SYMBIOPTIMA

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

• Reference of the call: H2020-SPIRE-2014-2015
• Start/end date: 1 September 2015 – 3 years
• Partners: 15 partners from 7 EU countries
Project Case Study

1. The EU/ SPIRE needs

KA 2.5: New flexible energy and resource management concepts such as industrial symbiosis need to be developed. 
SPIRE goal: to migrate to the energy and resource efficient zero-waste process industry of the future

2. The Project Solution

ERMS – Energy & Resource management system
Integrated modular toolset for:
D/R optimization, energy aware P&S
Raw material & Waste flows management
LCA/LCC/SLC assessment

3. Value to Customers

Customers will be able to have:
• An integrated solution monitoring and optimizing concurrently the consumption (and, if possible, re-use) of its main resources: water, thermal energy, electricity, raw materials, waste, etc.

4. How will this happen?

Scalable portfolio of solutions (platforms and tools) conceived for the single company and the cluster of actors
What are the **key expected sustainability impacts** of SYMBIOPTIMA?

**Baseline(s):**
1 - chemical industrial site (PET yearly production: 308 MT of PET - 11 % of Total EU PET market) with a monthly consumption of about : 6M KWh (energy), 8M KWh (gas), 11M KWh (biomass), 35M m³ (water)
2 - Industrial park (>20 companies for 12MT goods/year)

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<th>Indicator</th>
<th>Baseline</th>
<th>Expected Impact</th>
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| **Global Warming Potential (mainly CO2 emission reduction)*** | 1 – 462000 tons CO2/year  
2 – 775000 tons CO2/year | *Data to be evaluated in yr3 of project*  
CO2 emission reduction in a range 15-25% mainly due to:  
Improved production resources efficiency: 18%  
Increased used of recycled material: 30%  
Increase thermal energy efficiency: 12% |
| **Fossil energy intensity***                   | 1 - Cumulative energy demand currently 1,1 MJ per tonne of product  
2 - 18200 GWh/year for average industrial park | *Data to be evaluated in yr3 of project*  
Reduction of energy demand from outside the cluster: 20%  
Reduction for cluster energy consumption: 10%;  
Improvement in excess heat recovery: 25% |
| **Total material consumption***               | 1 – 27000 ton/year  
2 - Equivalent mineral resource 35944000 ton/year, Equivalent biomass consumption 1964000 ton/year | *Data to be evaluated in yr3 of project*  
Improvement in material re-use: 25%  
Reduction of un-used waste: 35%  
Reduction for cluster resource consumption: 5%;  
Reduction in cost for symbiotic recycling of PET: 68% |
What outputs or learning from SYMBIOPTIMA could have value for other SPIRE projects here?

Advanced Energy & Resource Management System (ERMS) supporting industrial symbiosis paradigm
- based on distributed architecture
- exploiting semantic web and model based optimization technologies
- fostering complete digitalization of process assets

Modular and scalable set of tools addressing:
- Integrated optimization of Demand-Response and Energy Aware Planning & scheduling of the cluster
- MPC solutions for real time optimization of energy (co-)generation systems
- An integrated LCSA (Life-cycle sustainability assessment) framework including LCA-LCC-SLC aspects
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