



Advanced Materials & Nanotechnology for Energy

EMIRI – Energy Materials Industrial Research Initiative
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EMIRI Association works for the future of Advanced Materials for low carbon energy (LCE) in Europe



EMIRI is an Industry Community coming together ...



*
Founding / current members

Supported by Research & Technology Organizations



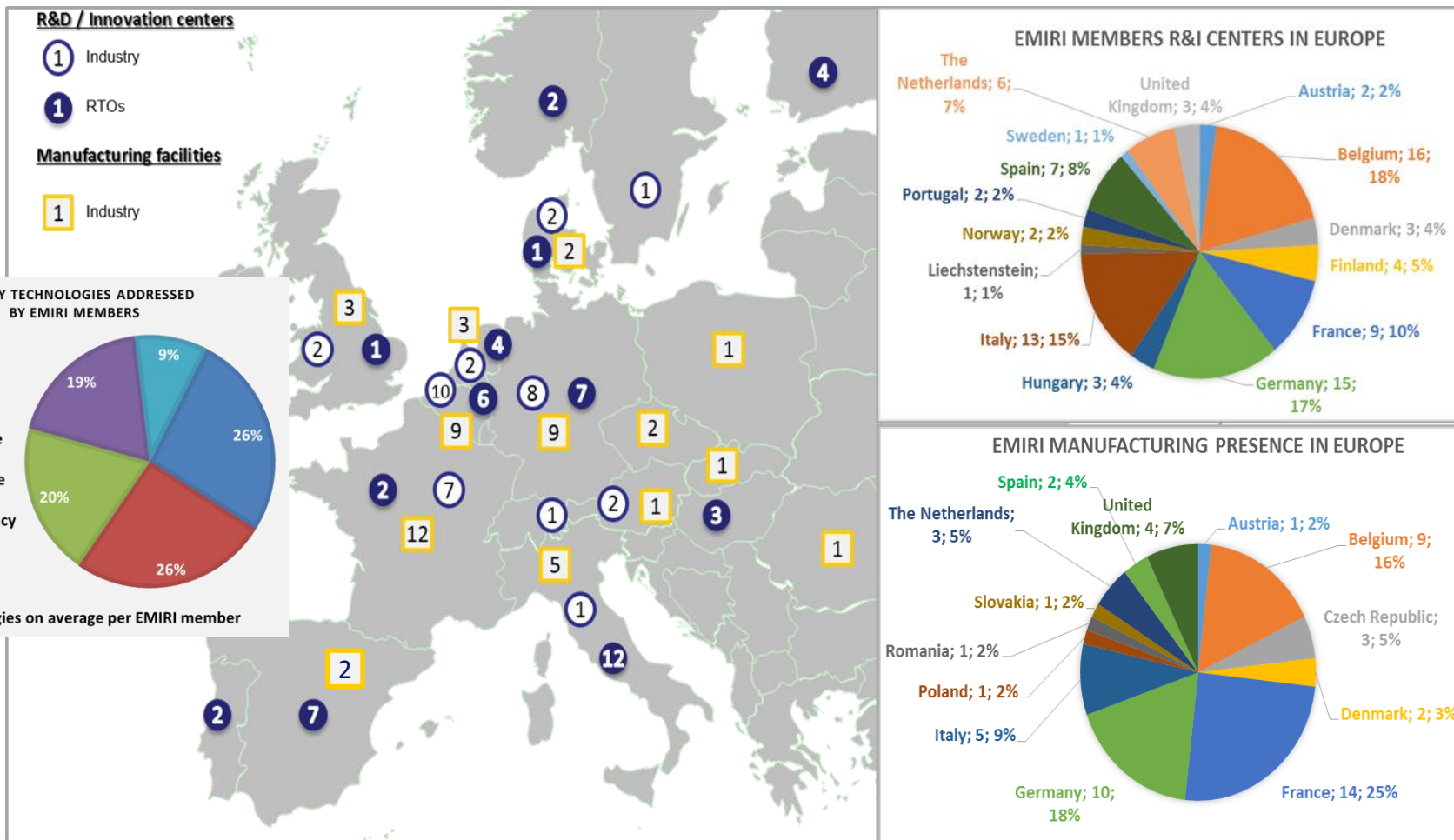
With key Associations bringing in their expertise



The EU sector of Adv. Mat. for LCE

	Revenues from operations in EU ~ 30 billion €	Manufacturing sites > 300	
	Direct jobs ~ 110.000 Direct & indirect jobs > 500.000	Researchers in industry ~ 5.000 researchers	
	R&D spending ~ 800 million €	Capital expenditures ~ 2 billion €	

Activities of EMIRI members span Innovation & Manufacturing of Advanced Materials over Europe

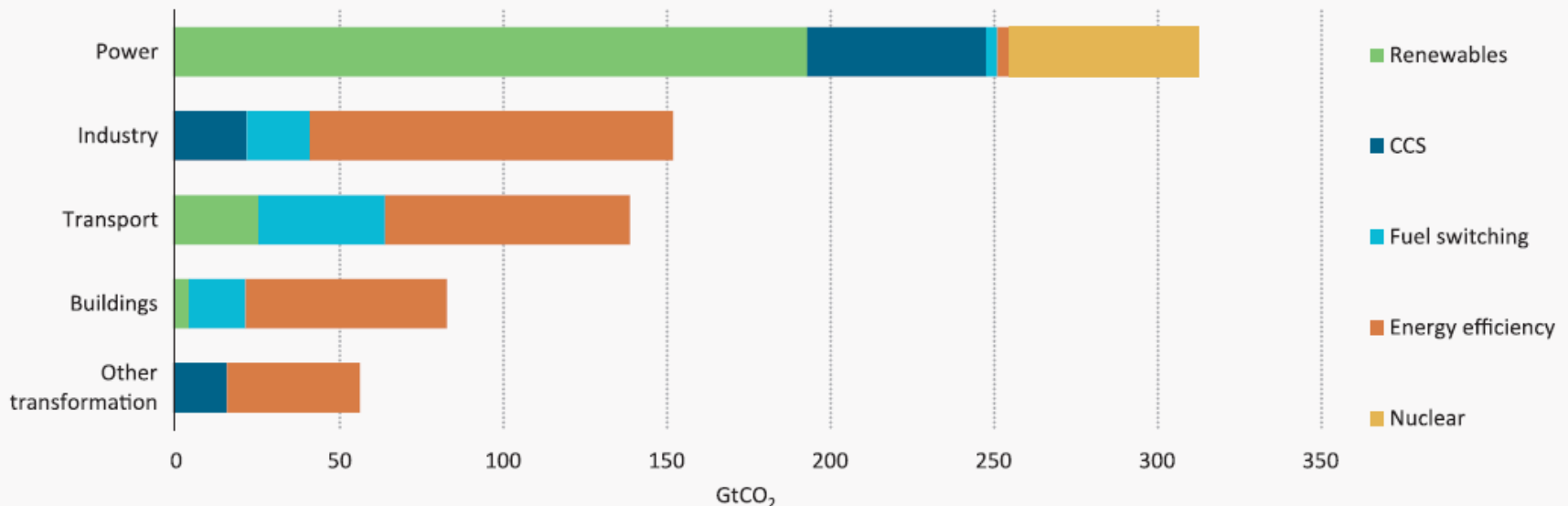


Presence in 19 EU countries, over 80 innovation centers, over 50 manufacturing sites

To reduce CO₂ emissions, the power sector will have to contribute more than others, mostly through renewables

Figure I.1

Cumulative CO₂ reductions by sector and technology in the 2DS to 2050

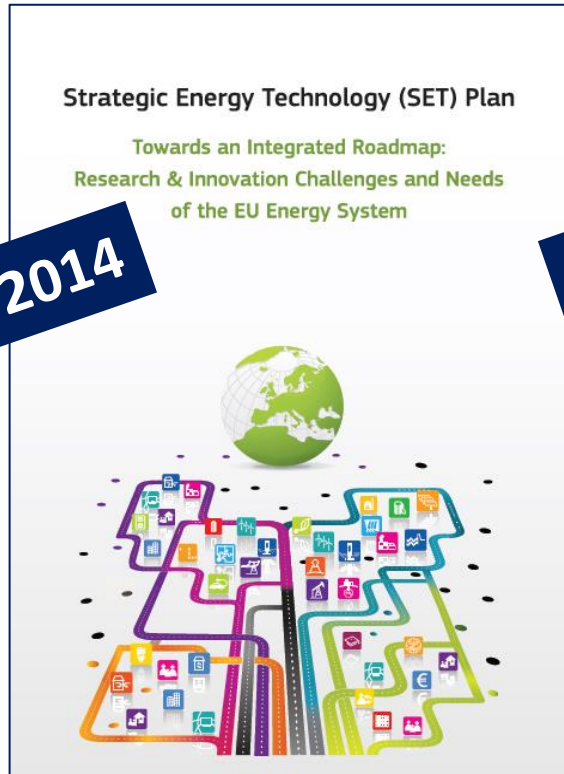


Key point

A portfolio of low-carbon technologies is needed to reach the 2DS; some solutions will be broadly applicable, while others will need to target specific sectors.

Source: International Energy Agency 2015

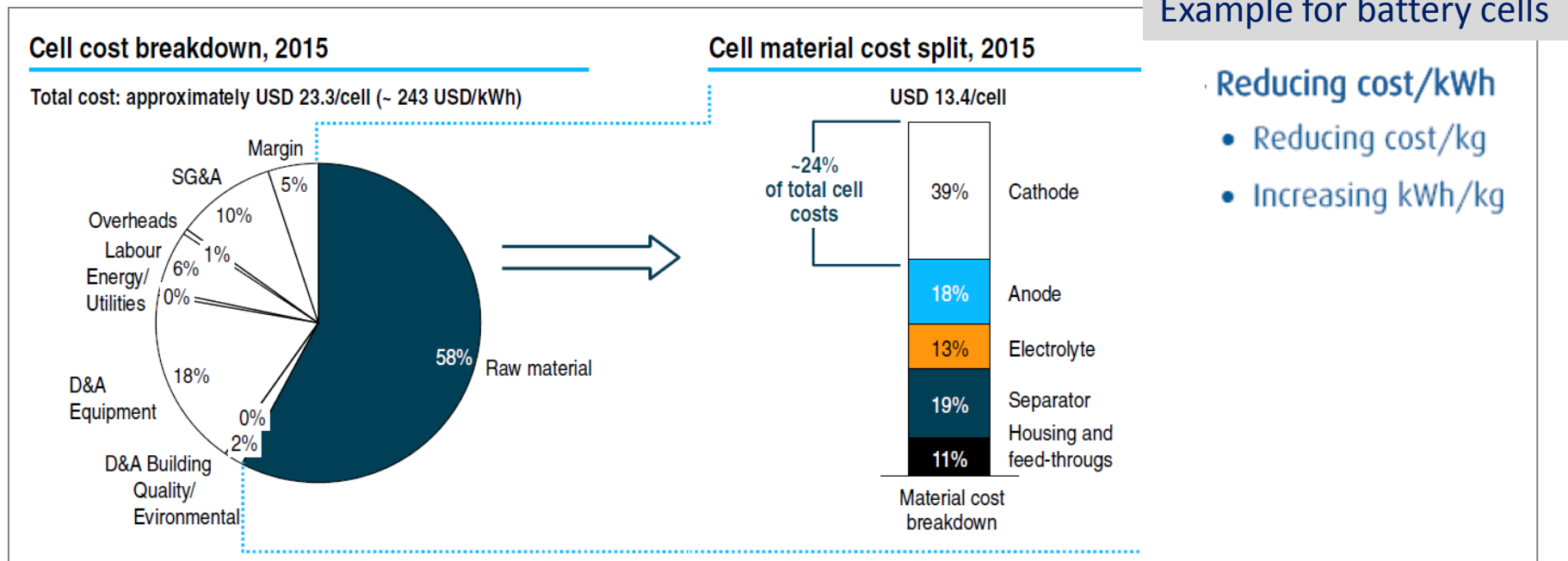
EU's Energy Union paves the way for a clearer, more business-friendly, more market-oriented and innovation-driven approach to tackle Energy Challenges



“An innovation-driven transition to a low carbon economy offers great opportunities for growth and jobs ... ***Technological leadership must be followed by the development of industrial production capabilities or technology supply chains across Europe.*** This requires bringing together research, industry, the financing sector and public authorities.”

Advanced Materials are a Key Enabling Technology to accelerate transformation of EU energy system

- Cost of low carbon energy (LCE) technologies must keep coming down to ensure their adoption & deployment across EU in frame of Energy Union
- This is made possible by reduction in cost, increase in performance, and extension of lifetime of the Advanced Materials enabling these low carbon energy technologies
- **Innovation in Advanced Materials is crucially needed and long, risky and capital-intensive innovation cycles would benefit from risk-sharing at EU level**



The EU-based Industry of Advanced Materials for LCE is a source of growth and jobs for EU



Revenues from operations in EU
~ 30 billion €

Manufacturing sites
> 300



Direct jobs
~ 110.000
Direct & indirect jobs
> 500.000

Researchers in industry
~ 5.000 researchers



R&D spending
~ 800 million €

Capital expenditures
~ 2 billion €

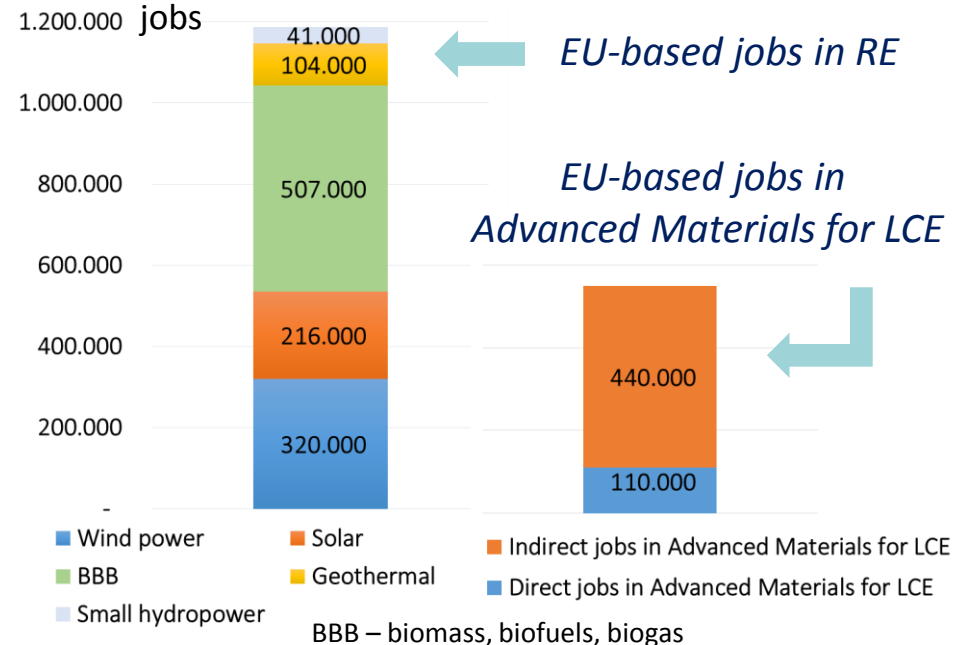
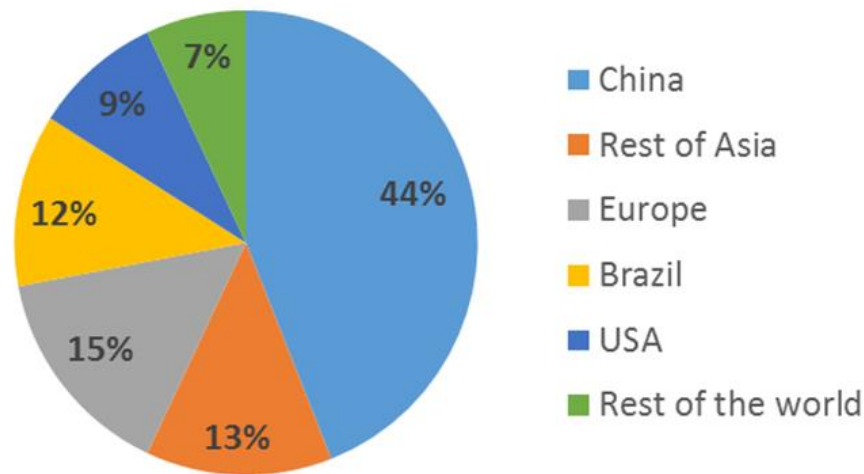


* EMIRI internal evaluation

EU must establish Industrial Leadership in Advanced Materials for LCE or others will ...

- Capacity for production of low carbon energy is developing faster outside EU
- Manufacturing of devices, components, Advanced Materials is moving to end-markets (leading to emergence of new champions often at expense of historical players)
- Innovation centers are also following the trend with some delay
- This creates future dependency risks on imported low carbon energy technologies
- EU-based Industry of Advanced Materials for low carbon energy represents more jobs than any renewable energy (RE) value chain in EU and close to 50% of total EU-based jobs in RE

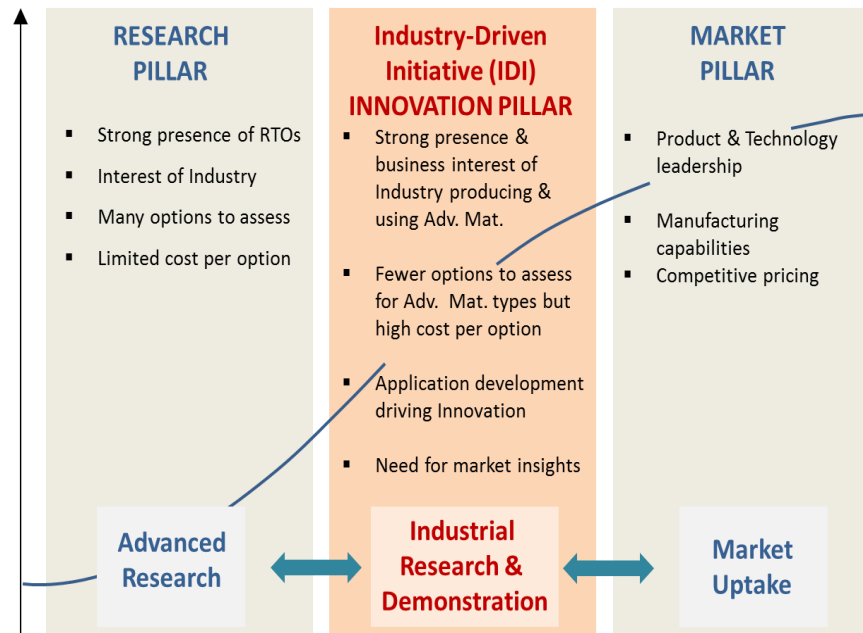
IRENA Association estimates global renewable energy jobs at 7.7 million (direct & indirect)



Innovation is key to Industrial Leadership of EU in Advanced Materials for LCE

- EMIRI supports the development in EU of **policies crucially needed** for the market pull & the technology push (innovation) of low carbon energy technologies **to ensure Manufacturing in EU**
- EMIRI calls for creation at EU level of an Innovation Pillar bridging the gap between research and market and providing Industry with a stable framework stimulating EU-based innovation**
- The Innovation Pillar on Advanced Materials for LCE will reduce innovation risks and accelerate innovation** to reach faster and better the market
- The Innovation Pillar should be **based on strong public private interactions**, engage actors along the value chain and build on orientations strongly supported by Industry & Research
- The Innovation Pillar should be developed based on the Industry-Driven Initiative (IDI) proposal produced in collaboration with the EU Commission DG R&I** and in line with SET Plan
- The IDI promoted by EMIRI is called EMERIT (Energy Materials for Europe – Research & Industry innovating Together), focusses on TRL 4-7 and is limited to max 20 Innovation Topics**

Advanced Materials KPIs



KC1

Advanced Materials to increase energy performance of buildings

Advanced Materials to make renewable electricity technologies competitive

KC2

- Identify clear priorities for industrial growth & jobs in EU-based sector of Advanced Materials for low carbon energy technologies
- And develop a strong presence in Europe of innovation ecosystems and manufacturing value chains
- By innovating with Advanced Materials fit to serve the demanding & growing market of low carbon energy technologies

Advanced Materials Competences & Infrastructures
Incl. Modelling, Testing, Characterization

- *Build upon strong European expertise*
- *Integrate different innovation stakeholders along innovation & value chains*
- *Empower focus on innovation to reduce risks and accelerate innovation*
- *Offer spillover effects for other sectors than Energy*










KC3

Advanced Materials to enable energy system integration

Advanced Materials to enable the decarbonisation of power sector

KC4

The EMERIT IDI contributes significantly to key actions outlined in the “Integrated SET Plan”

Action #	Title	Level of contribution of IDI to support action	
1	Sustain technological leadership by developing highly performant renewable technologies and their integration in the EU's energy system	VERY HIGH	
2	Reduce the cost of key technologies	VERY HIGH	
3	Create technologies and services for smart homes that provide smart solutions to energy consumers	LOW	
4	Increase the resilience, security and smartness of the energy system	HIGH	
5	Develop new materials and technologies for, and the market uptake of, energy efficiency solutions for buildings	VERY HIGH	
6	Continue efforts to make EU industry less energy intensive and more competitive	LOW	
7	Become competitive in the global battery sector to drive e-mobility forward	HIGH	
8	Strengthen market uptake of renewable fuels needed for sustainable transport solutions	MEDIUM	
9	Step up research and innovation activities on the application of carbon capture and storage (CCS) and the commercial viability of carbon capture and use (CCU)	HIGH	
10	Maintaining a high level of safety of nuclear reactors and associated fuel cycles during operation and decommissioning, while improving their efficiency	NONE	

Less is more ... Industry calls for prioritization and focus to reach critical mass & ensure innovation success

Example of energy system integration – 4 Innovation Topics

Advanced Materials for lower cost, high safety, long cycle life & environmentally friendly electrochemical batteries (Li-ion batteries)

Advanced Materials for lower cost, high safety, long cycle life & environmentally friendly electrochemical batteries (next generation electrochemical batteries)

Advanced Materials for lower cost storage of energy in the form of hydrogen or other chemicals (power to gas, power to liquid technologies)

Advanced Materials to facilitate the integration of storage technologies in the grid

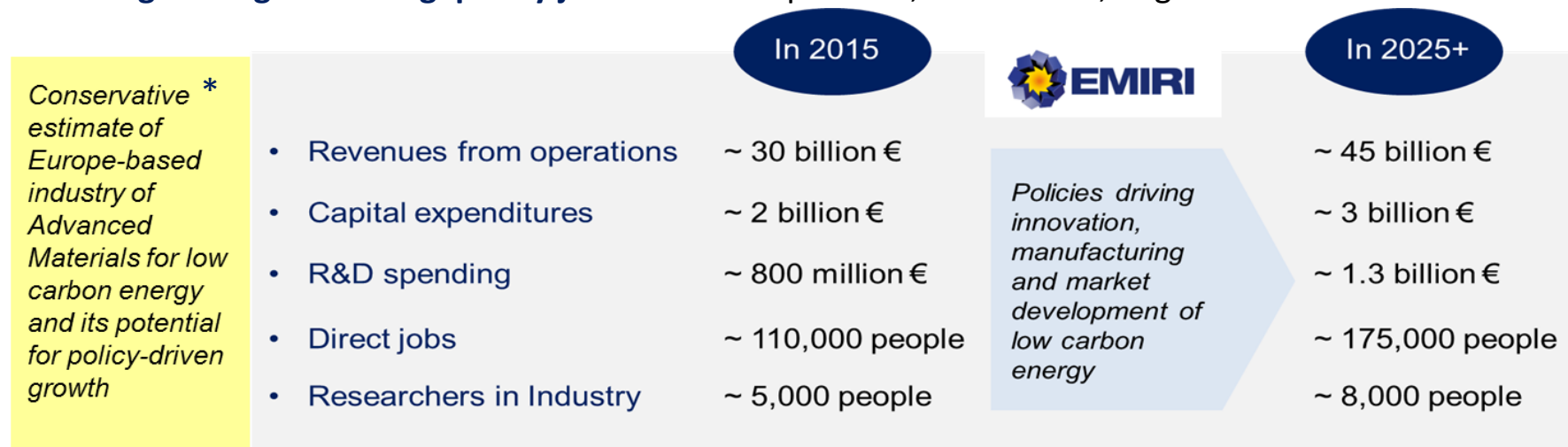


SIEMENS



Achieving the specific innovation objectives of the EMERIT IDI will contribute to ...

1. **Getting the right Advanced Materials faster to the market** by addressing the three typical innovation risks (execution, adoption and co-innovation risks)
2. **Accelerating the development & deployment of low carbon energy technologies** enabled by Advanced Materials (contributing to tackle Energy Union Challenges)
3. **Enabling more competitive value chains to drive competitiveness of the EU Industrial Sector of Advanced Materials for Energy and restore Industrial Leadership of EU** (contributing to 20% of EU GDP from manufacturing by 2020)
4. **Securing R&D and capital investments of the Industry in EU**
5. **Safeguarding & creating quality jobs in EU** for operators, researchers, engineers



* Based on < 5% annual market growth rate and partial capture of market growth by European Industry

Environmental Challenge

- One of today's most pressing global environmental challenge is **climate change mitigation**

Technology Challenge

- **Accelerating the transformation of the energy systems** towards more low carbon energy (LCE) is a crucial part of the solution (also offering energy security)
- LCE technologies cover energy performance of buildings, harvesting of renewable energy, energy storage, decarbonization
- **Cost of LCE technologies must keep coming down** to ensure adoption & deployment of LCE in Europe and rest of the world

Innovation Challenge

- Advanced Materials accounting for important share of cost of LCE technologies, **innovation in Advanced Materials is needed** to reduce intrinsic cost, increase performance and lifetime of these technologies

Business Challenge

- **EU is losing leadership in LCE technologies** and represent today less than 15% of jobs in the sector

TAKE AWAYS (ct'd)

And this is a business opportunity for EU and others



The business opportunity

- EU, based on historical strengths in chemistry & metallurgy, has industrial leadership in Advanced Materials for LCE. This represents 500.000 jobs direct & indirect (close to 50% of EU-based jobs in LCE technologies)
- Policies stimulating market pull & technology push (innovation) of LCE technologies to ensure manufacturing could lead, by 2025+, to creation of 300.000 jobs and a 50% increase in revenues & investments of the EU-based Industry of Adv. Materials

The way forward

- **To accelerate innovation in Advanced Materials**, industry players and research organizations within **EMIRI call for the creation of an Innovation Pillar**, based on open collaboration between innovation actors (Industry & Research) and policy makers
- EMIRI has worked over 2015 in collaboration with EU Commission DG R&I on the creation of **an Industry-Driven Initiative (IDI) called EMERIT laying the foundations & priorities of the Innovation Pillar**
- **EMERIT IDI will contribute to reinforcing presence in Europe of a competitive industry** impacting economic growth and employment (+50% beyond 2025), safeguarding investments and creating strong innovation ecosystems for the Energy Union

What is the added value of being an EMIRI member

EMIRI members play a pivotal role in shaping the future of advanced materials as a key enabling technology in the European Union.

EMIRI welcomes new members representing all the technologies featured in the SET Plan.

As a member, you will benefit from

- Participating in setting long-term funding priorities in advanced materials for the low-carbon energy & energy efficiency sector
- Being informed about EU and Member States priorities and funding opportunities
- Enhancing your visibility towards European and national policymakers
- Joining a proactive, motivated network of potential future consortium partners - leading industrial players, SMEs, research institutes, universities, trade associations and technology platforms