

May 2015 - Green growth for Clean Manufacture cluster

Three additional research projects have joined the Clean Manufacture eco-factory research cluster. Clean Manufacture brings together European-funded projects which share a common goal – to help manufacturers improve the efficiency of their factories and compete worldwide. The cluster now includes seven projects involving 93 industrial and academic partners in 19 countries, covering sectors including marine, automotive, steel, civil engineering, woodworking, textiles, foodstuffs and aerospace.

The new projects are:

- **DAPhNE** – designing new continuous sustainable processes using optimised microwave technologies with real time self-adaptive control. The DAPhNE consortium will provide economies of scale for the ceramic, cement and glass industries.
- **Factory-ECOMATION** – developing new technologies and processes for the energy-intensive iron and steel industry; and for carbon-intensive woodworking industries.
- **REEMAIN** – combining intelligent employment of renewable energy technologies and resource-saving strategies, to boost both energy and material efficiency in textiles, food and steel production industries.

REEMAIN project manager, Anibal Reñones of Spanish research centre CARTIF, says: *“Joining the Clean Manufacture cluster means an opportunity to gain visibility and impact on the current and upcoming exploitable results of the REEMAIN project, with a special focus in those dealing with the increase of energy and resource efficiency in EU factories.”*

The Clean Manufacture cluster was founded in 2013 by members of four research projects:

- **AREUS** – developing integrated robotic and energy-reduction technologies.
- **EMC2-Factory** – improving production efficiency for automotive, rail and aerospace.
- **ENEPLAN** – cutting the environmental and process costs of machining.
- **REFORM** – reducing the environmental cost of composites manufacturing.

AREUS project manager, Marcello Pellicciari of the Università degli studi di Modena e Reggio Emilia in Italy says: *“In the Clean Manufacture cluster we are not only enhancing the dissemination and communication of our main activities and results but also sharing our experiences and different approaches towards sustainable manufacturing.”*

Clean Manufacture programme manager, Dr Rosemary Gault of the University of Sheffield AMRC, says: *“We’re delighted to welcome these new projects to the Clean Manufacture cluster. By bringing our projects together, we can better share our knowledge and help more European manufacturers put these new technologies and techniques into practice in their own factories. By helping companies reduce their waste and costs, and introduce more efficient production lines, the Clean Manufacture cluster can support a sustainable, wealthy future for us all.”*

Why work together?

By working together, the projects hope to widen the audience for their results and to avoid duplication of effort. Joint dissemination and training activities continue to promote the completed projects as well as those which are still active to the benefit of the commercial audience who have access to existing results and to the latest technology through one platform. Partners in the different projects have been able to work together and share expertise. Clustering will allow the projects to develop a common definition of a clean manufacturing process and to increase take-up of the technologies necessary to bring about a sustainable manufacturing revolution.

Technical developments

Green and sustainable manufacturing is necessary to meet Europe's emissions goals and to maximise the use of scarce resources. It is often seen as an expensive luxury, but by reducing the material used during production, by making things right first time, reducing waste and scrap and by reducing energy use, green manufacture can be very cost effective, making businesses more competitive.

The goals of the cluster address a number of ways in which factories can be made greener. First, it is necessary to assess current energy use. Within the different projects, the cluster is developing a comprehensive **sensing**, monitoring and evaluation system. It is also developing **standards** for economically and environmentally-friendly factory infrastructures and methods and labels to quickly evaluate factory **sustainability footprints**.

It is also necessary to define, assess and optimise environmental and economic process requirements at factory and **supply-chain** levels. To do this, predictive **simulation** of eco-efficient plants (robotic, production) is being carried out and the projects are developing simplified simulation frameworks and tools for fast evaluation of **manufacturing processes performance**.

A number of different production technologies are being developed for use within the green factories. These include high-temperature microwaves and self-adaptive control for more flexible, **modular, re-configurable and smart factories**, implementation of new microwave systems for **ultra-fast materials processing** which will reduce energy consumption, waste generation and greenhouse gases emissions. Methods to reduce scrap and increased throughput during **composite layup through AR and thermo-assisted tape-laying** have been developed and a water and abrasive recycling unit for **abrasive water jet machining** is available.

As well as new production techniques, it's also important to improve existing processes to make them less inefficient. **Optimised** manufacturing systems have been developed for both robotic and composite manufacture. The new microwave technologies have been specifically designed to maximise the integration potential with existing machinery, allowing existing infrastructure to be reused. Another project has developed machine-level **retrofitting technologies** to improve performance of existing plants. **Planning and operations tools** have been created for cost-effective, eco-efficient production and resource planning, and **factory design tools** (at the factory, CAM, and robotic levels) have been created. **Active** and **self-adaptive control** for robotics and for high-temperature microwave processes are in progress and a real-time framework for development of optimal **control of hybrid manufacturing processes** is available.

An integrated set of **energy reduction technologies** for robotic plant and factory eco-systems is available, including a new electric power supply for energy exchange, storage and recovery at the factory level, comprehensive energy recovery solutions and energy reduction through equipment and control innovation. Technologies are being developed for **emissions abatement** and a set of **waste reduction / recovery / recycling** technologies has been created.



The Gullón biscuit factory in Spain is one of three companies in different sectors demonstrating energy-saving technologies developed by the REEMAIN project.

Past events

After participating in several impact seminars in Brussels, the first meeting of the cluster was held in Sheffield on 15 October 2013. Members of the initial four projects in the cluster discussed ways of working improve the research results and to deliver the results to industry. The cluster has since held joint dissemination events at Industrial Technologies in Athens, TPA-Italia in Milan, and EWEA in Copenhagen, carried out joint training events and developed a leaflet giving information on all the projects.

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For further information please visit:

http://ec.europa.eu/research/industrial_technologies/factories-of-the-future_en.html

Factories of the Future is a EUR 1.2 billion program in which the European Commission and industry are collaborating in research to support the development and innovation of new enabling technologies for the EU manufacturing sector.

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