Ben Zhu

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Personal information:

Ben Zhu is currently a PhD candidate at Delft University of Technology, focusing on Developing a dynamic and applicable Industrial Symbiosis data repository by use of semantic web tools extracting from and combining major European databases.

He graduated from the MIND programme in 2013. Under the structure of this master, he studied first at the University of Graz in Austria, followed by the Delft University of Technology and Leiden University in the Netherlands. By the courtesy of this program, he also went to Rochester Institute of Technology in the US for three months, partly to complete research for his master's thesis. His thesis is about LCA and LCC on industrial symbiosis, which was presented in the 7th ISIE Biennial conference in Korea.

He is generally interested in sustainability issues, particularly in the field of life cycle assessment, industrial symbiosis, renewable energy and sustainability in design. He has hands-on experience with interactive LCA on the design of portable biogas system, life cycle sustainability assessment and LCA on the housing sector. Ben also holds a master's degree with distinction in sustainable energy systems from University of Edinburgh, focusing on wind and marine energy.

Title of thesis: Life cycle assessment and simplified life cycle costing on industrial symbiosis

Abstract:

This paper adopts the life cycle thinking as the approach to assess the economic and environmental performances of industrial symbiosis. A detailed guidance of implementing LCA on industrial symbiosis under four research purposes is presented. 19 scenarios of two firms interacting with each other are analyzed in detail regarding the choice of functional 6unit, the determination of LCA alternatives and the quantification of material flows. Symbiosis is considered as a multifunctional process, which enables the comparison of symbiosis design options.

This research contributes to develop a framework of LCA and life cycle costing (LCC) on industrial symbiosis. The equation of calculating LCC from the perspective of symbiosis is presented. The steps and procedures of this framework are illustrated with a case. A symbiosis assessment diagram with flows as well as monetary and physical parameters is designed to visually reflect the relevant information regarding LCC and LCA.

Simplifying the LCA approach, the essence of LCC from the perspective of symbiosis, the necessity of having an integrated framework and the symbiosis design of the case study are discussed. While future researches are recommended on deepening the case study, broadening the methodology and incorporating consequential approaches.