

EERA Joint Programme Advanced Materials and Processes for Energy Applications (AMPEA)

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Number participants and associates:	34 from 18 European Countries

Why a Joint Programme on Advanced Materials and Processes for Energy Applications?

Implementing a basic science programme for energy is one of the key roles assigned to EERA by the SET-plan. Basic science is often presented as crucial in generating the breakthroughs needed to bring new generations of technologies to the market. The aim of AMPEA is to foster a truly multi-disciplinary approach to develop enabling tools and new concepts for future emerging energy technologies.

Vision and objectives of AMPEA

The mission statement of AMPEA has been defined by all participants of the joint programme (JP) and states that it has to develop new horizons for science for energy, visible in Europe at the industrial and political level. Thus, the main objective is to harness and integrate materials science and process innovation for high performance sustainable energy technologies, in order to enhance the long-term competitiveness of European Industry. In order to bridge fundamental and applied research fields, AMPEA works in close coordination with other EERA-JPs, with Universities (European Platform of Universities Engaged in Energy Research - EPUE) and with the Energy Materials Industrial Research Initiative (EMIRI).

AMPEA is organised to apply the capacity of 3 “tools” sub-programmes (SPs) corresponding to generic research areas to “applications” SPs related to known emerging energy challenges and domains. There are presently 3 identified “applications” namely **SPA**: artificial photosynthesis, *i.e.* the ability to efficiently convert large amounts of solar energy into solar fuels; **SPB**: materials for extreme operating conditions; **SPC**: low temperature heat recovery. Other “applications” SPs will be added in the future as they are identified and defined by the AMPEA and more generally by the EERA members.

Visit the webpage:

www.eera-set.eu

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Applications Sub-programmes (SPs)

SP 1 - New materials, coordinator FZ Jülich (DE) + deputy CSIC (ES)

The ambition of this sub-programme is to promote generic materials developments having a potential for high efficiency energy applications. On the one hand, the sub-programme addresses innovative approaches for the synthesis and assembly of materials. On the other hand, it also explores functional materials with promising properties, in particular related to heat, mass and/or charge transport (studied in SP2), catalysis (important for Application A - Artificial Photosynthesis) and it establishes sound strategies to eliminate bottlenecks to the exploitation of these phenomena in energy applications.

SP 2 - Physical modelling, coordinator University College London, UKERC (UK) + deputy Université de Lorraine (FR)

This sub-programme on Multiscale Modelling supports and strengthens other technical programmes and technology platforms. The main aim is to develop cross-cutting multiscale modelling tools for energy materials and processes. These tools will then be applied to the study of materials, processes and systems considered as a whole or to their individual components or constitutive behaviours.

Sub Programme 3 - Characterisation platforms for materials and devices, coordinator by FZ Jülich (DE) + deputy ENEA (IT)

Advanced experimental characterisation and analysis platforms are essential for designing, developing and understanding new functional materials for energy applications and for understanding the relevant physico-chemical processes. Development of today and tomorrow's key experimental techniques is a complex, costly and time-consuming process that requires multidisciplinary skills. This sub-programme has three main objectives:

- A forum (*fora*) to facilitate large scale technique development (technique aspects, software, science/technique exchange);
- A platform providing users with easy access to the whole suite of experimental techniques included in this sub-programme;
- A platform for the characterization of energy devices.

Application SP A - Artificial Photosynthesis, coordinator Helmholtz Zentrum Berlin (DE) + deputy CEA (FR)

Application SP B - Materials for extreme operating conditions, coordinator VTT (FI) + deputy DLR (DE)

Application SP C - Low temperature heat recovery, coordinator Politecnico di Torino (IT) + deputy CNR (IT)

