

Expected results

Integrated software platform for cluster-level management of symbiotic energy and resources streams



Life-cycle sustainability assessment framework for the human-mimetic symbiotic cluster



Platform plug-ins for integrated process optimization and demand response



HW/SW Middleware for development of cross-sectorial smart monitoring



Energy Grid application framework



De-polymerization reactor for chemical PET

spirax
sarco

KIT
Karlsruhe Institute of Technology

BiLFINGER

SIEMENS

SYMBI
OPTIMA

grèn
RECYCLING REDUCE REUSE

Istituto di Tecnologie Industriali e Automazione
Consorzio Nazionale delle Ricerche

NXT
CONTROL

Synesis

SEMANTIC
WEB COMPANY

neogroup

ACTOR
Operations
Analytics Control Technology Research

vito
vision on technology

PARADOX
ENGINEERING
UNLOCKING THE VALUE OF YOUR DATA

Technology
Transfer System

SUPSI

Human-mimetic approach to the integrated monitoring, management and optimization of a symbiotic cluster of smart production units

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The context

A substantial resource efficiency improvement has already been achieved in process industries over the past years, but further technological breakthroughs are needed to pass beyond current limitations. Most measures focused on optimising the internal use a company does of its resources for improving local productivity, but real benefits for drastic sustainability improvements are to be found in **stronger synergies** between multiple autonomous entities.

The project

SYMBIOPTIMA proposes a completely new paradigm for industrial clusters: the **human-mimetic symbiosis**. Drawing inspiration from the complexity of the human body, it promotes the mutual interaction of diverse industries, also among different sectors, for beneficial reuse of flows (e.g. water, waste, by-products, energy, recycled materials) that could result in a more resource-efficient production at network level, and in fewer adverse environmental impacts.

SYMBIOPTIMA Objectives

Cross-sectorial energy and resource management of intra-cluster and inter-cluster streams

Development of a holistic model for the definition, life-cycle assessment and business management of a human-mimetic symbiotic cluster

Multi-level synergetic optimization of energy and resources flows within the sectors and across value chains

Extensive, multi-disciplinary, modular and “plug&play” monitoring and elaboration of all relevant information flows of the symbiotic cluster

Integration of all thermal energy sources, flows and sinks of the cluster into a systemic unified vision

Disruptive increase of cross-sectorial re-use for particularly impacting waste streams

Cluster

Cross-Sectorial ERMS

