

This fiche is part of the wider roadmap for cross-cutting KETs activities

'Cross-cutting KETs' activities bring together and integrate different KETs and reflect the interdisciplinary nature of technological development. They have the potential to lead to unforeseen advances and new markets, and are important contributors to new technological components or products.

The complete roadmap for cross-cutting KETs activities can be downloaded from:

<http://ec.europa.eu/growth/industry/key-enabling-technologies/eu-actions/ro-ckets>

Potential areas of industrial interest relevant for cross-cutting KETs in the Manufacturing and Automation domain



This innovation field is part of the wider roadmap for cross-cutting KETs activities developed within the framework of the RO-cKETs study. The roadmap for cross-cutting KETs activities identifies the potential innovation fields of industrial interest relevant for cross-cutting KETs in a broad range of industrial sectors relevant for the European economy.

The roadmap has been developed starting from actual market needs and industrial challenges in a broad range of industrial sectors relevant for the European economy. The roadmapping activity has focused on exploring potential innovation areas in terms of products, processes or services with respect to which the cross-fertilization between KETs can provide an added value, taking into account the main market drivers for each of those innovation areas as well as the societal and economic context in which they locate.

Taking the demand side as a starting point, cross-cutting KETs activities will in general include activities closer to market and applications. The study focused on identifying potential innovation areas of industrial interest implying Technology Readiness Levels of between 4 and 8.

MA.2.1: Energy-efficient factories

Scope:

To develop new and improved concepts for energy generation and recovery in production, including substitution of high-temperature processes.

Demand-side requirements (stemming from Societal Challenges) addressed:

- Tackle the “secure, clean and efficient energy” as well as the “climate action, resource efficiency and raw materials” societal challenge

Demand-side requirements (stemming from market needs) addressed:

- Reduce energy consumption (resulting in savings over the conventional energy purchase for industrial end-users and in the overall reduction of the energy demand on a global scale)
- Reduce resources consumption including raw materials as well as water and other utilities required during production (resulting in savings over the conventional raw materials as well as utilities purchase for industrial end-users and in the overall reduction of raw materials as well as other resources (such as e.g. water) demand on a global scale)

Specific technical/industrial challenges (mainly resulting from gaps in technological capacities):

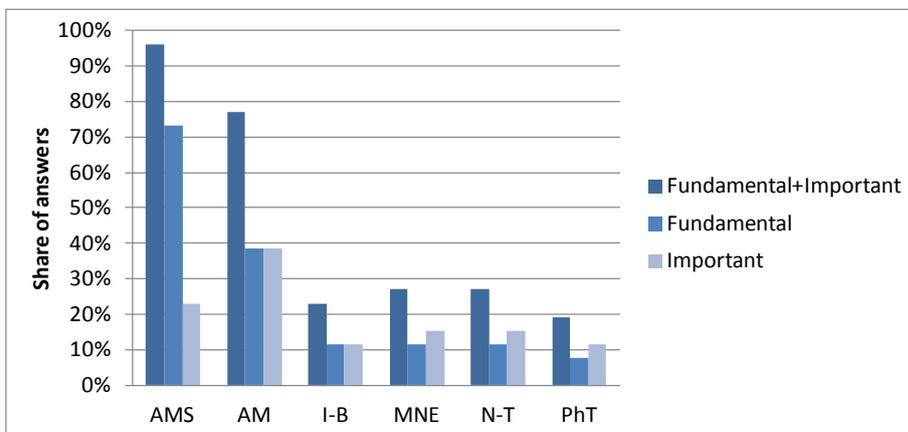
- Development of optimized self-adaptive and fault tolerant strategies, which lead to higher productivity and reduced energy consumption and process emissions (dust, air, water, noise, waste, etc.)
- Development of new solutions for green house gases emission reduction, in particular by using alternative materials and/or energy sources and innovative technology application
- Find flexible adaptation of energy resources for high performance machine drives
- Reduction in energy consumption in future manufacturing through ICT solutions to monitor and manage energy
- Complement decision-support systems by rich and intuitive energy management mobile dashboards available to the decision makers at plant and board levels of a manufacturing enterprise

Contribution by cross-cutting Key Enabling Technologies:

In respect to this Innovation Field, the integration of KETs could contribute to the development of new and improved concepts for energy generation and recovery in production, including the substitution of high-temperature processes, the use of alternative materials and/or energy sources and innovative self-adaptive technology application and ICT solutions and the flexible adaptation of energy resources for high performance machine drives.

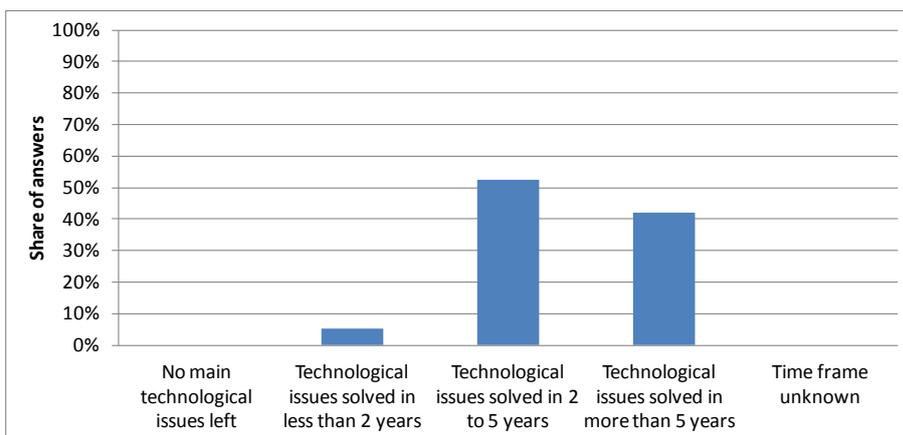
To this aim, the combination of KETs experts' opinions collected through the dedicated survey (whose result is depicted in the below bar chart), the examination of KETs-related patenting activity in respect to this Innovation Field, and desk research activities, have allowed identifying a rather strong interaction of KETs with respect to this Innovation Field, with either fundamental or important contribution mainly by the following KETs:

- Advanced Manufacturing Systems (AMS)
- Advanced Materials (AM)



Timing for implementation:

According to the majority of KETs experts' opinions (whose result is depicted in the below bar chart), desk research, and in line with the KETs-related patenting activity in this field, it is considered that the main technological issues holding back the achievement of cross-cutting KETs based products related to this Innovation Field could be solved in a time frame of 2 to 5 years, yet significant consensus by experts indicates also greater periods being necessary:



Hence, depending on the specific technical and/or industrial challenges holding back the achievement of cross-cutting KETs based products related to this Innovation Field, the provision of support in the short to medium term should be taken into consideration within this framework.

Additional information according to results of assessment:

➤ Impact assessment:

- Any manufacturing and process industries, but in particular energy-intensive industries are strongly incentivized to reduce their energy intensity due to the high share that electricity as well as heat usage have in their total production costs.
- In order to decrease the total energy bill, optimized energy management approaches can be successfully applied. These encompass ICT solutions to monitor and optimally manage energy, optimized self-adaptive and fault tolerant strategies that can lead to higher productivity and reduced energy consumption, the use of alternative materials and/or energy sources that can substitute their counterparts in the production, and a variety of other approaches.
- All these approaches can translate into reduced energy consumption, thus into savings over the conventional energy purchase for industrial end-users, as well as reduced process emissions (including greenhouse gases).

➤ ***Results of patents scenario analysis:***

- 15 exclusively KETs-related patents identified in the period 2001-2011 for the specific Innovation Field
- Hence, no significant patent-related indicators can be reported in this field