EIT Manufacturing

Transition to Green Manufacturing

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Impact of AI, Big Data and Robotics on CO_2 reduction

29th of March, 2023

Co-funded by the European Union

Manufacturing – A base for prosperity in EU

2.1M+

enterprises

€7.11Tr

in turnover

32M

jobs (16%of the total EU working population)
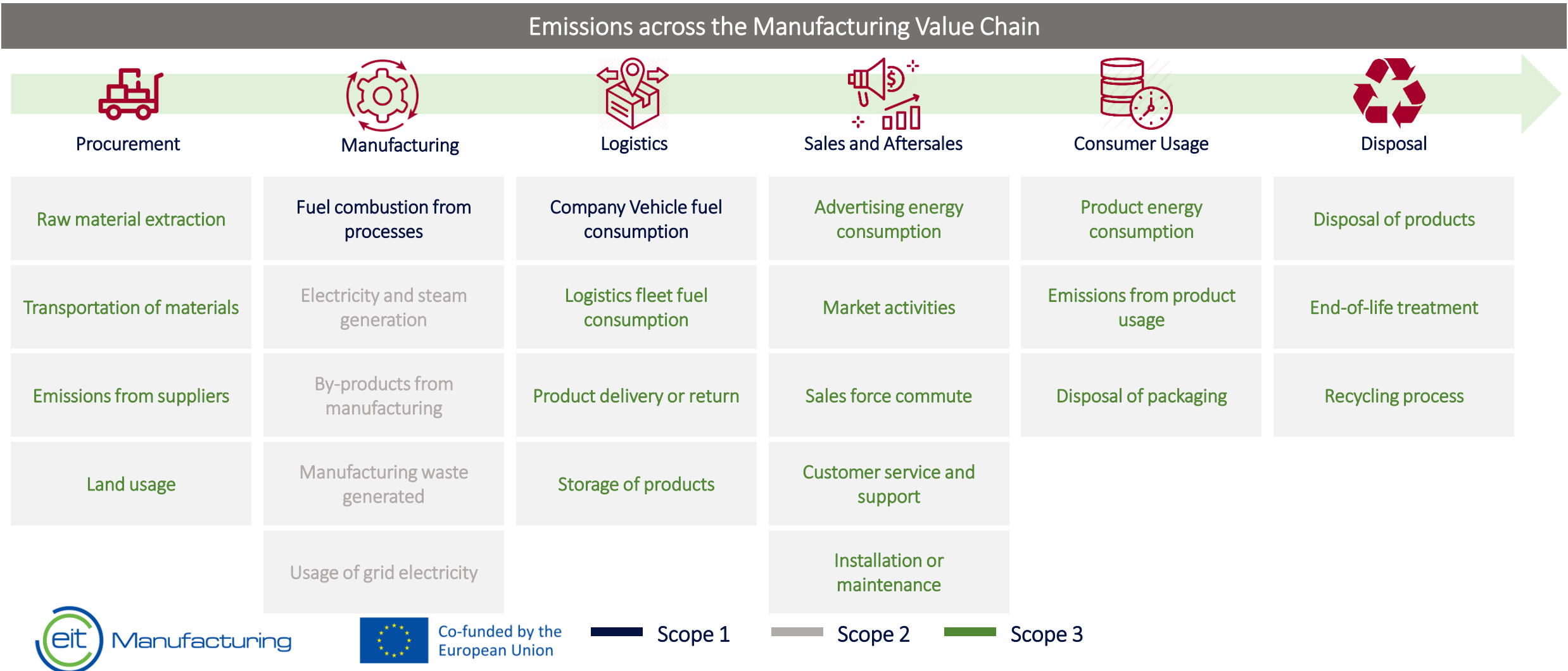
13M

Jobs in the growing high-tech manufacturing

16.1%

Share of EU-28 GDP (2016)

80%

of EU exports

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Manufacturing represents **largest share of direct emissions along value chain**
while indirect emissions emerge from all other value chain processes

Emissions across the Manufacturing Value Chain

Procurement	Manufacturing	Logistics	Sales and Aftersales	Consumer Usage	Disposal
Raw material extraction	Fuel combustion from processes	Company Vehicle fuel consumption	Advertising energy consumption	Product energy consumption	Disposal of products
Transportation of materials	Electricity and steam generation	Logistics fleet fuel consumption	Market activities	Emissions from product usage	End-of-life treatment
Emissions from suppliers	By-products from manufacturing	Product delivery or return	Sales force commute	Disposal of packaging	Recycling process
Land usage	Manufacturing waste generated	Storage of products	Customer service and support		
	Usage of grid electricity		Installation or maintenance		

▬ Scope 1   ▬ Scope 2   ▬ Scope 3

Sources: Manufacturing Value Chain; Ministry of the Environment Government of Japan; The Lean Post: Cutting Carbon Emissions; HBR: Climate Business

EIT MANUFACTURING KIC
The European Innovation Network for Manufacturing

Our Vision
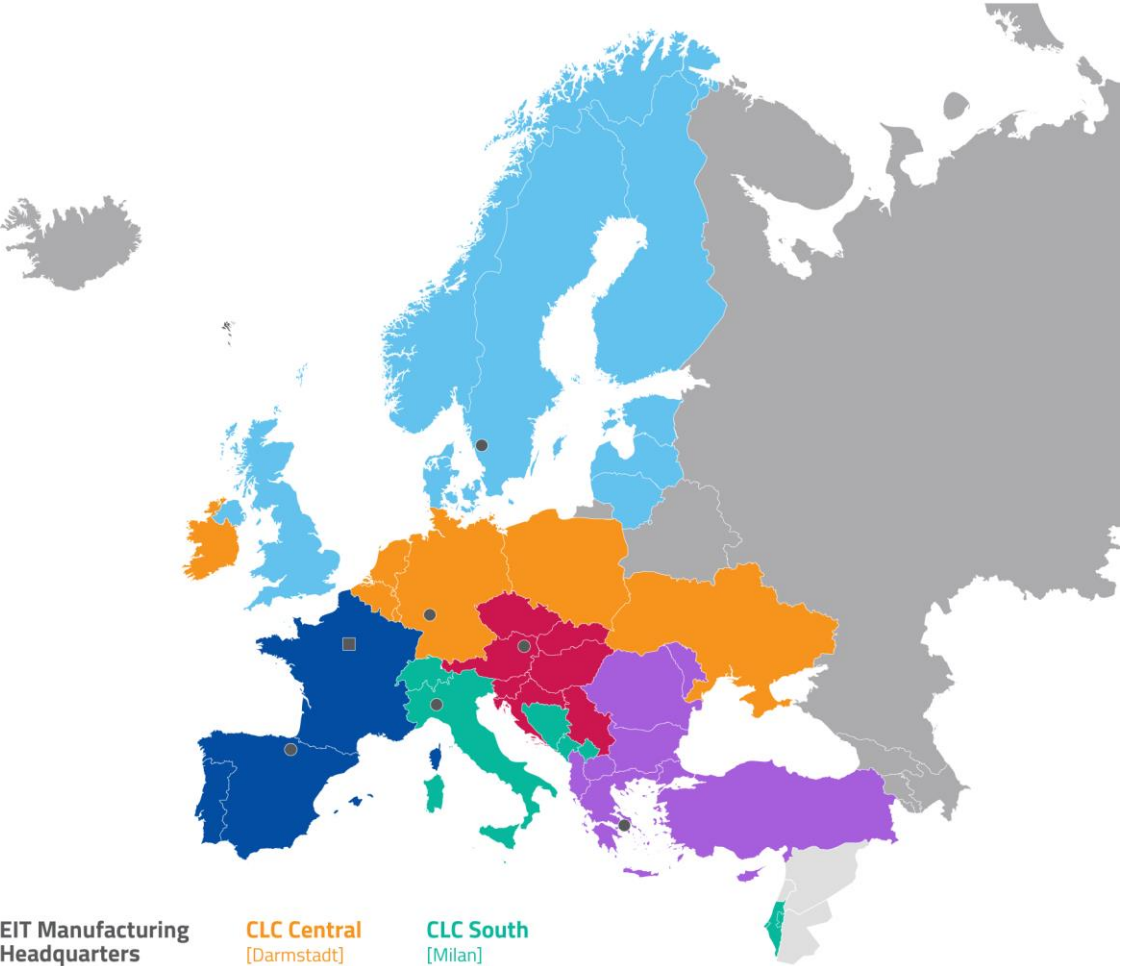**Global manufacturing innovation is led by Europe**

Locations: Linking key manufacturing & innovation hubs

Legal Entity   **France**

Headquarters   **Paris**

6 Co-location Centers (CLCs)

- ● **San Sebastian** Spain
- ● **Gothenburg** Sweden
- ● **Darmstadt** Germany
- ● **Milan** Italy
- ● **Vienna** Austria
- ● **Athens** Greece

EIT Manufacturing Headquarters
Paris

CLC Central
[Darmstadt]

CLC South
[Milan]

CLC West
[San Sebastian]

CLC North
[Gothenburg]

CLC East
[Vienna]

CLC South-East
[Athens]

*In addition, dynamically growing number of **RIS** hubs*

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Powerful partnership: 80+ partners from 18 countries

As of March 2022

EIT Manufacturing – How We Do It

Our flagships – Four focus areas

Flexible production systems for competitive manufacturing

Low environmental footprint systems & circular economy for green manufacturing

Digital & collaborative solutions for innovative manufacturing ecosystems

Human-machine co-working for socially sustainable manufacturing

Our Approach

Innovation

RIS

Education

Business Creation

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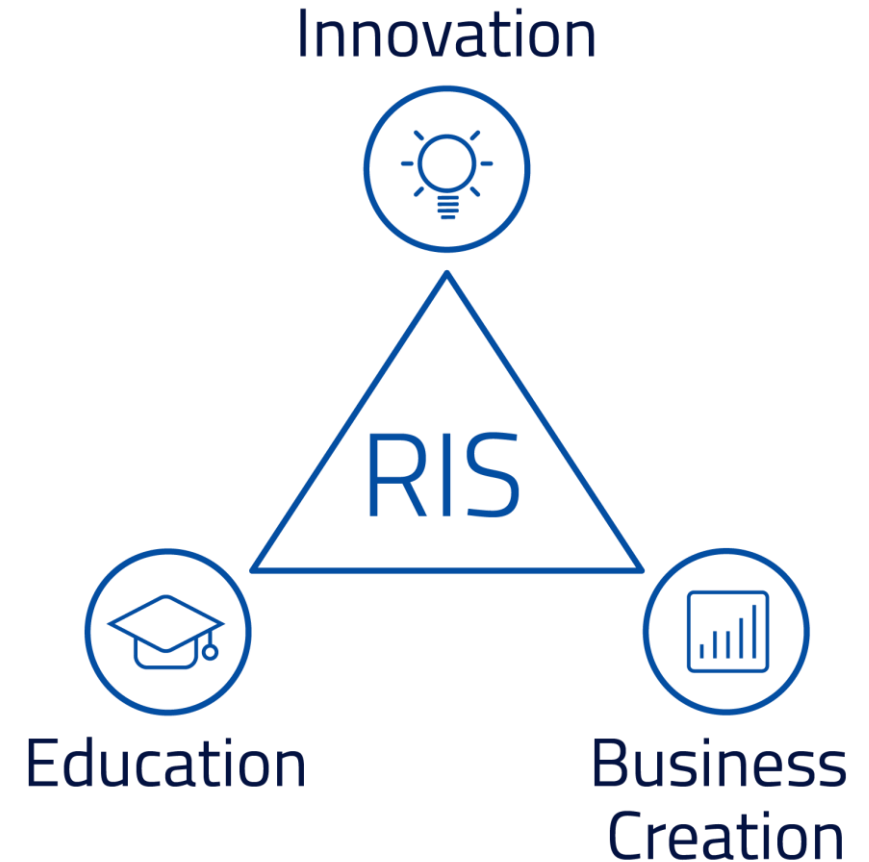
EIT Manufacturing funded projects on AI, Big Data and Robotics for CO_2 reduction

Low environmental footprint systems & circular economy for green manufacturing

- Waste-free Manufacturing through digital support and AI
- Automation of Visual Inspection and Finishing Processes for Aero-engines
- End-to-end digitalized production test beds
- Air purification unit for manufacturing environment
- Smart Measurement Assisted Assembly Lines for large-scale structures
- Digital Twin towards zero-defects manufacturing (ZDM) and circular economy
- Zero-defect welding for e-mobility
- Sensor integrated high speed machining for Zero-Defects
- Edge intelligence for condition monitoring and status visibility of assets in harsh industrial environments.
- FactoryBricks: Smart Learning @Home for the Management of Connected Factories
- Simulation Enhanced/Enabled Nuggets for Learning and Mastering Manufacturing for Light weighting
- Learning Factories for Digital Transformation of SMEs

Green APS - Green Advanced Planning & Scheduling

CHALLENGE: Manufacturing processes consume more natural resources than ecologically bearable, and industrial companies often neglect it. How to optimize processes to produce more with less energy?

SOLUTION: Integration of AI-supported Energy Management Systems integrated to an Advanced Planning and Scheduling (APS) solutions that analyzes energy offer, demand, and consumption variables

BENEFITS:

- Reducing energy consumption and carbon footprint of energy intensive industries.
- Maximizing the use of renewable energy sources
- Reducing overall costs while contributing to a green economy

Pillar: Innovation

Leading organization: INESC TEC

Activity leader: INESC TEC, Softi9, RP Santini, Unimore, TVARIT and voestalpine

Flagship: Low Environmental Footprint Systems & Circular Economy for Green Manufacturing

01-Jan-22   31-Dec-22

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MASSI - Manufacturing Assessment for Sustainability Strategic Insights

CHALLENGE: companies are struggling to understand which actions and initiatives should be prioritized and which are the plants or the production processes that will benefit more from a sustainability initiative

SOLUTION: The solution leverages a digital platform to evaluate the sustainability performance of plants and to understand how and where it is convenient to apply the sustainability efforts. The collected data will be mapped on a "maturity model" that will be explored through the digital platform, allowing plants to have evidences and actionable results that allows to make data-driven decisions regarding sustainability journey and to monitor the adopted initiatives.

Pillar: Innovation

Leading organization: Cefriel

Project Partners: Cefriel, Supsi, MC Sonae, Sonae Arauco, DANA

Flagship: Low Environmental Footprint Systems & Circular Economy for Green Manufacturing

01-Jan-22   31-Dec-22

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Battery recycling automation

EIT Manufacturing-funded Innovation project

- Aim to design flexible solution for automatic disassembling of battery packs

- Contributes to enhanced industrialisation of recycling and sustainability of the battery value chain

- Saves operators from the hazards connected with manual operations on battery packs
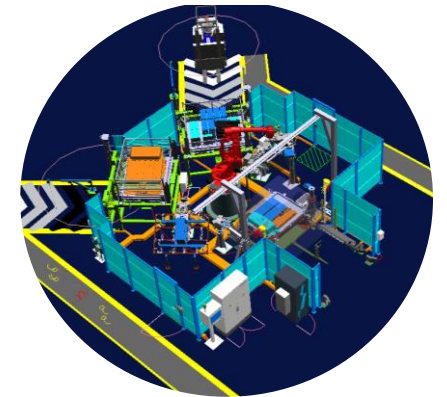
" *Thanks to EIT, we have industrialized and commercialized an innovative and flexible solution that disassembles batteries from different manufacturers, powered by artificial intelligence and meta-languages*

EIT Manufacturing supported initiatives in 2023

CoboSort

Development of ML models and robot grippers, as well as their integration within a reliable and inclusive collaborative robotic induction system that enable sorting of full/partially/not packaged pieces of clothes.

DPGSM

Designing off-site manufacturing using patented BIM process innovation and applying AI to optimise the planning process.

Technical Enablers for Green Manufacturing across sectors

Technology	Benefit
Artificial intelligence (AI)	- Intelligence can help monitor current emissions, forecast future emissions and also identify further opportunities to reduce emissions across the value chain.
Augmented Reality (AR)	- Real-time knowledge and information sharing to improve decision-making and work procedures -Predictive maintenance
Digital twins	- To predict product life and condition, - To improve design,
Internet of Things (IoT)	-Better monitor emissions while also enabling optimal energy consumption.
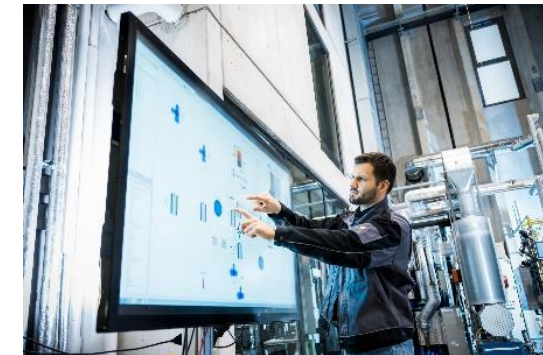
Technical Enablers for Green Manufacturing across sectors

Technology	Benefit
Blockchain	-helps measure emissions at every stage of a product's lifecycle as well as monitor emissions along the value chain. It also helps maintain a transparent record of GHG emissions.
Automatic digital Visual systems	- Quality control systems
Smart sensors	- Real-time data to improve monitoring. - Predictive maintenance - Emissions control - Improve traceability of raw materials and products
Test beds	-Mirror real-life manufacturing sites bring the challenges of process digitisation to live, by making processes tangible and accessible.
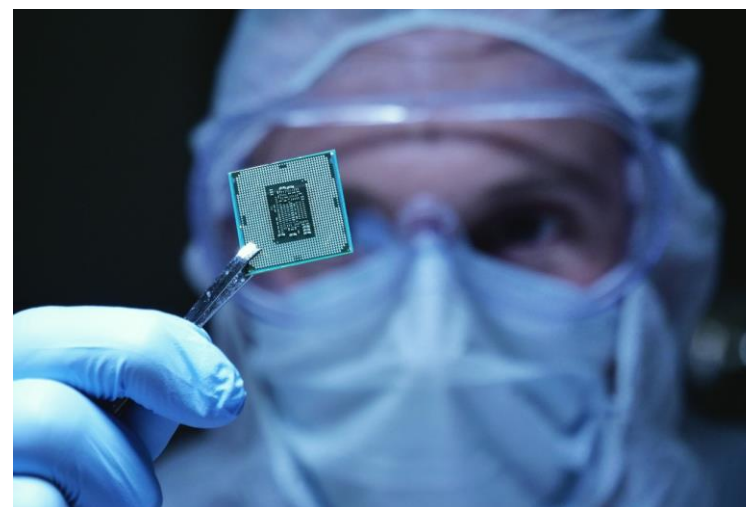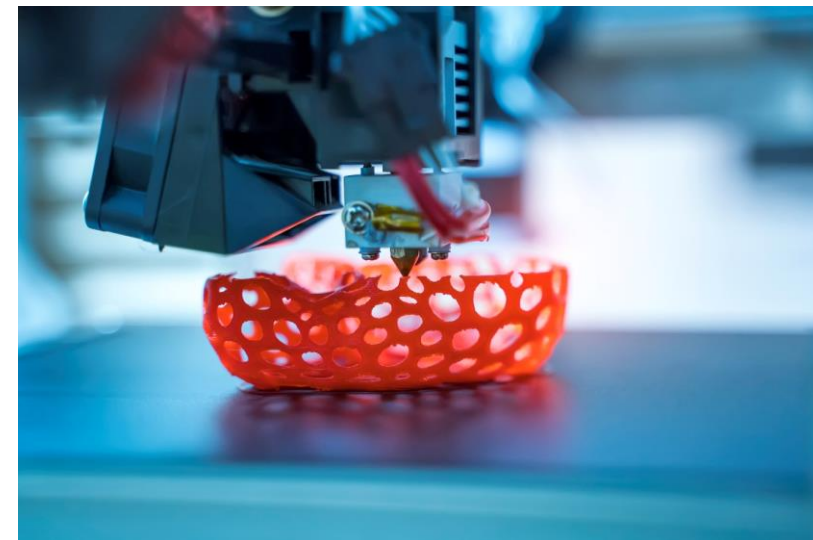
Driving the sustainability agenda forward

- **Environmental and social aspects** key to a more sustainable manufacturing industry

  - *'Fixing our Future',* developed with the community, offers a compelling vision, together with stories and debates to foster thinking

  - Increasing focus on environmental and human impact of EITM-supported Innovation activities

- **Financial sustainability** key to the competitiveness of the sector

  - Core criteria in call for proposals process

Fixing Our Future.

A vision for the future of Manufacturing in Europe 2030.

Find out more

You can join AGORA and the **Green & Circular** sphere

The social network and open innovation platform
for the pan-European manufacturing community

- **Bring together like-minded professionals** passionate about green and circular manufacturing

- **Help make sense and raise the bar on sustainability discussion and action** in the European industry

- **Drive a more competitive and sustainable manufacturing sector**