SHAREBOX - Agent Based Modelling (ABM) based Industrial Symbiosis (IS) network design

Project:
Secure Management Platform for Shared Process Resources

Resource efficiency offers a major economic opportunities for the European Process Industry, both in terms of cost savings as well as opportunities to offer greener products and services. Industrial Symbiosis (IS) is the use by one company or sector of by-products, including energy, water, logistics and materials, from another. The approach that underpins SHAREBOX centres on logical work flow that covers from the identification of new symbiotic synergies right through optimised connections among companies and organisations in established symbiotic relationships. SHAREBOX provides plant operations and production managers with the robust and reliable information that they need in real-time in order to effectively and confidently share resources (plant, energy, water, residues and recycled materials) with other companies in an optimum symbiotic ecosystem. The objetive of SHAREBOX project is to develop and bring to market a secure platform for the flexible management of shared process resources with intelligent decision support tools. To provide plant operations and production managers with the robust and reliable real-time needed to optimise symbiotic connections (plant, energy, water, residues and recycled materials) with other companies in a symbiotic ecosystem. In order to overcome the limitations in current Industrial Symbiosis delivery and ICT tools for IS facilitation, a number of key innovations are being brought to the SHAREBOX development that yield a world first ICT platform technology that holds the potential to be a major catalyst for increased Industrial Symbiosis (IS) among process industries and for enabling cross-sectoral interactions.

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Sector:

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Engineering

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Summary:

The research contributions presented in this document focus on (1) allocation of operational costs among firms involved in Industrial Symbiotic Relations (ISRs) and (2) incentive allocation to enable fair and stable implementation of Industrial Symbiotic Networks (ISNs). We model such relations as cooperative games and show the implementability in (one-to-one) ISRs. Then, for (many-to-many) ISNs, we show the cases in which monetary incentives are required and provide a practical multi-agent framework for incentive allocations—that guarantee the implementability of ISNs in a fair and stable manner

Theme:
Energy and resource management systems - SPIRE-06-2015
Keywords:
Industrial Symbiosis, Resource efficiency, Management, ICT, Mathematical tools, Intelligent tools, Platform, User interface, Data entry, Security, Anonymity, Tracking, Material Flow, Industry, Software, Optimization, Relationships, Network, Connection, Sustainability, Environment, Compatibility
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Contact Name:
Georgios Chalkias
Email:
gchalkias@iris.cat