effective

EFFECTIVE

First Strategic Workshop – “Paving the way to effective clustering towards exploitation & dissemination of FoF project results”

SESSION-1: Business trends and market prospects

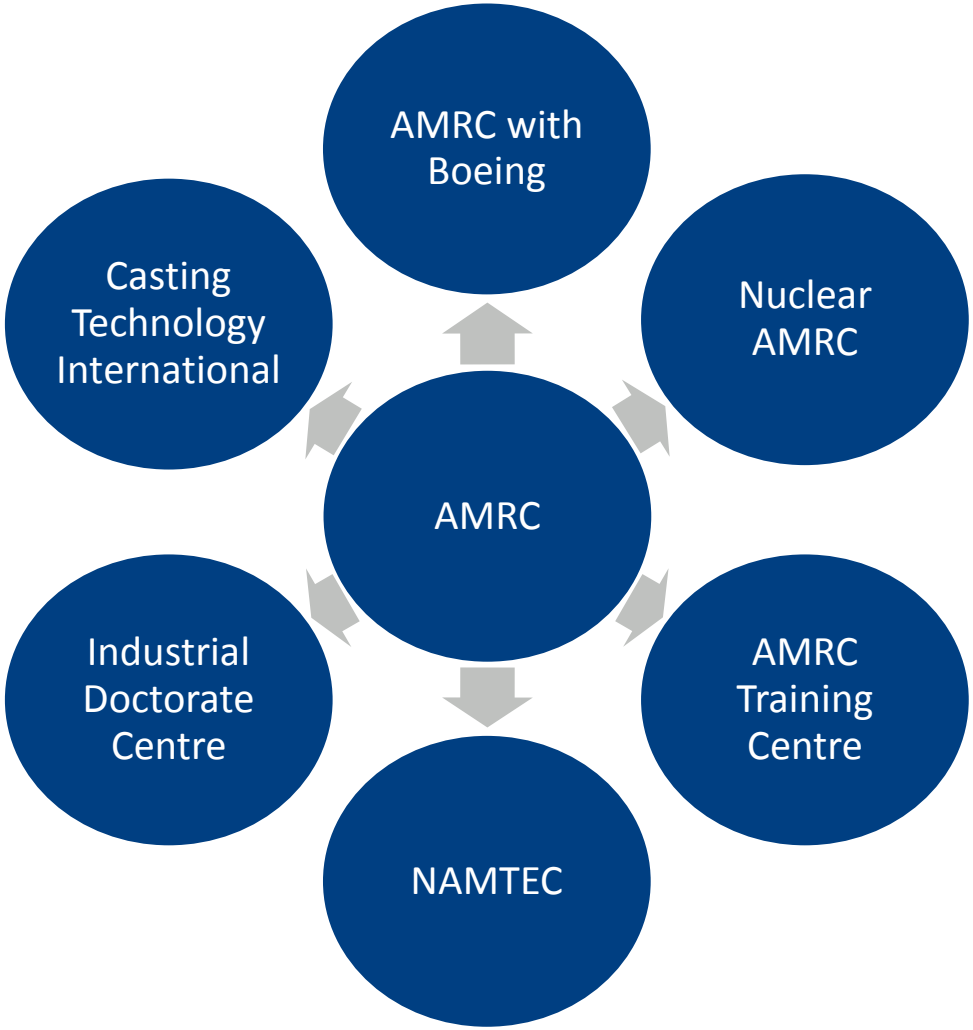
The European “Clean Manufacture” initiative: a success story of FoF project clustering

Where I work

A world leading cluster of industry-focused manufacturing R&D centres and supporting facilities.

Developing new means, methods, tools and techniques to advance manufacturing technology.

AMRC Structure



My role

- Write, submit and manage European grants

REFORM

Manufacturing Phases of FRP Parts

- **(Pre)forming**
- **Curing**
- Cutting / Trimming
- **Assembly / Joining**
- **Disposal**

Industrial Objectives (Towards Eco-Factory)	Technologies (Innovative solution proposed)
Reduce scrap in lay-up processes	Laser templates / VR
Reduce energy consumption	Laser-assisted thermoplastic tape-layup
Reduce waste in AWJM	Recycling and full water recovery
Reduce machining, tolerances and fastener-count	Low thermal mass tooling Smart alignment
Reduce number of parts	Intelligent. Lightweight fixtures
Recycle CFRP	New low temperature, low pressure process

REFORM Main Objectives

- Laser-assisted tape layup
- Augmented reality layup
- Combined water and abrasive recycling for AWJM
- New AWJM components to improve power and accuracy
- Lightweight assembly fixtures made from recycled material
- New methods of recycling composites
- Business tool for SMEs to assess impact of new technologies

- Reduce energy use by 30% (thermoset) / 20% (cutting)
- Reduce scrap by 30% (layup) / 50% (cutting)
- Reduce costs by 30% (hand layup) / 40% (tooling)
- Reduce delivery time by 15%-20% - all areas
- Recyling of thermoplastics / 100% recycling AWJM consumables / Reclaimed fibres within 8%-20% of virgin properties

AREUS

Goals:

- Energy Consumption reduction technologies
- Novel factory electrical power supply system to improve the use of renewable energy
- Eco-efficient design of robotic production system
- Robotic manufacturing processes optimization environment
- LCA & LCC methods for robotic manufacturing lines

Main impact:

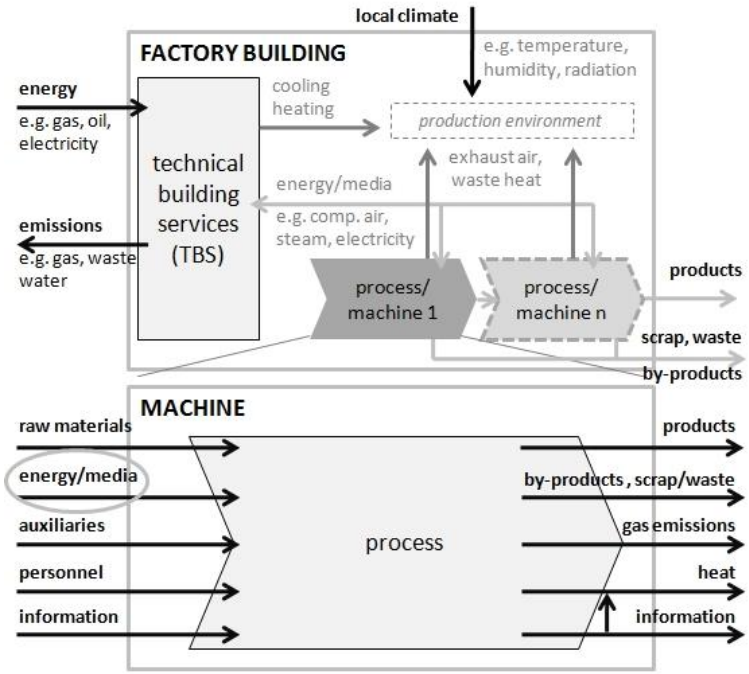
- Reduction of Energy Consumption (-35%)
- Reduction of Peak Power (-35%)
- Reduction of LCC of factories (25%)

AREUS
Automation and Robotics for EUropean Sustainable manufacturing

EMC2-Factory

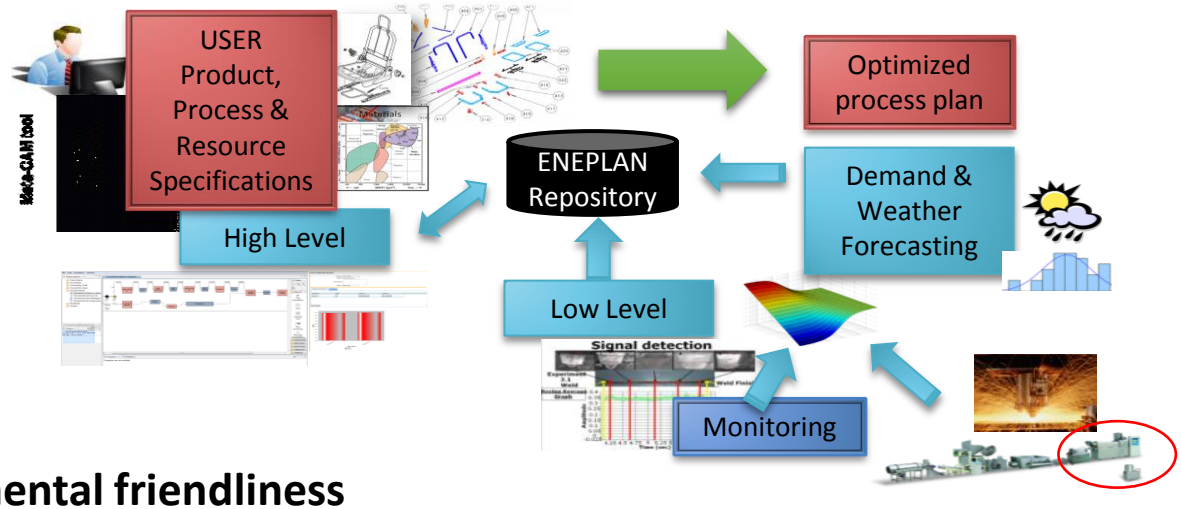
Reduce global resource consumption through:

- Alternative sustainable manufacturing processes
- Monitoring environmental performance
- Intelligent components and control strategies
- Process planning simulation and optimization methodologies



- Improve energy efficiency
- Reduce emissions and waste
- Improve cost-effectiveness
- alternative sustainable manufacturing processes (machining, joining and assembly),
- Intelligent components (drives, sensors and actuators) with enhanced control strategies;
- Knowledge-intensive processes based on diffusion and re-use of eco-solutions
- factory planning simulation SW to support optimization of energy/resource efficiency;
- Factory design guidelines and methodologies to evaluate design options, plan and run clean and competitive factories in green/brown field contexts.

ENEPLAN



Energy efficiency & Environmental friendliness

- Environmental footprint reduction for metal formed components by selecting a more energy efficient combination of process among those available in the already existing supply chain.
- Energy efficiency improvement in working conditions (process level)

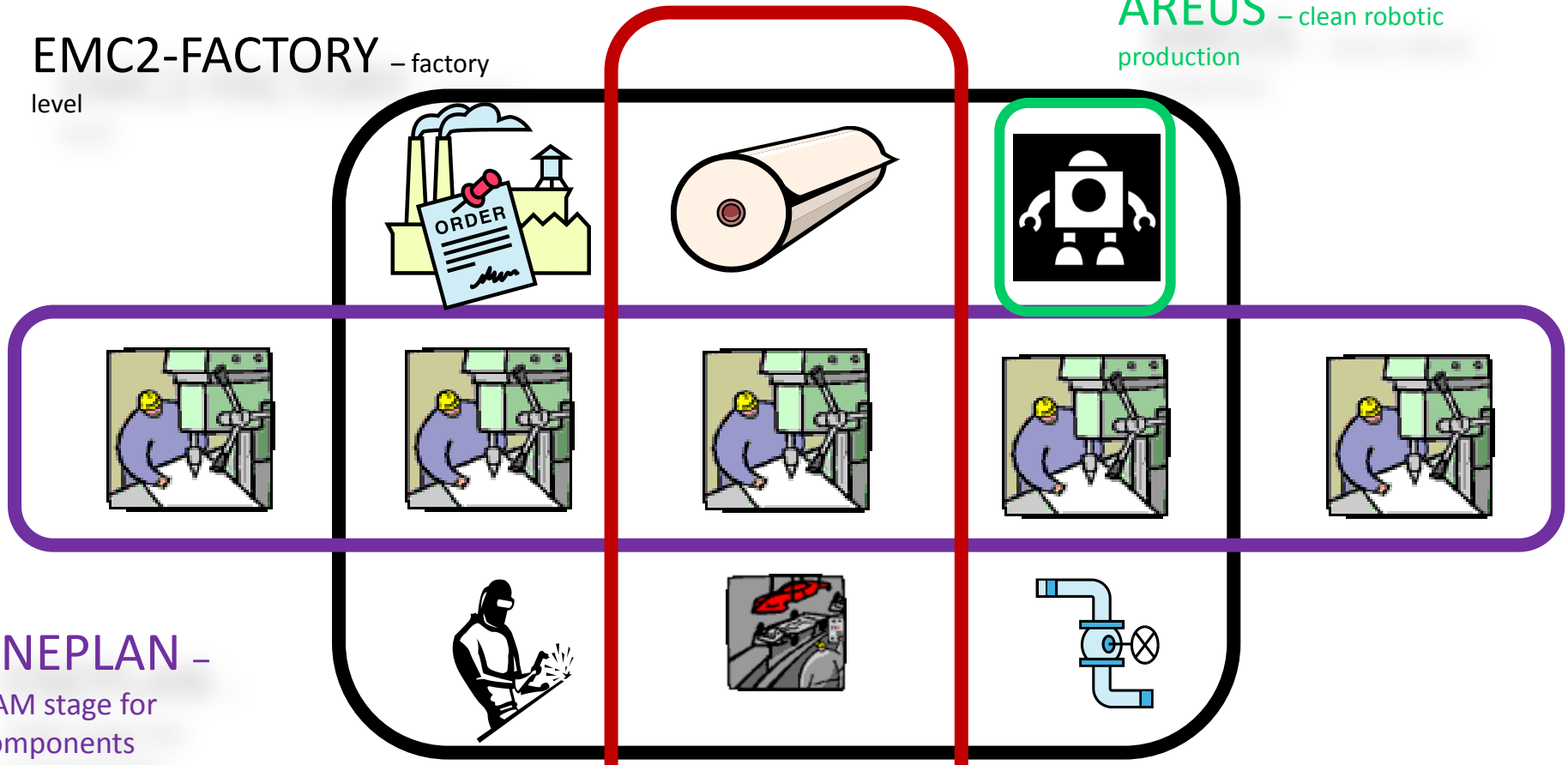
Quick respond to market demands

- Multi-process, multi-company distributed control using the same control along the supply chain
- possibility to use the system to adapt work sequences, process routes and machines behavior to the most efficient working conditions

Four projects, one goal: creating the eco-factory of the future

EMC2-FACTORY – factory level

AREUS – clean robotic production



ENEPLAN – CAM stage for components

REFORM – life-cycle of single component

Four projects, one goal: creating the eco-factory of the future

Initiated by EC in Impact Workshops

Objectives (left to cluster):

- More effective dissemination
- Joint training events
- Improved take-up of results
- Technical demonstrations

FP7 Clustering meeting - Report

Doc Ref:	ECO_Cluster_RP_131015_03	Date:	15 Oct 2013

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Technical synergies of the projects: joint demonstration

- LCA methodology and boundaries
  - Shared LCA methodology between ENEPLAN and REFORM
- Business case methodology
  - Shared from REFORM to ENEPLAN
- Demonstrators
  - A demonstrator was shared between ENEPLAN, REFORM and EMC2-Factory
- Common Key Performance Indicators
- Common vocabulary & terminologies

Project clustering: concrete actions undertaken

- Paper on clustering
- Link to other projects in cluster on project website
- Produce joint “Eco-factory” logo and dissemination material
- Joint workshops, seminars and training events
  - Clustering meetings in Brussels (EU sponsored)
  - Clustering meetings as partner sites
  - Banners and leaflets
  - Shared training event (Milan)
  - Shared exhibition stand (Athens, Milan, Copenhagen)
- Inclusion in FOCUS
- Access to lower TRL results to be integrated in DEMO projects

Practical issues encountered

- IPR issues when sharing technical results
  - Standard features demonstrators
  - Common partner performs demonstrator and sources available results from other projects
  - IPR of methodologies (and timing)
- Trying to organise meetings for 50+ partners
  - Knowing who to speak to in each project
  - Cost of shared meeting
- More desire to share from academics / “profession” coordinators
  - Time / cost penalties
- Projects all at different stages
- Project life-cycle – who “owns” cluster
- Types of projects which are clustered

Conclusions, next steps and suggestions to improve clustering

- Determine benefit to the projects involved
- Add clustering activities to proposal template / DoW
  - Funding for clustering
  - Increases desire of partners to cluster
  - Clustering activities spelled out in DoW
  - (methodologies / timing / types of project…)
- Life-cycle of cluster
- Joint publications and guidelines
- Standardisation and labelling
- IPR guidance