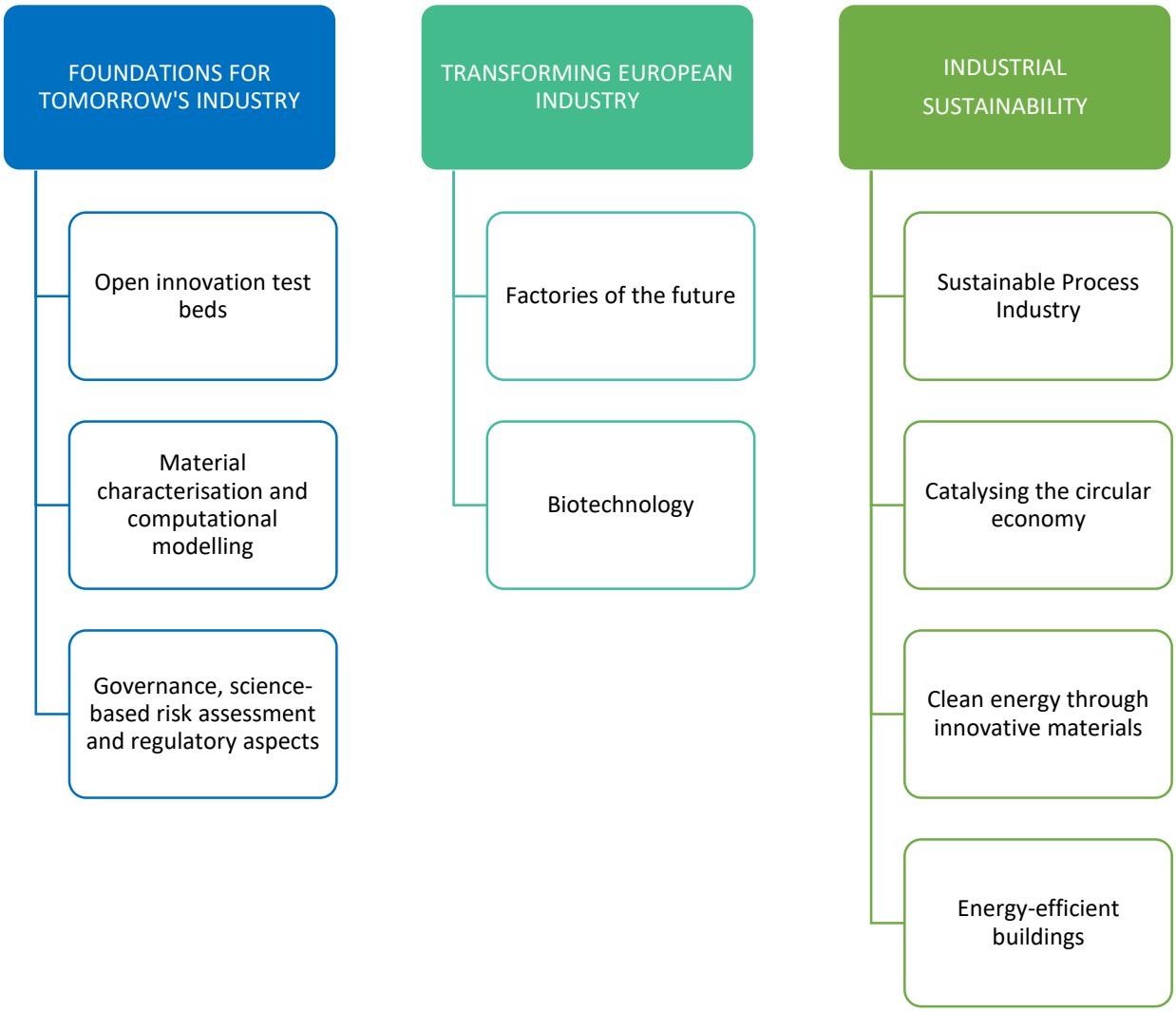
NANOTECHNOLOGIES, ADVANCED MATERIALS, BIOTECHNOLOGY AND ADVANCED MANUFACTURING AND PROCESSING

The 2018-2020 Work Programme (WP) of the Leadership in enabling and industrial technologies – Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing (LEIT-NMBP) aims at reaching the following objectives:

- Stimulate **jobs and growth**;
- Enhance the **integration and deplyment of enabling technologies by European industry**;
- Stimulate **strong private sector involvement**;
- Enhance **product competitiveness and impact**;
- **Technology validation in an industrial environment** to a complete and qualified system, ready or close to enter the market;
- Provide **new opportunities to tackle societal challenges**.

The overall budget dedicated to LEIT-NMBP is about **€3.8 billion**.

The activities of this WP will be implemented by the following three calls for proposals:



FOUNDATIONS FOR TOMORROW'S INDUSTRY

*The purpose of this call is to **lay the foundations for tomorrow's industry in Europe**, and to **create jobs and growth** through an innovation ecosystem for the design, development, testing, and upscaling of advanced materials and nanotechnologies. This should enable a vast array of applications and facilitate innovators to bring their disruptive ideas to the market. Success will be seen in an effective eco-system allowing innovators to overcome the technological and regulatory barriers.*

Open innovation test beds

Open Innovation Test Beds are physical facilities offering technology access and services. Their objective is to bring nanotechnologies and advanced materials within the reach of companies and users in order to advance from validation in a laboratory (TRL 4) to prototypes in industrial environments (TRL 7). These test beds will allow European industry and SMEs to develop leadership in nanotechnologies and advanced materials across the whole value chain with significant impact on **jobs creation and growth**. Proposals should include a **business case** and **exploitation strategy**. In particular, they should demonstrate the likelihood of an additional turnover of at least 4 times the requested EU funding, within 5 years after the end of the grant.

Action	Topic	Opening date	Deadline(s)
IA	Open Innovation Test Beds for nano-enabled surfaces and membranes	16/10/2018	22/01/2019 03/09/2019

Material characterisation and computational modelling

Material characterisation determines materials properties, structure and performance. These activities are central to materials research and development, upscaling and manufacturing of such materials and to materials performance validation in products, to comply with regulation, safety and quality requirements. With the recent growth in available computational power, predictive modelling of materials is now in a position to be used to predict trends, to design new materials, to understand phenomena occurring in measurements and reduce the need of massive experimental testing. This can accelerate innovation and favour economically viable paths to new technological solutions for manufacturing. This is a key application area of **High-Performance Computing** (HPC) and closely linked with the **Digital Single Market** (DSM) strategy as a driver for growth.

Action	Topic	Opening date	Deadline(s)
RIA	Real-time nano-characterisation technologies	16/10/2018	22/01/2019 03/09/2019
RIA	Adopting materials modelling to challenges in manufacturing processes	16/10/2018	22/01/2019 03/09/2019
CSA	Sustainable Nano-Fabrication	16/10/2018	03/09/2019

Governance, science-based risk assessment and regulatory aspects

Managing the risks of every emerging technology is of key importance for its societal acceptance and consequent possible success. The overall challenge is to **establish a suitable form of nanotechnology risk governance** and to **ensure that beyond the state of the art technologies are accepted by stakeholders** (civil society, industry, regulators). This requires working on three different layers: (i) a **scientific research layer** for sound foundations, (ii) a **regulatory research layer** to validate and translate the scientific findings into appropriate regulatory frameworks and implementation, and (iii) a **market layer** dealing with the daily management of risks and safety. These three distinct layers should be integrated through actions for risk governance, risk assessment and safe by design. International collaboration is strongly encouraged.

Action	Topic	Opening date	Deadline(s)
RIA	Safe by design, from science to regulation: metrics and main sectors	16/10/2018	22/01/2019 03/09/2019
CSA	In support of documentary standards	16/10/2018	03/09/2019

RIA: Research and Innovation Action
IA: Innovation Action
CSA: Coordination and Support Action

TRANSFORMING EUROPEAN INDUSTRY

*The purpose of this call is to transform European industry through the **integration of digitisation and other enabling technologies** and **achieve global industrial leadership**. Success will be seen in global industrial leadership, notably in manufacturing, and in opportunities for re-industrialisation.*

Factories of the future (FOF)

Topics under FOF will support industry to **develop new manufacturing technologies**, **optimise work environments** so that its workforce can drive the transition to new technologies, enable more customised products and underlying production flexibility, optimise environmentally sustainable production and increase accuracy, efficiency and reliability in various fields of production ranging from micro assemblies to very large parts.

Action	Topic	Opening date	Deadline(s)
IA	Open Innovation for collaborative production engineering	16/10/2018	21/02/2019
IA	Refurbishment and re-manufacturing of large industrial equipment	16/10/2018	21/02/2019
IA	Pilot lines for modular factories	16/10/2018	21/02/2019
RIA	Handling systems for flexible materials	16/10/2018	21/02/2019
IA	Materials, manufacturing processes and devices for organic and large area electronics	16/10/2018	22/01/2019 03/09/2019
IA	Advanced materials for additive manufacturing	16/10/2018	22/01/2019 03/09/2019

Biotechnology

These biotechnology topics will support European industry through the continued development of **cutting-edge biotechnologies**, **new biotechnologies for the global challenge of environmental protection** and **breakthrough solutions to transform industrial processes** using environmentally friendly and sustainable methods outcompeting conventional alternatives.

🔗	Action	Topic	Opening date	Deadline(s)
	RIA	Boosting the efficiency of photosynthesis	16/10/2018	22/01/2019 03/09/2019
	RIA	Microorganism communities for plastics bio-degradation	16/10/2018	05/03/2019

RIA: Research and Innovation Action
IA: Innovation Action
CSA: Coordination and Support Action

INDUSTRIAL SUSTAINABILITY

*The purpose of this call is to **further strengthen the global leadership of Europe's industry in environmental sustainability**, through a combination of mature and disruptive technologies. Success will be seen in making measurable contributions to identified sustainable development goals.*

Sustainable Process Industry (SPIRE)

The process industry embraces cement, ceramics, chemicals, engineering, minerals and ores, non-ferrous metals, steel and water sectors. Topics under SPIRE will support the European industry towards improved integration of industrial operations leading to **better valorisation of energy and material streams**, **sustainable raw materials** and **enhanced performance and efficiency of particularly high energy-intensive processes**.

Action	Topic	Opening date	Deadline(s)
IA	Efficient integrated downstream processes	16/10/2018	21/02/2019
IA	Adaptation to variable feedstock through retrofitting	16/10/2018	21/02/2019
IA	Digital technologies for improved performance in cognitive production plants	16/10/2018	21/02/2019

Catalysing the circular economy

Catalysis is ubiquitous in the **chemical industry**, and a key technology in all future scenarios for a sustainable economy. The progressive substitution of products derived from fossil fuels, at all steps along the industrial value-chain, plays a crucial role to successfully decarbonise industrial processes. Moreover, carbon dioxide (CO_2) or C1 building blocks are promising alternative feed stocks for chemicals, materials and fuels; and breakthroughs in reusing it have attracted strong industry interest. These future disruptive technologies could play a very significant role in lowering the carbon footprint of industry and the entire economy. The foreseen activities will help **make the circular economy an industrial reality**, and will help **decarbonise industry**.

Action	Topic	Opening date	Deadline(s)
RIA	Photocatalytic synthesis	16/10/2018	22/01/2019 03/09/2019

Clean energy through innovative materials

To deliver on the Paris agreement (COP21), the updated Europe 2020 targets and the Energy Union policies including the SET-Plan, **significant reductions in CO_2 and greenhouse gas emissions are needed** in a short time span. Significant reductions will be obtained by **electrifying the road transport sector** and **integrating sustainable energy sources**, like wind energy and photovoltaics, in the electricity grid. Both areas need specific energy production technologies, as well as energy storage solutions, based on innovative advanced materials and nanotechnologies, in line with the Communication on Accelerating Clean Energy Innovation.

Action	Topic	Opening date	Deadline(s)
RIA	Materials for non-battery based energy storage	16/10/2018	22/01/2019 03/09/2019
RIA	Smart materials, systems and structures for energy harvesting	16/10/2018	22/01/2019 03/09/2019

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Energy-efficient buildings (EeB)

To deliver on the Paris agreement (COP21), the updated Europe 2020 targets and the Energy Union policies including the SET-Plan, **significant reductions in CO_2 and greenhouse gas emissions are needed** in a short time span. The construction sector has a crucial impact on energy consumption and carbon emissions in the European Union: buildings account for 40% of the total energy consumption and are responsible for 36% of greenhouse gas emissions in Europe. The challenge in 2018-2020 is therefore to develop further, demonstrate and validate **key breakthrough technologies for energy-efficient buildings and districts**, in line with the Communication on Accelerating Clean Energy Innovation. European added value will result from the impact, on decarbonising the EU building stock and developing affordable and integrated energy storage solutions. Implementation of the activities under EeB should comply with EU, national, regional and local regulations and legislation, in particular regarding health, safety and environmental impact.

Action	Topic	Opening date	Deadline(s)
IA	Integration of energy smart materials in non-residential buildings	16/10/2018	21/02/2019
IA	New developments in plus energy houses	16/10/2018	21/02/2019
IA	Integrated storage systems for residential buildings	16/10/2018	21/02/2019

Other opportunities for LEIT – NMBP research and innovation across Horizon 2020

RIA: Research and Innovation Action
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CSA: Coordination and Support Action

The policy context

http://www.un.org/sustainabledevelopment/sustainable-development-goals/

https://ec.europa.eu/clima/policies/international/negotiations/paris_en#tab-0-0

United Nations Framework Convention on Climate Change
http://unfccc.int/paris_agreement/items/9485.php

Energy Union
https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union

Circular economy
http://ec.europa.eu/environment/circular-economy/index_en.htm

Digital single market
https://ec.europa.eu/digital-single-market/