VITAL

BIOMATTERS

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EUBCE, 26 June 2024

Funded by the European Union

Innovate UK

Innovative processing technologies for bio-based foamed thermoplastics

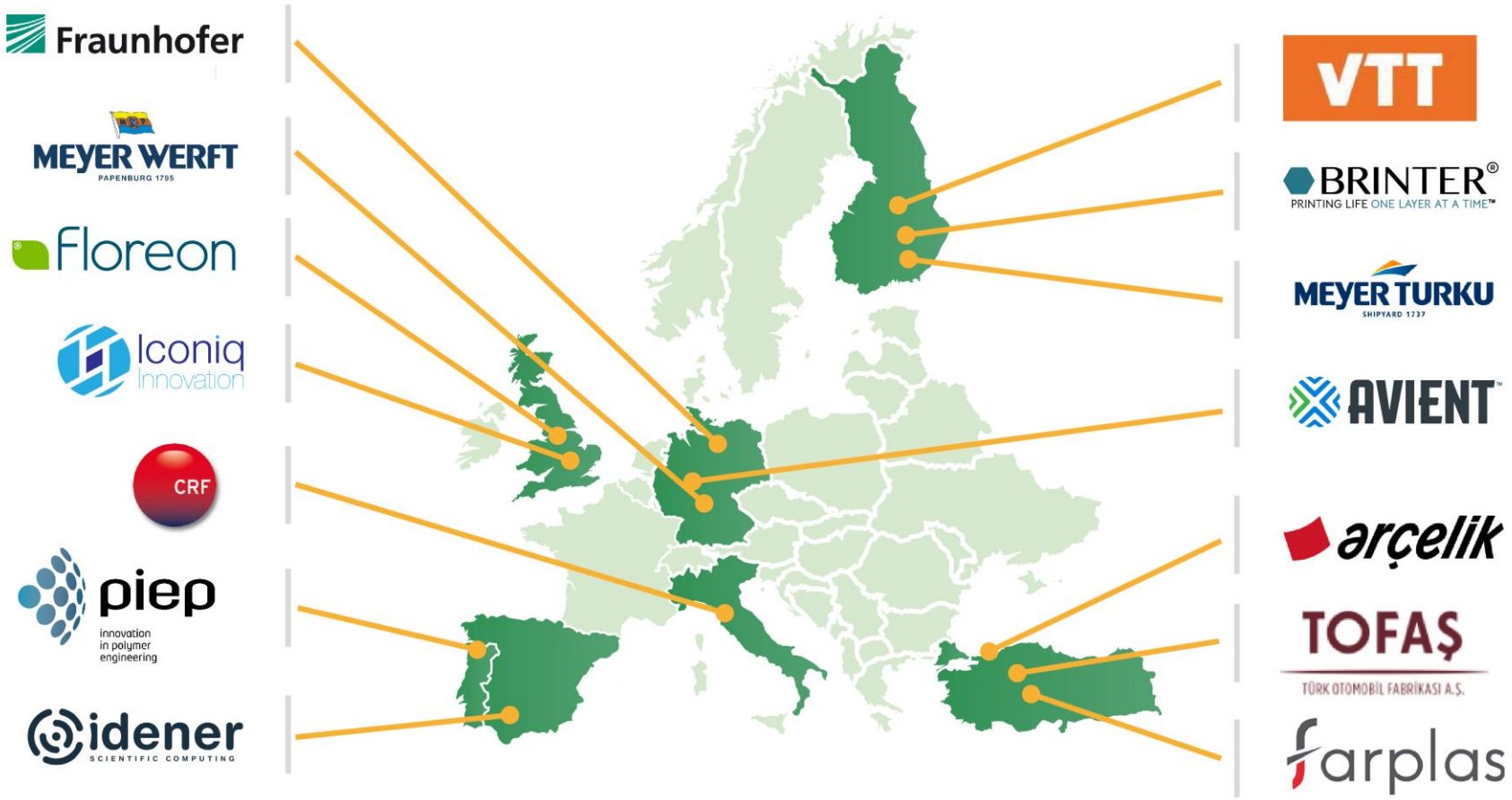
36 month duration

◦ 1.6. 2022 – 30.5. 2025 ◦ 6 m€ grant ◦

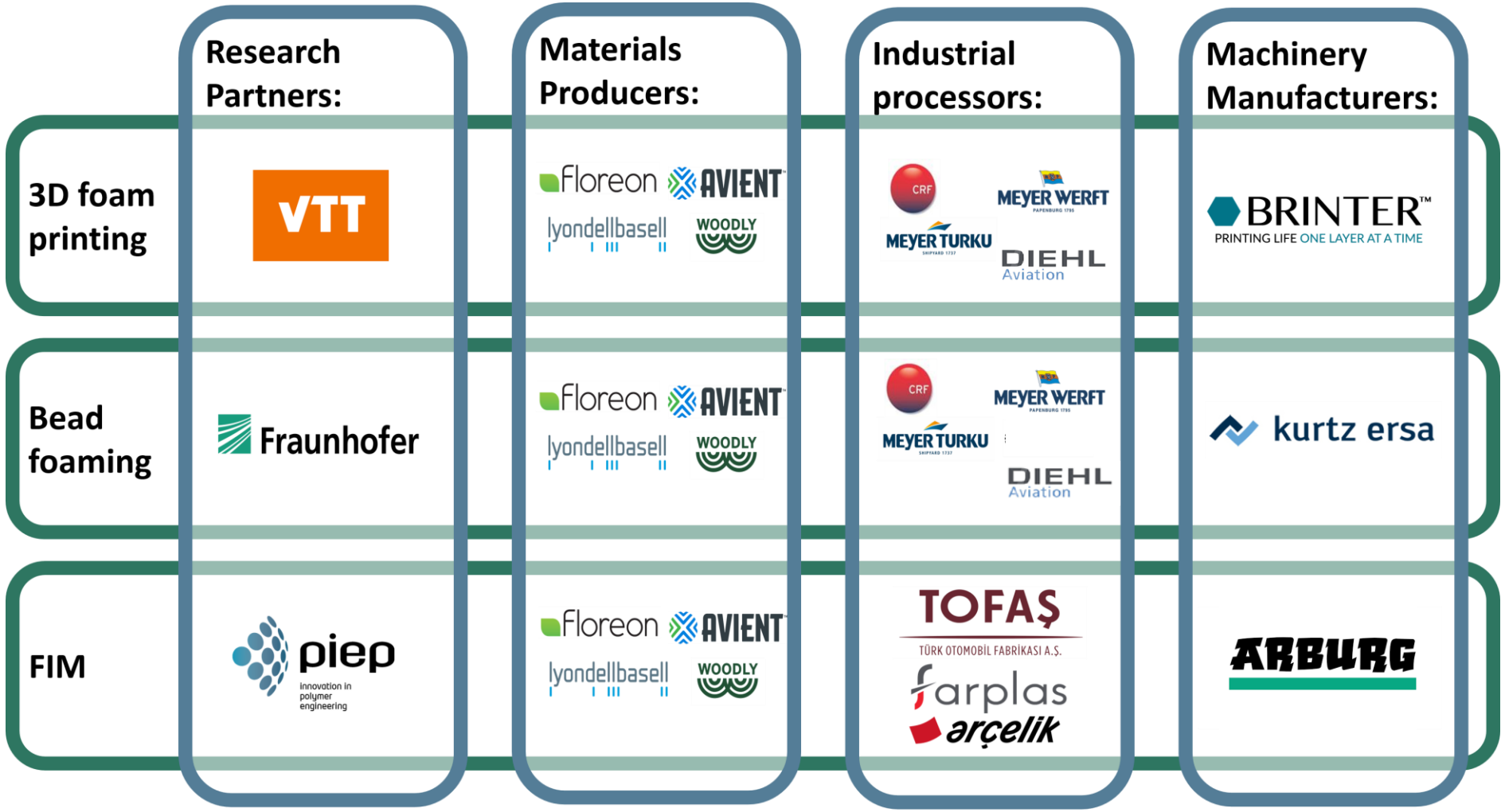
◦ 14 partners

InnoVatIve processing Technologies for bio-based foAmed thermopLastics (VITAL) GA. 101058328

Partners


Fraunhofer
MEYER WERFT
PAPENBURG 1795
Floreon
Iconiq Innovation
CRF
piep
innovation in polymer engineering
idener
SCIENTIFIC COMPUTING
VTT
BRINTER®
PRINTING LIFE ONE LAYER AT A TIME™
MEYER TURKU
SHIPYARD 1737
AVIENT
arçelik
TOFAŞ
TÜRK OTOMOBİL FABRİKASI A.Ş.
farplas

3 value chains



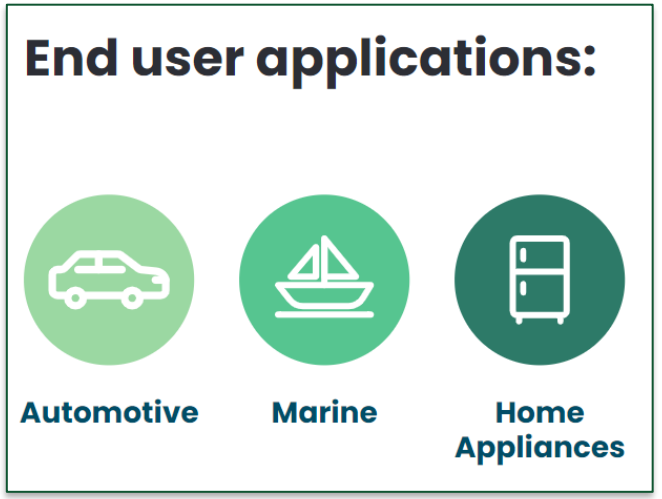
* Foam Injection Moulding

Approach

- 3 different manufacturing processes across 3 different value chains for bio-based thermoplastics (b-bTPs)
  - Value Chain 1: 3D foam printing
  - Value Chain 2: Bead foaming and autoclave foaming
  - Value Chain 3: Injection molding and foam molding

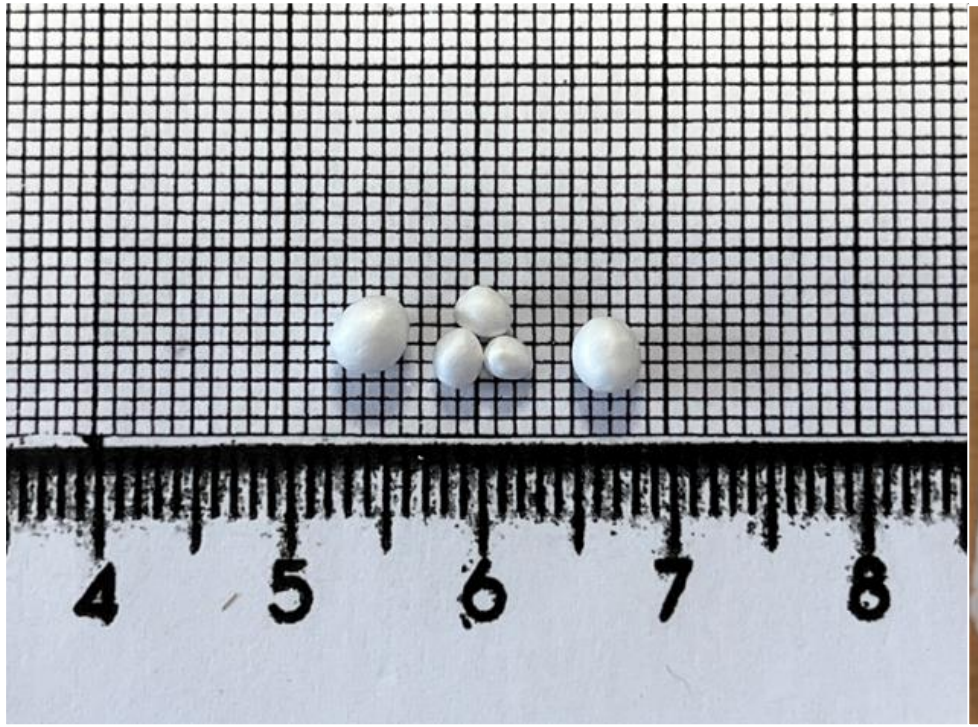
- Material and process R&D including recycling b-bTPs
- Digital
  - Simulation tool for 3D printing
  - digitally optimized recycling

- End-use demonstrators

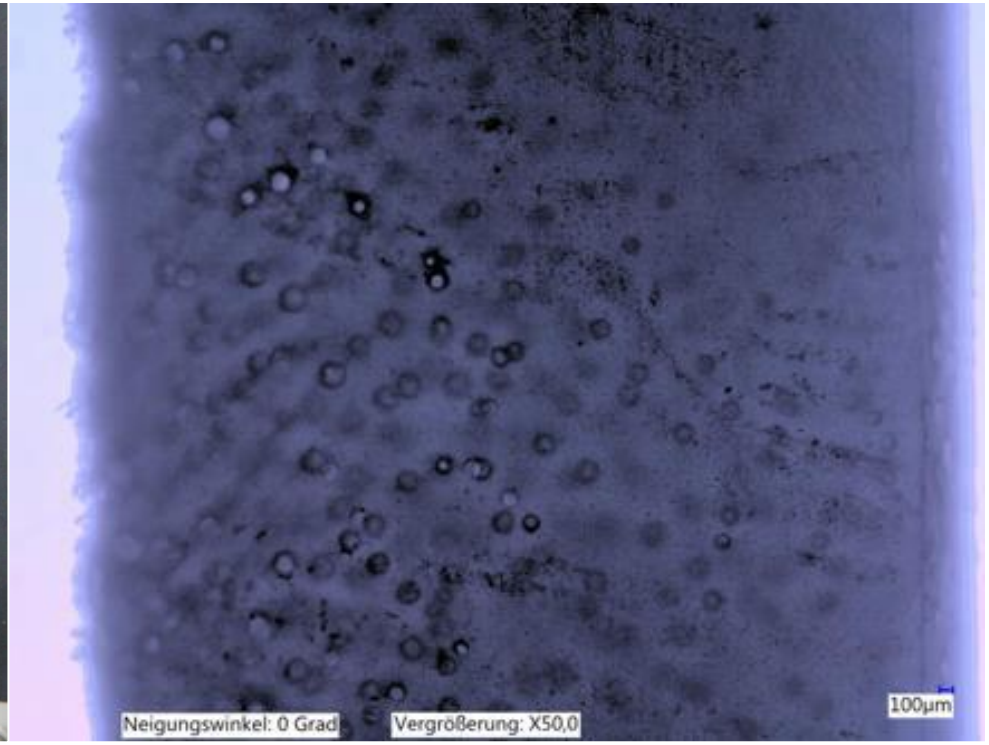


3D Foam Printing

Bead Foaming



Foam Injection Moulding



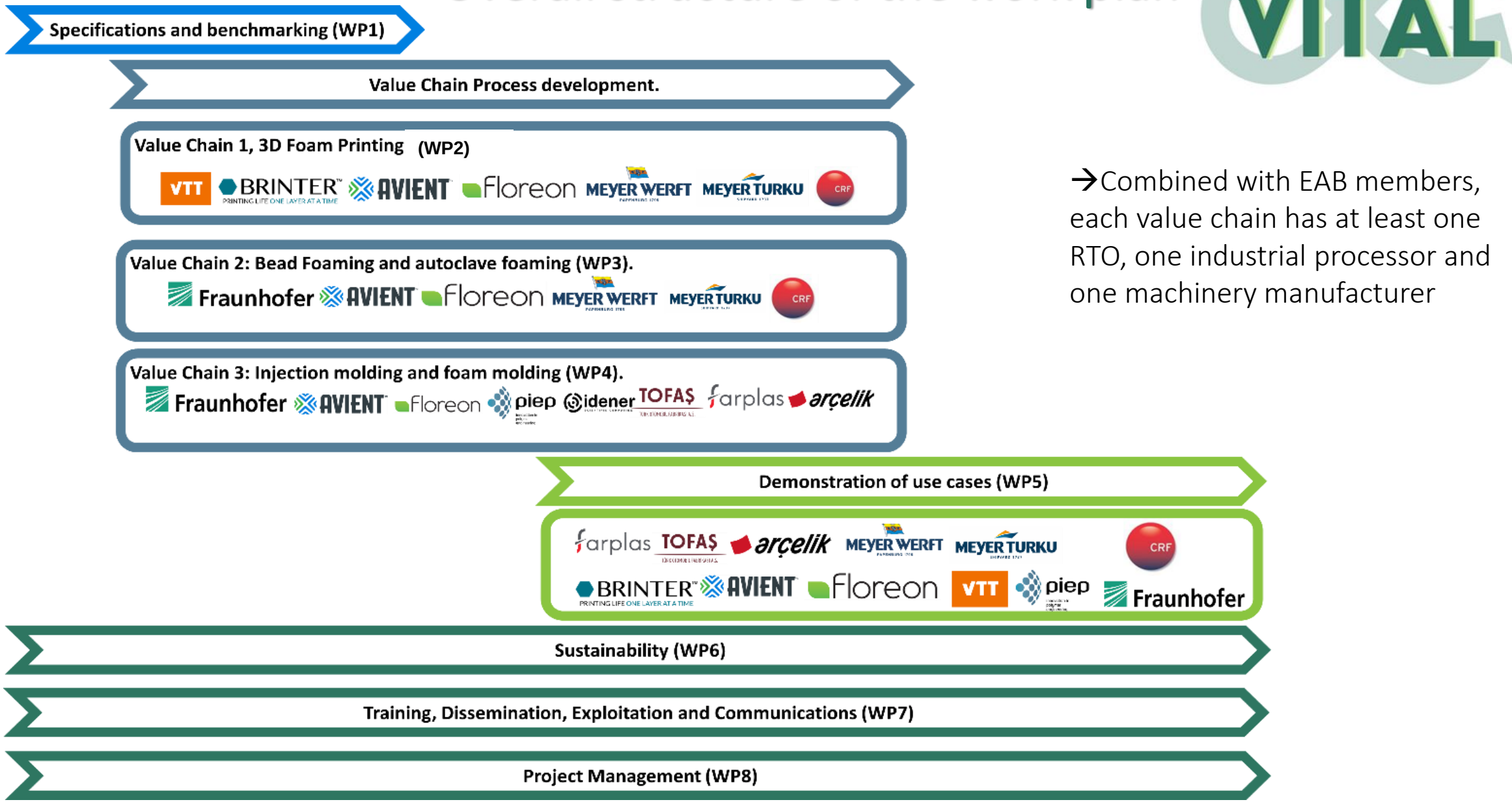
Acheivements to date

- **3D foamed biobased plastics printing system** is built and demo printing trials in progress. Some practical challenges to be overcome to optimize equipment and process.
- Novel **3D foam printing simulation tool** designed. Currently being validated with rheology data from priting trials.
- **RF-based bead foaming & moulding process** has been optimized to the processing of PLA bead foams from standard grade raw materials. Novel materials under evaluation.
- **Foam injection moulding digital twin and AI control system** – parameters defined and currently collecting data.
- **Flame retardant bio-based foams**. A number of formulations have been developed and are now being evaluated for the 3 processes

Acheivements to date

- **Novel biobased polyamides**. Have been synthesized at lab scale but still further work to optimise MW distribution and scale-up.
- **Databased of foamed bio-based thermoplastic parameters**. Internal database created. All project data will be added to this database and shared publically at the end of the project through industry standard software and open access repository.
- **Digitally optimised mechanical recycling**. Scope defined, awaiting materials data to further develop.
- **Demonstrator components**. Parts defined and preliminary trials undertaken.

Overall structure of the work plan



→Combined with EAB members, each value chain has at least one RTO, one industrial processor and one machinery manufacturer

Next steps

- **The final 12 months** of the project have now begun.
- **Manufacturing trials** are now beginning, to produce demonstrator components.
- **Real world data is being collected** about energy use, performance and recycling.
- **Exploitation planning** is now underway for the period following the project.
- **Future work** may focus on scaling up robust supply chains.
- **Knowledge is being compiled** to speed future uptake of biobased materials!

Impact

- The 6 use cases in VITAL combine to create pathways to **mitigate ~75,000 tonnes CO2 eq/year** from fossil-based materials through a conversion to bio-based materials.

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