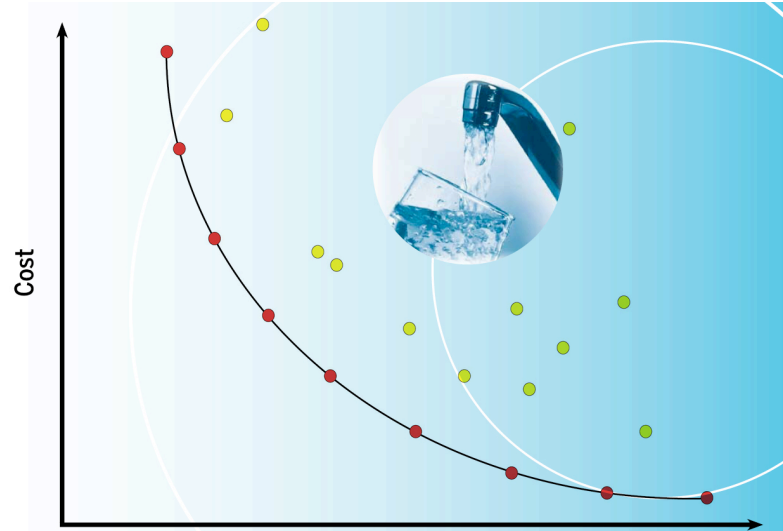


PROJECT FACTSHEET

www.list.lu/en/research/project/oasis/?no_cache=1&cHash=faa8a5615f556620476b5a70ec309703

OASIS

Applying optimization-based integrated process modelling LCA to potable water production



Inspiration

Life cycle assessment (LCA) is a recognized methodology, governed by ISO 14040-44 standards, which is used to quantify environmental impacts associated with a product, process, or service across its whole life cycle (from raw material extraction to disposal). At the micro level, LCA can be effectively used to design industrial processes in order to improve their environmental performance. The main scientific barriers to this aim are, however, the lack of flexibility of models representing process plants in LCA and the lack of a systematic way of generating process design and operation alternatives for carrying out environmental improvements. In order to overcome these limitations, a progressive sophistication of LCA modelling is necessary.

Innovation

A step towards an integrated process modelling-LCA framework was recently made by the partners of the OASIS project, who developed an effective tool, EVALEAU, to simulate and assess potable water treatment chains. The tool's framework is potentially replicable and scalable to other industrial sectors. In order to fully address the aforementioned limitations and in line with the international efforts of the LCA community to strengthen the role of LCA in process ecodesign, the next step of development envisaged by the partners consists in coupling LCA with optimization algorithms automatically seeking the best design alternative (in the realm of technically and economically feasible solutions) according to predefined environmental criteria.

The OASIS project addresses the question of the feasibility and effectiveness of increasing the automation of the ecodesign of an industrial process, by optimizing its future operating conditions based on integrated process modelling-LCA approach. The main aim of the project is therefore to develop a generic process ecodesign modelling framework, rooted on coupling of process modelling, LCA and optimization algorithms based on constraint and multiobjective programming. The project will focus on the case of water treatment chains and the developed ecodesign approach will be tested and validated on four specific case studies of water treatment designs already successfully studied by the project partners.

Impact

OASIS builds on existing competences and collaborations between the project partners and is an essential step in the pursuit of their respective research agendas. The main impact foreseen is the consolidation of collaborative efforts between these groups toward building a critical mass around this scientific topic. This will ensure the transfer of novel knowledge to the scientific community as well as an increase in the international visibility and recognition of the project consortium.

Partners

INSA - National Institute of Applied Sciences (FR) , Insight Centre (IE)

Contact

5, avenue des Hauts-Fourneaux
L-4362 Esch-sur-Alzette
phone: +352 275 888 - 1 | LIST.lu

Dr-Ing. Enrico BENETTO (enrico.benetto@list.lu)
© Copyright April 2025 LIST

LUXEMBOURG
INSTITUTE OF SCIENCE
AND TECHNOLOGY

