustainability in Circular Economy (CE) by effective circularity solutions applied to multifunctional biocomposite constituents with >50% sustainable materials contained in lightweight products.

PATHWAY TO MOBILITY DECARBONIZATION



CONCEPT



SUSTAINABILITY

- Bio-based composites
- Lightweight materials
- Positive LCA
- Recycling technologies



ADVANCED PROPERTIES

- Fast curing resins
- Extreme environment
- Thermal management
- Energy harvesting & storage



MANUFACTURING & SECURITY

- OoA processes
- Self-monitoring
- Joining techniques
- Joining techniques



OBJECTIVES



Description	
1	Bio composites requirements definition
2	Material Driven Design (MDD) methodology
3	New green chemistries with high valuable bio-based content grades from fully renewable sources
4	Lightweight materials through functional properties EMI-shielding
5	Recover 100% recycled carbon fibre
6	Lightweight composite parts using bio-based and recycled materials
7	Prototypes validation for transport sector
8	Define potential circularity solutions for biocomposite waste from EoL
9	To demonstrate environmental & economic sustainability of the biocomposite solution in the CE framework
10	To disseminate the project results to EU institutions and relevant stakeholders in transport sector
11	Business cases and exploitation strategies for industrialisation

MILESTONES

MILESTONE 1

Baseline for sustainable materials development (MTDD); framework and constraints to start the project development

MILESTONE 2

CDR: Critical Design Review: materials for biocomposites developed

MILESTONE 3

PDR: Preliminary Design Review: manufacturing technologies selected

MILESTONE 4

FDR: Final Design Review: prototypes manufactured and tested

MILESTONE 5

Environmental and techno-economic viability assessed

MILESTONE 6

Circularity identification of multifunctional biocomposites



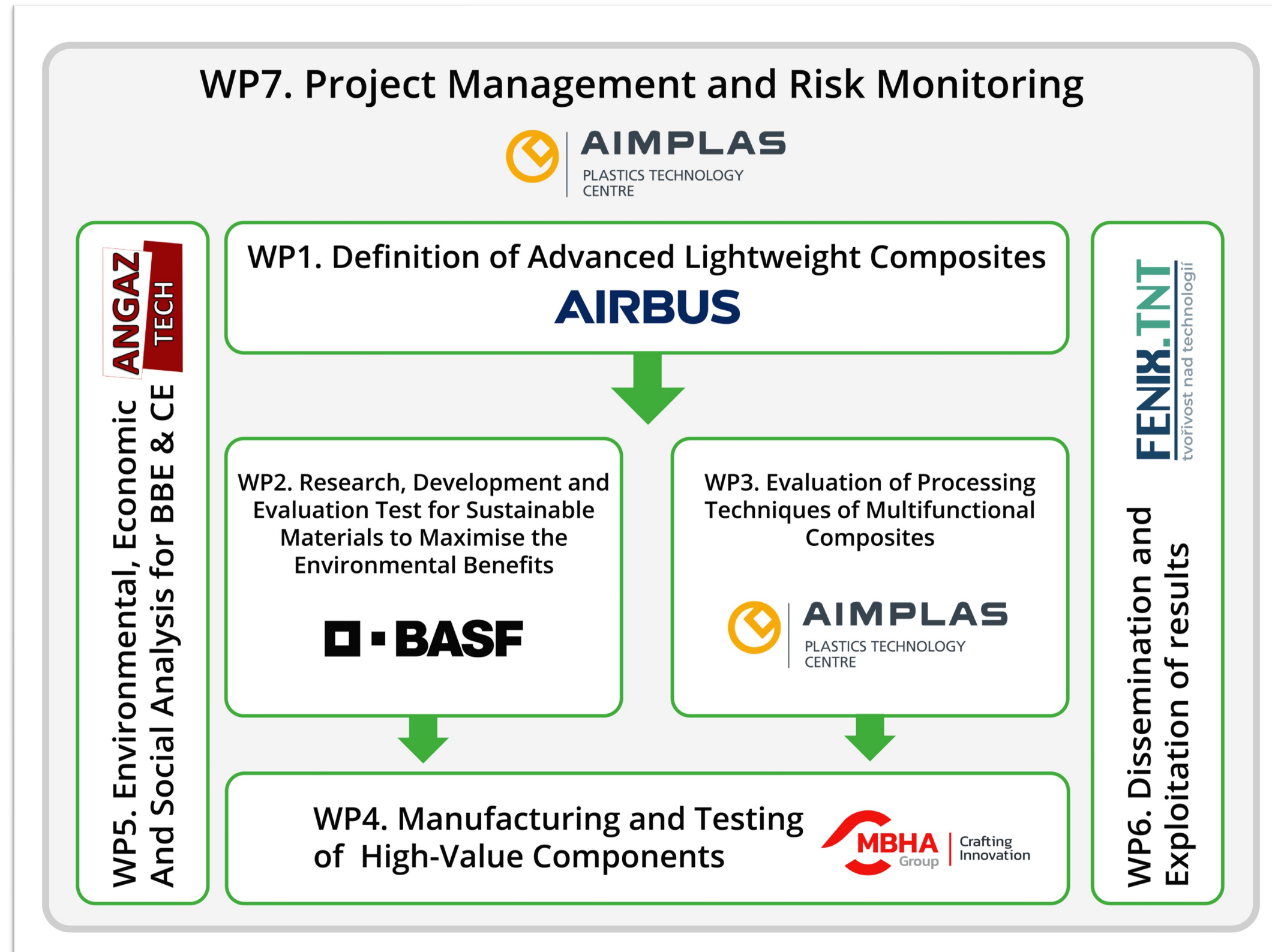
Cooperation of **14 partners** from **8 European countries.**

Spain, France, Germany, Turkey,
Italy, Poland, Czech Republic and
England



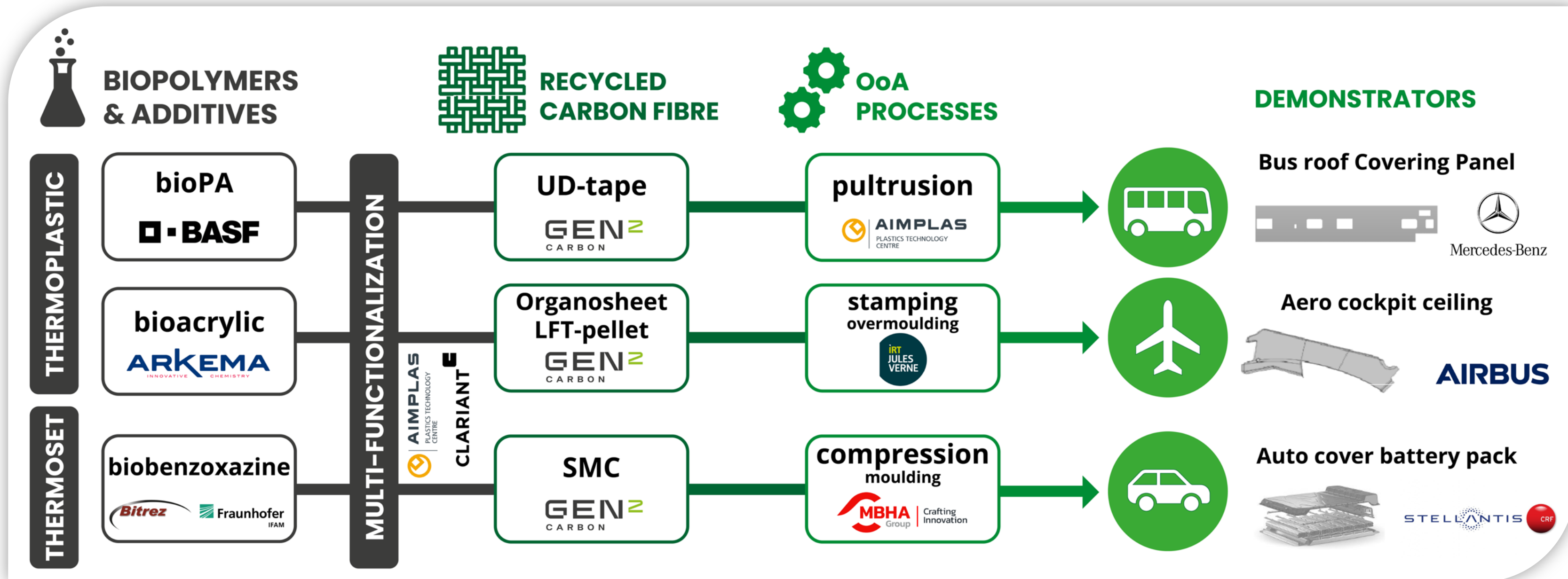


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