

Safe-and-Sustainable-by-Design Chemicals and Materials

Networking Session
organised by



Philippe JACQUES - EMIRI

17 June 2024

Setting the scene

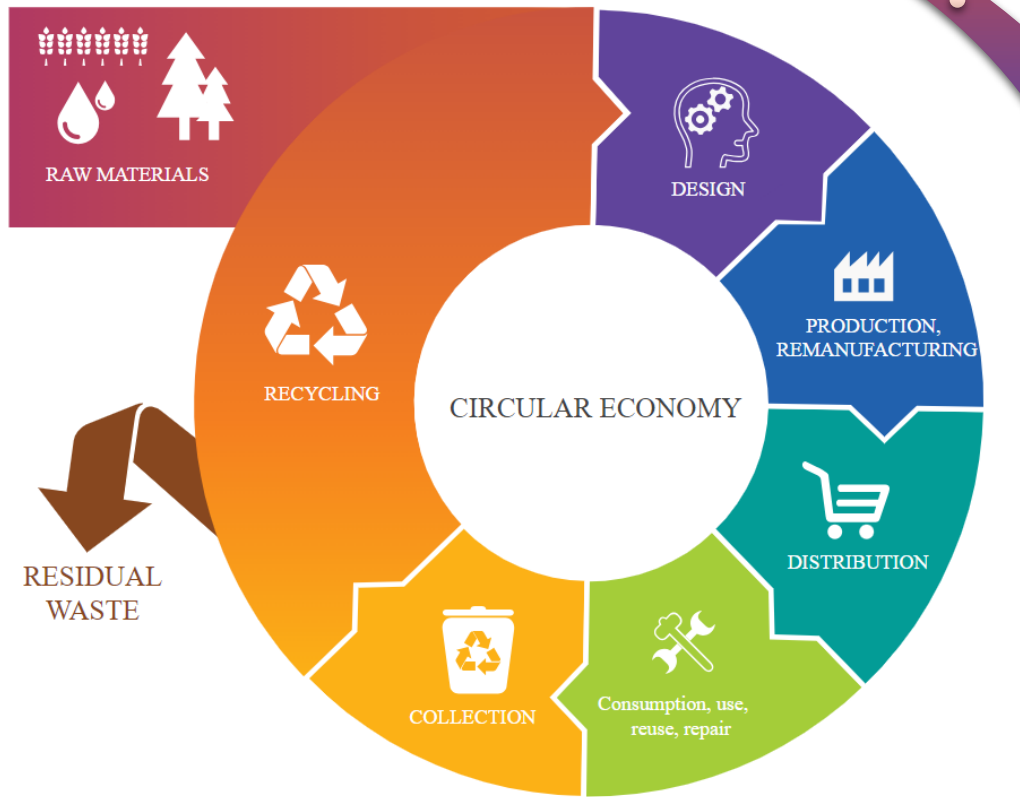
Advanced Materials in Circular Value Chains

Raw materials

Advanced materials *

Components, parts,
articles,...

Products, Devices,...



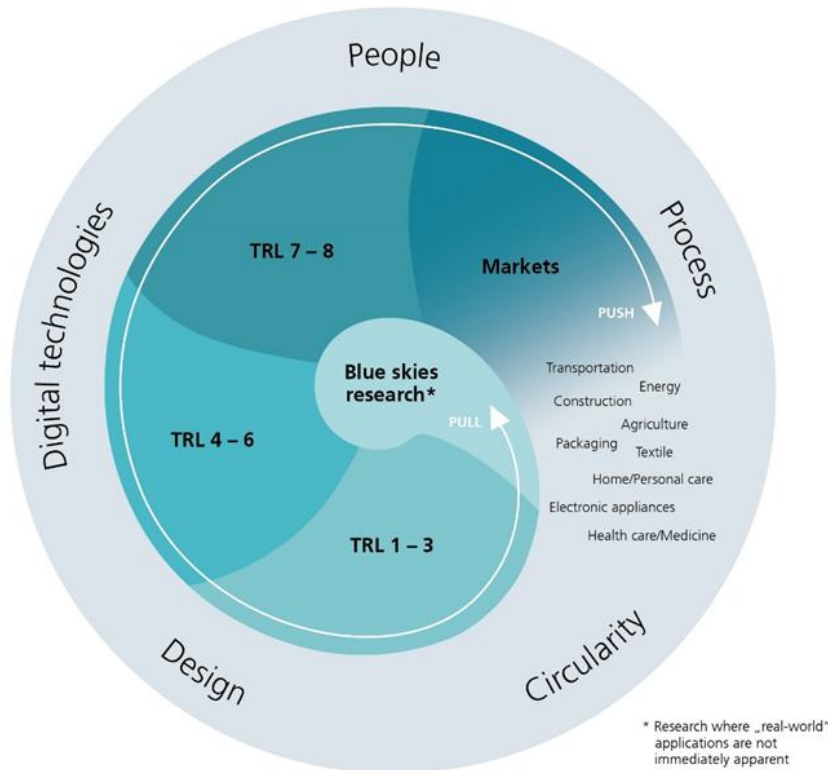
Advanced materials are fundamental for EU's Twin Transition, resilience and competitiveness

- ✓ CRM substitution
- ✓ Resource-efficiency
- ✓ Minimal environmental impact
- ✓ Safe and sustainable
- ✓ Circularity

* *Materials intentionally designed and engineered to have new or enhanced properties with the objective to offer superior performances or special functional attributes to a product*

The Materials 2030 Manifesto – Feb. 2022

A call for new forms of inclusive cooperation across the entire value chain to overcome the current fragmentation of Europe's R&D



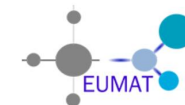
Europe must support the evolution of materials research

- Uniting Digital and Material capacities and competences
- Combining technology push and market pull
- United EU

“A systemic approach is needed to develop the next generation solution-oriented advanced materials which will offer faster, scalable and efficient responses to the challenges and thus turn them into opportunities for Europe's society, economy and environment today and in the future”

2 years later...

- 450+ organisations involved
- ~ 700 contributing experts



Advanced Materials for Industrial Leadership

The EC Strategy for a EU AM Ecosystem

- Overall objective is “to create a dynamic, secure and inclusive ecosystem for advanced materials in Europe that both ensures leadership in research and fast-tracks innovations to the single market.”
- To achieve this:
 - EU, national and regional priorities on research and innovation for advanced materials must be coordinated in a European approach and private investments substantially increased;
 - innovators and small and medium-sized companies must be supported to design and test materials with superior performance and properties for circularity and sustainability;
 - the larger-scale and more rapid deployment of advanced materials must act as market catalysts for the twin transition and increase EU resilience and economic security.

“...starting with energy, mobility, construction and electronics as preliminary priorities to be extended regularly to other areas depending on common needs identified.”



ACTIONS FOR A EUROPEAN ADVANCED MATERIALS ECOSYSTEM

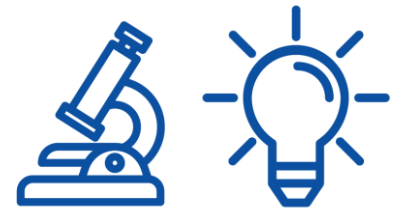


MORE INFORMATION:

[Advanced Materials for Industrial Leadership](#)

[EU funded research results in advanced materials](#)

R&I as a launch pad for future needs



1. Common R&I objectives and priorities: co-created with Member States*



*see **Annex** to Communication Advanced Materials for Industrial Leadership for **preliminary list of R&I priorities**

2. Four priority areas as a starting point in 2024 ⇒ updates foreseen in 2025 (health?)
3. Crosscutting characteristics: Circular economy, including Safe and Sustainable by Design
4. Ultimate goal: Aligning European and national research programmes according to “needs for advanced materials”

Advanced Materials for Industrial Leadership

The EC Strategy for a EU AM Ecosystem

R&I as a launch pad for future needs



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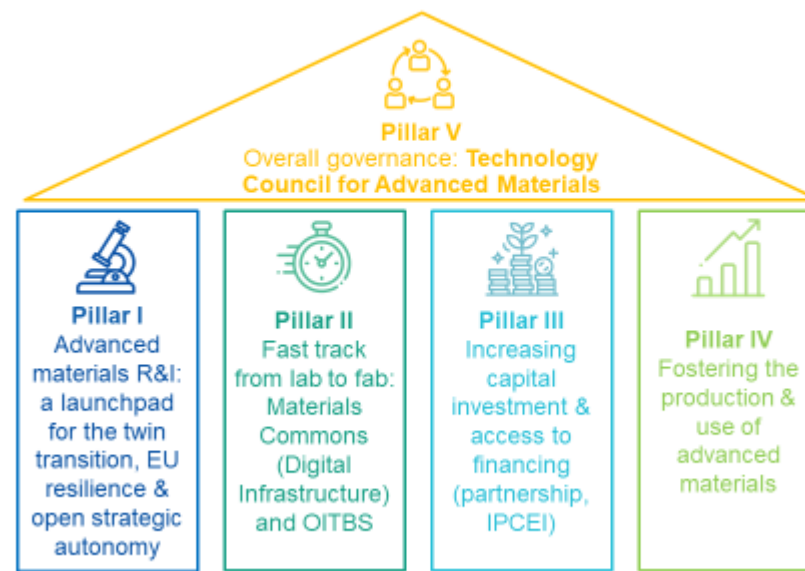


*see Annex to Communication Advanced Materials for Industrial Leadership for preliminary list of R&I priorities

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5 Pillars - 14 actions



The actions (2): Lab to Fab

- Material Commons
 - European Digital Infrastructure, possibly in the form of a European Digital Infrastructure Consortium
 - Building on national initiatives, such as Diadem (France) and MaterialDigital (Germany)
- Access to Technology Infrastructures
 - Single-entry catalogue, with relevance across industry, particularly for SMEs
 - Currently, 28 available test beds, with a funding of EUR ~319 Million
 - Funding possibilities for further technology infrastructures

8

The actions (3): Capital investment & Finance

- Horizon Europe partnership «Innovative Materials for EU »
 - Public-private, co-programmed, at least EUR 500 Million (2025-2027)
- European Forum for Important Projects of Common European Interest
- European Innovation Council
 - > EUR 130 Million (2024), including nanomaterials, solar-to-x, quantum components
- European funding instruments
 - Innovation Fund
 - STEP
 - Invest-EU
 - Global Gateway

8



**The upcoming co-programmed Partnership
under Horizon Europe**

**“Innovative Advanced Materials for
Europe”
(IAM4EU)**

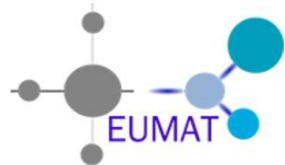
June 2024

“Innovative Advanced Materials for Europe”

Building on the experience of...



The Energy Materials Industrial Research Initiative



The European Technology Platform for Advanced Materials and Technologies



An EU flagship R&I initiative



The European Technology Platform for manufacturing technologies



The European Technology Platform for Sustainable Chemistry

Advanced Materials – what is covered?

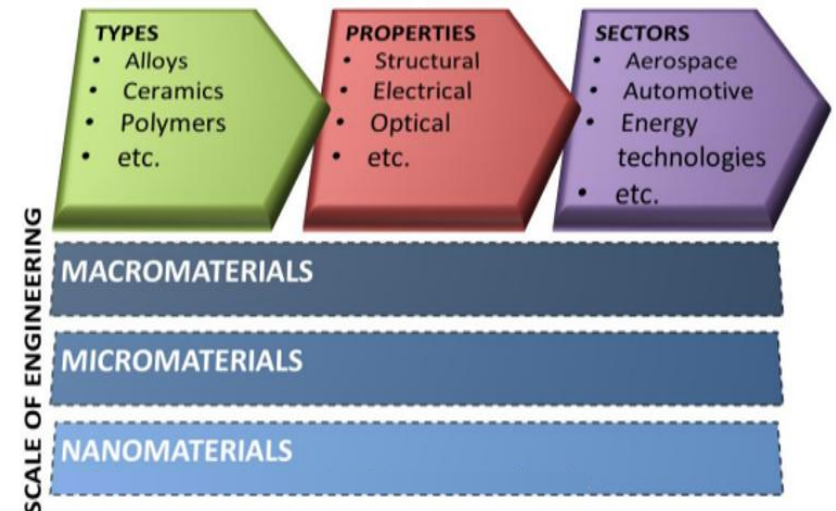
- **Intentionally designed** and engineered materials¹ to have:
 - **new or enhanced properties**, and/or
 - **targeted or enhanced structural features**to achieve specific or improved **functional performance**.
- Advanced materials include both:
 - **new emerging** materials from innovative manufacturing processes (high tech materials) and
 - materials that are **manufactured from traditional** materials (low tech materials).

2

¹Source: [https://one.oecd.org/document/ENV/CBC/MONO\(2022\)29/en/pdf](https://one.oecd.org/document/ENV/CBC/MONO(2022)29/en/pdf)



“**Innovative**” emphasizes the commercial potential of these materials / refers to innovative ways to use classical materials in new applications



Problem Statement & Ambition

Main challenges, failures, gaps,...



The need for advanced materials addressing ever **more stringent requirements at an ever faster pace**



A **fragmented landscape** of stakeholders, competences, resources and initiatives



Lack of resilience and sustainability of the industrial value chains relying on materials

A multi-sectorial accelerator for the design, development and uptake of safe and sustainable advanced materials towards a circular economy

Objectives and Expected Impacts

*Aligning with Horizon Europe Strategic Plan for 2025-27
Contributing to implementing EC Policy on Advanced Materials for Industrial*

OBJECTIVES

EXPECTED IMPACTS

GENERAL

EU leadership in advanced materials innovation and **industrial competitiveness** in strategic markets

Twin Green and digital Transitions
Competitive & sovereign EU

SPECIFIC



IAMs and associated technologies



Cross-enabling tools & methodologies



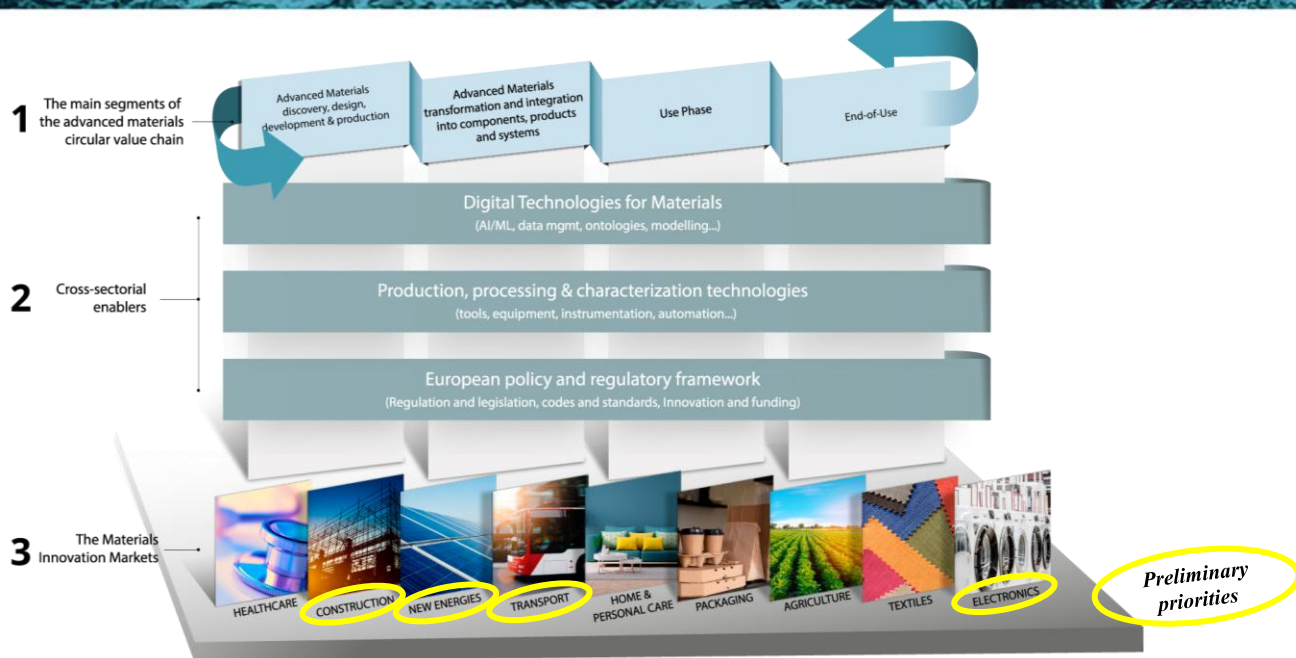
Ecosystem enablers and synergies

Resilient & circular industrial value chains, from IAM design to end-of-life

High-level capabilities

A robust comprehensive innovation cycle, from low to high TRL

IAM4EU Guiding Principles



- ❑ IAM4EU will cover all the segments of the industrial value chains, relying on SSbD materials towards circularity
- ❑ IAM4EU will support and accelerate the IAMs innovation cycle from basic research to market uptake (leveraging on infrastructures, business services,...)

- ❑ IAM4EU will recognize the key enabling role of all types of IAMs.
- ❑ As a co-programmed partnership with industry, IAM4EU will ensure that research investments meet industrial needs and boost uptake into marketable products.

Building synergies with other partnerships

Contacts with Process4Planet / Made in Europe / EIT Raw materials / ERA-MIN / Raw Materials partnership proposal / European Metrology (EURAMET) / PARC / Photonics21 / AI Data Robotics / KDT / Chips JU / BATT4EU / Clean Hydrogen / B4P / 2Zero / Clean Aviation / Circular bio-based Europe / EOSC

Joint Interest (examples)

- with MiE and P4P on energy & resource efficiency; end of use & recycling and the setting up of a federated digital framework covering the life cycle of materials
- with EIT Raw Materials and RM partnership proposal to articulating research priorities with industrial needs, address new skills and upskilling and the networking of cross-border infrastructures in the field of materials (in general) and critical/strategic raw materials

Heatmap of joint interest of partnership across IAM4EU R&I priorities (SRIA)

	RM	EIT RM	Chips JU	2Zero	Clean Aviation	CBE JU	BATT4EU	PARC	EOSC	MiE	CLEAN H2	B4P	P4P	EURAMET	Photonics	AIDR
1.1 Eco-design, harnessing the full potential of Innovative Advanced Materials in their design, production and processing	#	1	0	2	3	3	3	3	3	1	3	3	2	2	2	2
1.2 Innovative Advanced Materials with cutting-edge functionalities â pushing the frontiers on materialsâ performance	#	1	0	2	3	3	2	3	3	0	3	3	2	1	3	3
1.3 Reducing CRIMs dependencies through Innovative Advanced Materials	#	3	3	2	3	3	1	3	2	0	3	3	1	1	2	2
1.4 Innovative Advanced Materials with minimized resource usage throughout their lifecycle	#	2	0	2	3	3	2	1	3	0	3	3	2	3	1	2
1.5 Innovative Advanced Materials purposed for secondary use	#	0	0	1	3	2	1	1	3	0	3	2	2	2	1	1
1.6 Innovative Advanced Materials sourced from sustainable and renewable resources	#	0	3	2	3	3	3	1	3	0	3	3	3	2	1	3
1.7 Innovative Advanced Materials transformation by Generative Design (GD) and 3D printing (3DP)	#	0	0	0	1	3	1	0	3	0	3	2	2	0	2	3
1.8 Innovative Advanced Materials for (mass) customization of products and components	#	2	1	0	1	0	3	2	2	1	0	3	2	1	2	3
2.1 Enhancing component and product longevity	#	2	0	2	3	3	2	2	3	0	2	3	3	0	2	3
2.2 Smart components & productsâ maintenance and repair strategies	#	0	0	2	3	3	1	0	3	0	2	2	1	2	3	3
2.3 Recovery technologies (including for multi-materials), to reclaim valuable materials from end-of-life components & p	#	2	0	3	3	3	2	3	3	0	2	3	3	3	1	2
2.4 Innovative Advanced Materials recycling technologies for second use	#	3	1	2	3	2	3	1	3	0	2	3	2	3	1	1
3.1 Establish an integrated, trusted, federated digital framework covering all the materials lifecycle	#	3	1	0	1	2	3	2	3	2	3	1	3	3	3	2
3.2 Model driven SSbD and LCA materials development tools	#	0	0	2	0	3	3	3	3	1	2	3	3	2	2	3
3.3 Digitalization of materials performance management systems	#	0	0	2	3	3	1	3	3	1	2	2	3	1	3	3
3.4 Innovative Advanced materials identification and traceability connecting Digital Materials and Product Passports	#	1	3	1	3	3	3	3	3	0	2	2	3	2	3	1
4.1 Life Cycle Analysis (LCA) data for informed materials design	#	1	2	3	3	3	3	2	3	2	1	3	2	2	2	3
4.2 Multi-physics, multi-scales modeling and characterization to accelerate materials design	#	0	0	2	1	3	1	3	3	0	1	3	1	1	3	2
4.3 Digital methods enhancing characterization and testing	#	1	0	3	1	3	2	3	3	0	1	3	3	0	3	3
4.4 Materials knowledge systems and models	#	1	0	2	1	3	1	2	3	0	1	3	2	2	3	2
5.1 SSbD as an Integrated Part of Innovative Advanced Materials Development	#	1	0	3	0	3	3	1	3	0	1	3	2	3	2	3
5.2 Harmonized Testing Guidelines That Address the Specifics of Innovative Advanced Materials	#	0	0	2	0	3	3	1	3	1	1	3	3	0	3	2
5.3 Regulations Keeping Pace with Innovation	#	3	0	3	0	3	3	3	3	0	1	1	1	1	3	1
6.1 Articulating research priorities with industrial needs	#	3	3	3	3	3	3	3	2	1	1	3	2	1	2	1
6.2 Contributing to new skills and upskilling	#	3	3	3	3	3	2	3	2	1	3	2	1	2	2	2
7.1 Networking of cross-border infrastructures	#	3	3	2	0	3	3	2	3	3	1	3	2	0	3	2
7.2 Digital infrastructures, including decentralized, federated materials data spaces	#	1	0	1	0	3	1	3	3	3	1	2	2	2	3	2
7.3 Technology infrastructures (OITBs, MAPs,...)	#	2	0	0	0	3	2	3	3	0	1	3	3	0	3	1
7.4 Portfolio of R&I and Business development services	#	2	2	2	1	2	1	1	3	0	1	1	3	1	2	1
8.1 Advanced Materials end-of-use strategies and circular business models	#	2	3	2	3	3	2	3	0	1	3	2	3	1	1	1
8.2 Building up synergies and cross-exploitation of Innovative Advanced Materials across strategic markets	#	0	0	1	1	2	3	1	3	0	1	3	1	1	1	2
8.3 Feedstock marketplace for Innovative Advanced Materials	#	18	1	2	1	0	3	3	0	3	0	1	1	1	1	0

Operational objectives

Implementing IAM-I key activities towards achieving General & Specific objectives of the IAM4EU partnership

1. **Federate stakeholders** and R&I communities across advanced materials along industrial value chains
2. Develop and maintain a **comprehensive up-to-date SRIA**
3. Facilitate operationalization and implementation of an **harmonized SSbD approach**
4. **Accelerate** the design, development and integration of **Safe & Sustainable IAMs**
5. Promote IAMs enabling new **circular business models**
6. Foster **fast and broad uptake of IAMs** and associated technologies by industry, with a particular focus on **supporting SMEs**
7. Foster links and/or **collaboration** opportunities
8. Contribute to **capabilities building** in the EU
9. Effective **communication** and widespread **dissemination**

OBJECTIVES

GENERAL

EU leadership in advanced materials innovation and **industrial competitiveness** in strategic markets

SPECIFIC



IAMs and associated technologies



Cross-enabling tools & methodologies



Ecosystem enablers and synergies

Areas of Intervention (Aols) developed in the SRIA

3 Areas of intervention

8 R&I Areas

I – IAMs AND ASSOCIATED TECHNOLOGIES TOWARDS RESILIENT & CIRCULAR INDUSTRIAL VALUE CHAINS

1. Enabling and enhancing resilience and circularity by IAMs
2. Breakthrough products through cutting-edge IAMs

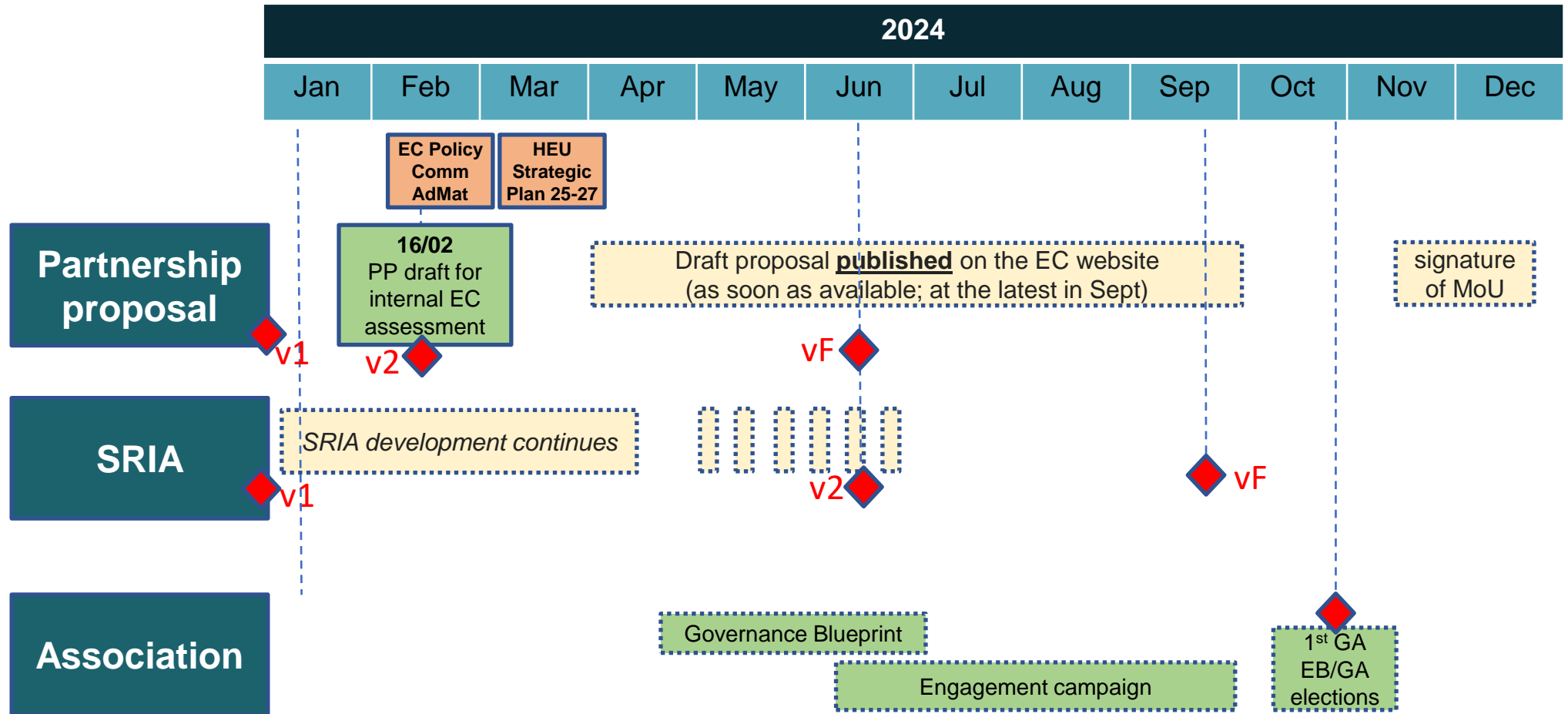
II - HIGH-LEVEL CAPABILITIES THROUGH CROSS-ENABLING TOOLS & METHODOLOGIES ALONG INDUSTRIAL VALUE CHAINS

3. Materials modelling, characterisation and testing (*generating data*)
4. Materials knowledge through digitalization (*managing/exploiting data*)

III - ECOSYSTEM ENABLERS AND SYNERGIES FOR A ROBUST COMPREHENSIVE INNOVATION CYCLE

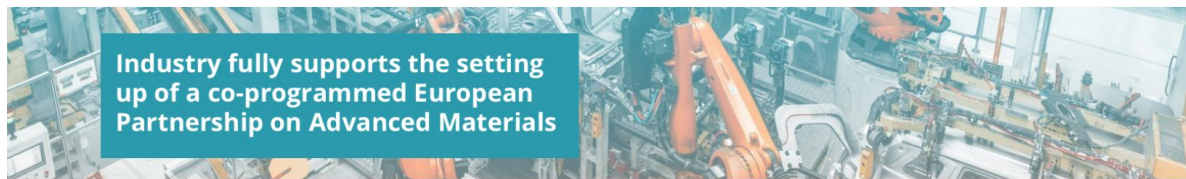
5. Fostering the maturing of IAMs low-TRL research to meet applications needs
6. Accelerating industrial take-up in key application areas, including leveraging technology infrastructures
7. Supporting European policy and regulatory framework

NEXT STEPS



Be prepared to join IAM-I The Innovative Advanced Materials Initiative

An open, inclusive and interdisciplinary association gathering all interested stakeholders communities



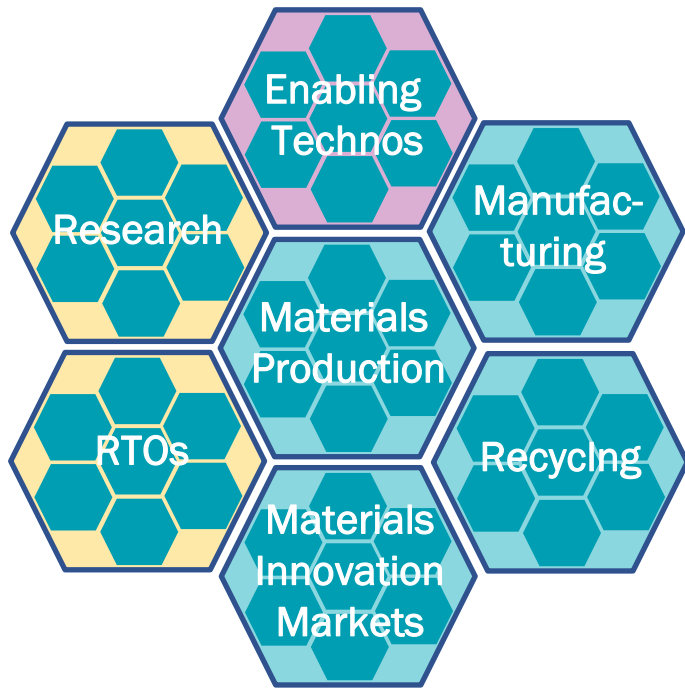
Any Question? Please contact us

info@ami2030.eu info@graphene-flagship.eu

“Innovative Advanced Materials for Europe”

A co-programmed partnership between the EC and a dedicated Association

Preliminary sketch of IAM-I, the private-side association to gather all relevant stakeholders



Open, Inclusive, inter-disciplinary, gathering all stakeholders communities

- **Along the Materials Value Chain**
 - Producers (all materials types)
 - Transformers / Integrators
 - MIMs
 - Recyclers
- **From supporting/enabling technos**
 - Digital
 - Equipment & tooling
 - Characterization & testing
 - ...
- **Along the Innovation Cycle**
 - Academic Research
 - RTOs
 - R & T Infrastructures
 - Industry (SMEs, Companies)

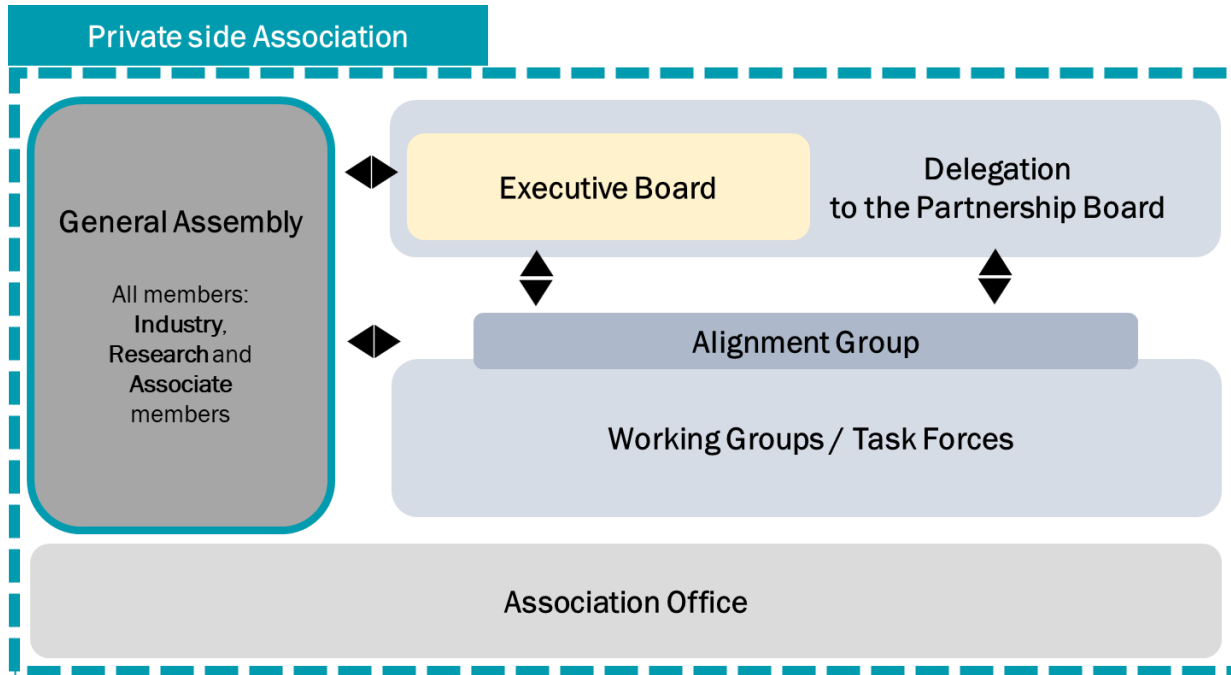
Transparent Governance

- **Full Members (voting rights)**
 - Companies
 - RTOs & universities
- **Associate Members**
 - Associations
 - NGOs
- **Governing Bodies**
 - Weighted representation from the different sectors
 - weighted voting system (75% industry / 25% research)
- **Financial contribution**
 - Per member category and size

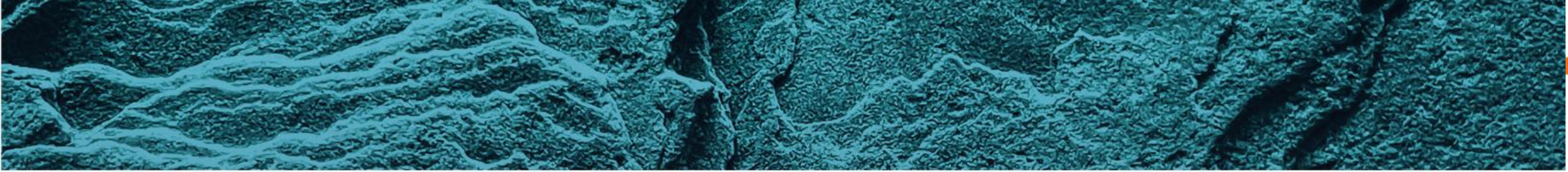
Target #	Industry	RTO / Academic	Associations
Q4 2024	60	60	15
2027	100	100	30

Be prepared to join IAM-I

The Innovative Advanced Materials Initiative



PROPOSED MEMBERSHIP CATEGORIES AND FEES 2024-2025		
Category	Criteria	Annual Fee ⁽¹⁾
Industry members		
Large	Headcount >5000 or turnover >€ 1.5 bn	10.000,00 €
Intermediate	Headcount <5000 and turnover < €1.5 bn	7.500,00 €
Medium-size SME ⁽²⁾	Headcount <250 and turnover < €50 mln	2.500,00 €
Small SME ⁽²⁾	Headcount <50 and turnover < €10 mln	1.250,00 €
Micro SME ⁽²⁾	Headcount <10 and turnover < €2 mln	750,00 €
Research members		
Large RTOs	Headcount > 3000	8.000,00 €
Intermediate RTOs	Headcount 1000-3000	6.000,00 €
Medium RTOs	Headcount 250-1000	3.000,00 €
Small RTOs and universities	Headcount < 250	1.500,00 €
Associate members		
Associations, NGOs and other stakeholders		1.000,00 €
+ one-off entry fee for new members (25% annual fee)		
<i>(1) 1/3 in 2024; then pro rata temporis from 2025 onwards</i>		
<i>(2) conforming to the SME definition of the European Commission</i>		



Questions?

Thank you