INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Advanced manufacturing and processing

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Specific objective

The specific objective of advanced manufacturing and processing research and innovation is to transform today's manufacturing enterprises, systems and processes. This will be done inter alia by leveraging key enabling technologies in order to achieve more knowledge-intensive, sustainable, resource- and energy-efficient trans-sectoral manufacturing and processing technologies, resulting in more innovative products, processes and services. Enabling new, sustainable products, processes and services and their competitive deployment, as well as advanced manufacturing and processing is also essential for achieving the objectives of the priority 'Societal challenges'.

Rationale and Union added value

The manufacturing sector is of high importance to the European economy, contributing to around 17 % of GDP and accounting for some 22 million jobs in the Union in 2007. With the lowering of economic barriers to trade and the enabling effect of communications technology, manufacturing is subject to strong competition and has been gravitating to countries of lowest overall cost. The European approach to manufacturing therefore has to change radically to remain globally competitive, and Horizon 2020 can help bring together all the relevant stakeholders to achieve this.
Europe needs to increase investment at Union level to maintain European leadership and competence in manufacturing technologies and make the transition to high-value, knowledge-intensive goods, creating the conditions and assets for sustainable production and provision of lifetime service around a

manufactured product. Resource intensive manufacturing and process industries need to further mobilise resources and knowledge at Union level and increase the investment in research, development and innovation to enable further progress towards a competitive low-carbon, resource-efficient and sustainable economy and to comply with the agreed Union-wide reductions in greenhouse gas emissions by 2050 for industrial sectors (5).

With strong Union policies, Europe would grow its existing industries and nurture the emerging industries of the future. The estimated value and impact of the sector of advanced manufacturing systems is significant, with an expected market size around EUR 150 billion by 2015 and compound annual growth rate of about 5 %.

It is crucial to retain knowledge and competence in order to keep manufacturing and processing capacity in Europe. The emphasis of the research and innovation activities shall be on sustainable and safe manufacturing and processing, introducing the necessary technical innovation and customer-orientation to produce high knowledge content products and services with low material and energy consumption.

Europe also needs to transfer these enabling technologies and knowledge to other productive sectors, such as construction, which is a major source of greenhouse gases with building activities accounting for around 40 % of all energy consumption in Europe, giving rise to 36 % of the CO2 emissions. The construction sector, generating 10 % of GDP and providing some 16 million jobs in Europe in 3 million enterprises, of which 95 % are SMEs, needs to adopt innovative materials and manufacturing approaches to mitigate its environmental impact.

Broad lines of the activities

(a) Technologies for Factories of the Future

Promoting sustainable industrial growth by facilitating a strategic shift in Europe from cost-based manufacturing to an approach based on resource efficiency and the creation of high added value products and ICT-enabled intelligent and high performance manufacturing in an integrated system.

(b) Technologies enabling energy-efficient systems and energy-efficient buildings with a low environmental impact

Reducing energy consumption and CO2 emissions by the research, development and deployment of sustainable construction technologies and systems, addressing the whole value chain as well as reducing the overall environmental impact of buildings.

(c) Sustainable, resource-efficient and low-carbon technologies in energy-intensive process industries

Increasing the competitiveness of process industries, by drastically improving resource and energy efficiencies and reducing the environmental impact of such industrial activities through the whole value chain, promoting the adoption of low-carbon technologies, more sustainable industrial processes and, where applicable, the integration of renewable energy sources.

(d) New sustainable business models

Deriving concepts and methodologies for adaptive, knowledge-based business models in customised approaches, including alternative resource-productive approaches.

Context

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