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# *“THE ROLE OF ADVANCED MATERIALS IN THE EUROPEAN LOW-CARBON TRANSITION”*

*EMIRI GENERAL ASSEMBLY  
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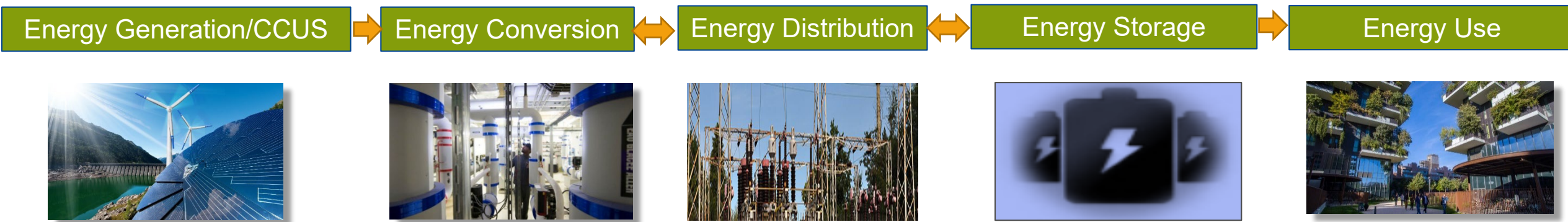
# Strategic context

- EU very ambitious targets to achieve climate neutrality by 2050, including intermediate (2030) targets (-55% GHG emissions)
- Challenge: achieve climate neutrality in an economically, environmentally and socially sustainable way:
  - ❖ Satisfying needs for energy – e.g. affordable (fair) and safe energy
  - ❖ fair balance between users and functioning of energy markets
  - ❖ creating more jobs / replacing obsolete ones
- While
  - ❖ ensuring strategic energy autonomy
  - ❖ securing /enhancing EU competitiveness in high value markets
  - ❖ reducing pressure on planet resources through sustainability by design and substitution of rare materials

# R&I has a strong role to play

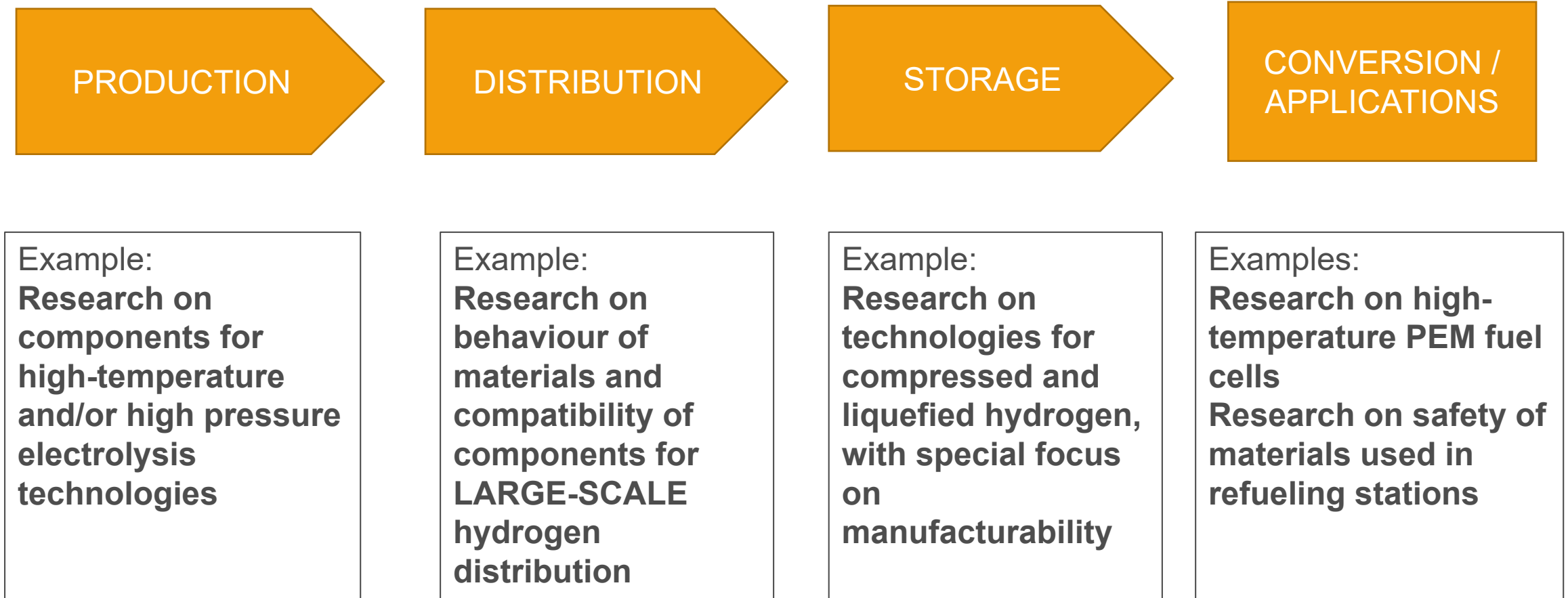
- Innovation from a competitive European industry has a key role in pursuing all these different goals simultaneously and in an efficient way
- The R&I Policy Framework need to fully leverage the potential of EU industry to accelerate the development of new technologies and processes in a way that industrial competitiveness and strategic autonomy are reinforced
- Half of the technologies needed for the transition to clean energy still need investments in R&I
- R&I policies and programmes need to be coordinated or aligned with industrial policies in a systemic approach
- EU policies and programmes should develop more synergies along the value chain, from basic research to deployment
- Institutional levels should better coordinate and work in synergy too

# Advanced Materials for Energy



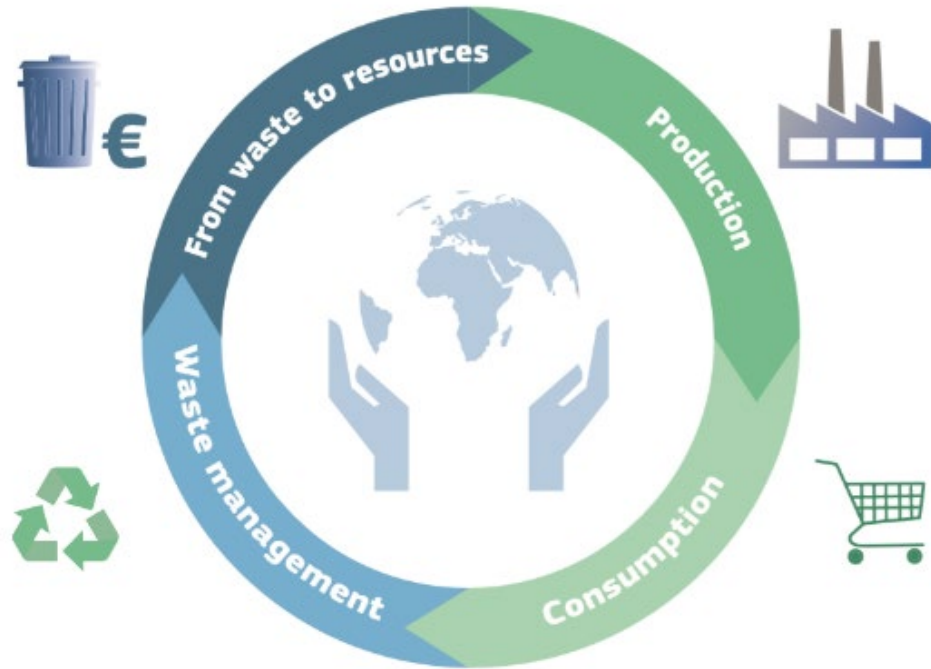
- Advanced materials are at the core of the clean energy transition, representing a significant share of capital costs of low-carbon energy technologies (>50%) and impacting performance.
- Advanced energy materials are essential elements in all dimensions of energy systems from energy generation to end uses
- Advanced Materials are critical enabling technologies, having a “ripple effect” throughout the whole economic system
- Several critical enabling technologies (artificial intelligence, big data, advanced computing, robotics) are needed for the production of the next generation of advanced materials

# Materials for Hydrogen Value Chain



***Research and Innovation actions on advanced materials are needed throughout the whole hydrogen value chain to enable large-scale deployment***

# Materials, Circularity and Sustainability



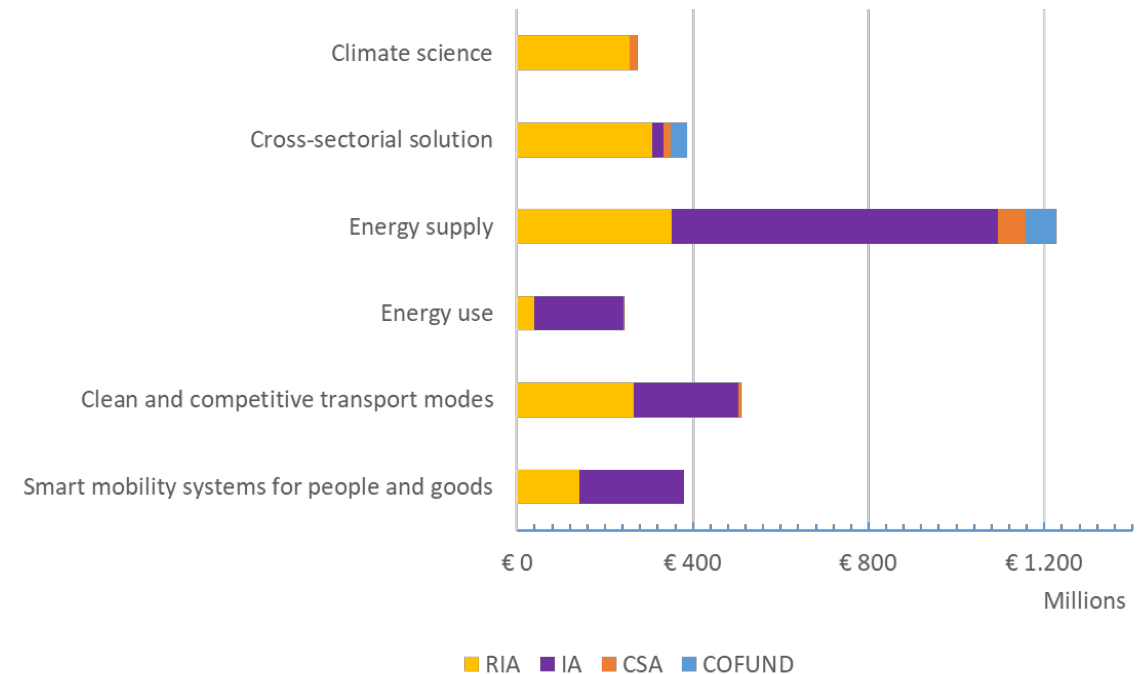
***Advanced Energy Materials are strategic enablers of Circularity and Sustainability***

# Horizon Europe Cluster 5 Energy, Climate and Mobility

## Work programme 2021-2022 overview

	Budget (Mio €)	Share of total	Number of topics	Share of total
Climate science	274.0	9%	17	9%
Cross-sectorial solution	387.5	13%	25	13%
Energy supply	1226.3	40%	67	36%
Energy use	244.0	8%	18	10%
Clean and competitive transport modes	511.0	17%	31	17%
Smart mobility systems for people and goods	380.0	13%	28	15%
<b>TOTAL</b>	<b>3022.8</b>		<b>186</b>	

EU contribution per Destination and type of action (2021-2022, in Mio EUR)



# R&I activities on developing energy materials

- Needed throughout the whole technology spectrum of energy systems (supply, conversion, storage, transmission and distribution, end uses, carbon capture)
- Should address multiple challenges :
  - ❖ Cross cutting the technology spectrum:
    - ❑ Increasing energy efficiency;
    - ❑ Decreasing costs;
    - ❑ Decreasing demand on critical raw materials;
    - ❑ Increasing recyclability of components and globally sustainable by design.
  - ❖ Specific to each technology: e.g. reduced charging time of batteries, developing efficient production processes, providing evidence for regulatory frame adjustment for hydrogen distribution and refuelling stations
- Significant presence of topics related to advanced materials for energy sector in WP 2021-22 of Cluster 5 (either with a specific focus on materials or with materials as one of the core elements)



# Energy Materials in Cluster 5 of Horizon Europe

- Examples of **topics with a specific focus on advanced energy materials**:
  - ❖ 2022-D2-01-02: Development of materials acceleration platform
  - ❖ 2021-D3-02-04: High-efficiency photovoltaic technologies
  - ❖ 2022-D3-01-02: Demonstration of innovative materials for wind
- Examples of **topics with energy materials as one of the elements**
  - ❖ 2021-D2-01-02: Advanced high-performance Generation 3b (high capacity / high voltage) Li-ion batteries supporting electro mobility and other applications (Batteries Partnership)
  - ❖ 2022-D3-01-11: Demonstration of innovative forms of storage and their successful operation and integration into innovative energy systems and grid architectures
  - ❖ 2021-D3-02-08: Electricity system reliability and resilience by design: High-Voltage, Direct Current (HVDC)-based systems and solutions
- In the new **Clean Hydrogen Joint Undertaking**: Commission requested that all relevant technology projects in the WP 2021/2022 will include a requirement on sustainability by design (life cycle)
- Cluster 5 calls on **renewable energy** will also include systematically requirement on sustainability by design when relevant

# From collaboration towards synergies

- Between EU programmes and between diverse components of EU programmes: Horizon Europe / InvestEU, interpartnership Assembly, Inter Pillar cooperation
- With EU Member States and supporting collaboration between Member States
  - From the SET Plan Roadmap on Materials (2011) towards the revision of the SET Plan and the revamped ERA approach
  - The new Clean Energy Transition Co-Funded partnership under Horizon Europe
- With industry
  - Relevant stakeholders - EMIRI Technology Roadmap (2019)
  - Development of the Alliances – linking better R&I and deployment (IPCEI, investment programmes)
- In the global frame:
  - second phase of Mission Innovation launched last June. Materials for energy activities have their space in the new Mission Innovation platform
  - CATALYST



# Thank you!

## # HorizonEU

<http://ec.europa.eu/horizon-europe>



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