AREUS

Automation and Robotics for EUropean Sustainable manufacturing

Developing integrated robotics and energy-reduction technologies.
www.areus-project.eu

DAPhNE

Designing new continuous sustainable processes for the ceramics, cement and glass industries.
www.daphne-project.eu/en/

EMC2-Factory

Improving production efficiency for automotive, rail and aerospace.
www.emc2-factory.eu

ENEPLAN

Improving energy and eco-efficiency of production lines.
www.eneplan.eu

FACTORY ECOMATION

Applying innovative automation for self-sustaining factories with zero environmental footprint.
www.semanticweb.it/factory-ecomation

REEMAIN

RESOURCE AND ENERGY EFFICIENT MANUFACTURING

Developing and demonstrating resource and energy-efficient manufacturing.
www.reemain.eu

REFORM

Reducing the environmental impact of composites manufacturing.
reform.eu.com

Seven projects with one goal: creating the factory of the future

Clean Manufacture brings together seven European-funded projects with a common goal – to help manufacturers improve the efficiency of their factories and compete worldwide.

The seven projects include 93 companies and research institutions from across Europe, and are investing a total €57 million in collaborative industry-led research and development.

The projects cover energy-efficient and eco-efficient process planning for machining-based manufacturing; sustainable automation and robotics; new technologies to reduce the environmental impact of advanced materials; and clean manufacturing for a range of key industries.

By bringing these seven projects together in one eco-factory research cluster, **Clean Manufacture** helps European manufacturers put these new technologies and techniques into practice in their own factories. By reducing material and energy costs, introducing more efficient production lines, and reducing waste, we can build a sustainable, wealthy future for all.

The seven projects have received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration.

AREUS: 609391 • DAPhNE: 314636 • EMC2-Factory: 285363 •
ENEPLAN: 285461 • Factory-Ecomation: 314805 •
REEMAIN: 608977 • REFORM: 283336

Clean Manufacture

Bringing together seven European-funded projects with one common goal – to help manufacturers improve the efficiency of their factories and compete worldwide.

European eco-factory research cluster

The projects in
Clean Manufacture

are working together to reduce waste and improve efficiency at all levels of the factory, from individual machines to the total facility.

By sharing best practice and integrating different technologies into joint testbeds, the projects can deliver the maximum value to industry.

Resource efficiency:

▶ **AREUS** is developing robot systems for sustainable manufacturing.

▶ **DAPhNE** is developing new adaptive production systems for eco-efficient firing processes.

▶ **EMC2-Factory** has improved machine efficiency using software simulation, smart controls, and innovative hardware.

▶ **ENEPLAN** is selecting the most energy-efficient processes and is optimising relevant set-up parameters.

▶ **Factory-Ecomation** has conceived a real-time optimal model predictive control development framework to make resource-intensive processes more sustainable.

▶ **REEMAIN** is optimising manufacturing parameters to reduce energy spent in key process steps.

▶ **REFORM** is recycling water and garnet abrasive for waterjet machining.

FACTORY OF THE FUTURE ▶

Factory & process efficiency:

▶ **AREUS** is reducing peak power loads of robots.

▶ **DAPhNE** is implementing high temperature microwave technology based on smart control and monitoring systems for different energy-intensive sectors.

▶ **EMC2-Factory** is fostering energy efficiency for production processes, technical building services and factory systems.

▶ **ENEPLAN** developed the MetaCAM tool to optimise current production lines or propose new processes.

▶ **Factory-Ecomation** is improving production efficiency through simulation-based decision support systems based on machine learning techniques.

▶ **REEMAIN** is developing a holistic factory simulation tool to analyse and test energy solutions such as concentrated solar power and electricity storage.

▶ **REFORM** is developing energy-efficient alternatives for composites lay-up.

Green products:

By improving and monitoring the energy and material efficiency of production, manufacturers can deliver quantifiable environmental benefits to customers.

Recycling and re-use:

▶ **AREUS** is developing energy-recovery technologies for robots.

▶ **DAPhNE** uses selected wastes from other industrial processes as raw material, reducing overall environmental impact.

▶ **EMC2-Factory** is recovering energy from factory and machine processes.

▶ **Factory-Ecomation** is developing a new energy recovery solution that re-uses waste energy from very low temperature flows.

▶ **REEMAIN** is developing cost-effective waste heat recovery at process levels.

▶ **REFORM** is developing low-energy methods to recycle carbon fibre composites, and turn off-cuts into high-value products.

Waste reduction:

▶ **DAPhNE** is developing efficient microwave heating processes which will reduce energy use and waste.

▶ **EMC2-Factory** is reducing leakages and losses in production processes and technical building services.

▶ **ENEPLAN** is optimising process parameters to minimise waste.

▶ **REFORM** is using augmented reality to reduce waste during composite lay-up.

FOCUS
www.focusonfof.eu