

## ANNUAL REPORT 2007

### Industrial Symbiosis System Boundaries (ISSB) – Consortium

#### RESEARCHERS OF THE CONSORTIUM

Sub-project 1: *Conceptual Analysis of Industrial Symbiosis System Boundaries, Åbo Akademi University:*

Dr. Jouni Korhonen, Academy Fellow (in charge of Sub-project 1)

Ms. Kaisa Pihlatie, Research Manager, M.Sc. (Env. Econ.)

Ms. Johanna Haataja, Research Assistant, B.Sc. (Econ.)

Mr. Olavi Holmijoki, Researcher, M.Sc. (Tech.), PhD student

Sub-project 2: *Modelling Industrial Symbiosis System Boundaries, Finnish Environment Institute (SYKE):*

Dr. Matti Melanen, Research Professor (in charge of Sub-project 2)

Ms. Laura Sokka, Researcher, M.Sc. (Env. Science and Policy), PhD student

Dr. Ari Nissinen, Senior Researcher, Post-doc

#### UPDATED SYNOPSIS OF THE PROJECT

The existing studies on environmental performance of industrial symbiosis systems (IS) usually concentrate on one or a limited number of factors. IS uses a narrow approach to system boundaries often considering just the impacts taking place within the arbitrarily defined symbiosis boundaries. These hypotheses are now verified through exploration-orientated literature and conceptual analyses. Tools potential for these kinds of assessments have been developed rapidly both in number and in capacity. However, the ISSB consortium observes that such tools are usually developed in a universal sense, i.e., not designed to the specific conditional and contextual factors of industrial symbiosis networks. Building upon the Life-Environment project "The Eco-efficiency of Regions – Case Kymenlaakso (ECOREG)" 2002–2004, the highly industrialized Kymenlaakso Region in Finland is analysed with the questions: *What are the appropriate system boundaries for the definition and development of IS systems? How can the boundaries and their environmental relevance be identified and evaluated?* One IS from the region is chosen for an in-depth case-study. As a result, a methodological framework is developed through which the environmental performance and overall sustainability of IS networks can be assessed and analysed.

#### PUBLICATIONS AND PRESENTATIONS

Articles published and accepted in peer-reviewed international scientific journals

Korhonen, J. 2007. From Material Flow Analysis to Material Flow Management: strategic sustainability management on a principle level. *Journal of Cleaner Production* 15 (17): 1585-1595.

Korhonen, J. 2007. Reconsidering the economics logic of ecological modernization. Accepted for publication in *Environment and Planning A*. [Acceptance letter dated October 6, 2007.]

Manuscripts submitted to peer-reviewed international scientific journals

Mickwitz, P. & Melanen, M. 2007. The role of co-operation between academia and policymakers for the development and use of sustainability indicators – A case from the Finnish Kymenlaakso Region. Submitted for publication in *Journal of Cleaner Production* on June 21, 2007.

Sokka, L., Melanen, M. & Nissinen, A. 2007. How to measure the sustainability of industrial symbioses? Submitted for publication in *Progress in Industrial Ecology (PIE)* on October 10, 2007.

Conference presentations

A platform presentation "Monitoring regional sustainability – indicators developed and used in the Finnish Kymenlaakso Region" (Matti Melanen), Workshop on Sustainability and Decoupling Indicators: Life Cycle Based Approaches, arranged by JRC/IES, Cyprus, January 22-23, 2007

- A platform presentation "Modelling industrial symbiosis system boundaries" (Laura Sokka) in Track 10 of the Västerås Conference (see Other activities / Conference arrangement below) <sup>1</sup>
- A platform presentation "A sector-level industrial ecology study from the Finnish Kymenlaakso Region" (Matti Melanen) in Track 10 of the Västerås Conference <sup>2</sup>
- A platform presentation "The challenge of industrial symbiosis system boundaries" (Jouni Korhonen) in Track 10 of the Västerås Conference <sup>3</sup>
- A platform presentation "Sustainability indicators developed for the Finnish Kymenlaakso Region – an example of successful co-operation between academics and regional authorities" (Matti Melanen) in Track 21 ("The Role of Academia in Regional Sustainability Initiatives") of the Västerås Conference <sup>4</sup>

## OTHER ACTIVITIES

### Conference arrangement

Organizing (Co-chairs Jouni Korhonen & Matti Melanen) the Track 10: "How Can Industrial Ecology Contribute to Regional Sustainability?" at the *13th Annual International Sustainable Development Research Conference*, Mälardalen University, Västerås, Sweden, June 10-12, 2007 <sup>5</sup>. Altogether 18 platform presentations were held in the track. Some of the presented papers were selected to be developed and submitted, through a peer-review process, for publication in a *Progress in Industrial Ecology (PIE)* special issue on industrial symbiosis system boundaries (for more information please refer to Editorial activities below).

At present, the consortium is working intensively for the *14th Annual International Sustainable Development Research Conference*, which will be held in New Delhi, India, September 21-23, 2008.<sup>6</sup> (ÅA team is the responsible organizer of the entire conference.) In the conference, the consortium will also organize a special track on "Industrial Ecology for Climate Change Mitigation" (for more information please refer to Editorial activities below). The 2007 conference already attracted altogether some 300 participants and some 30 in the IS session organized by the ISSB group. We believe the 2008 conference can attract up to 500 participants, and some 50 to the track on Industrial Ecology for Climate Change Mitigation. Matti Melanen, Jouni Korhonen and the entire ISSB consortium team are organising.

### Editorial activities (peer-reviewed international scientific journals)

Editing a Double Special Issue on "System Boundaries of Industrial Symbiosis", *Progress in Industrial Ecology (PIE)*, 2007-2008, Matti Melanen as Guest Editor, Jouni Korhonen as the Editor-in-Chief of PIE. (Selected Västerås Track 10 papers; 12 revised conference full-papers have been received and are in the review process.)

Based on the 2008 conference in New Delhi another special issue in PIE will be published with the preliminary working title "Industrial Ecology for Climate Change Mitigation". These editorial projects are based on the thorough connection the ISSB consortium has with its many international networks and partners (e.g. International Sustainable Development Research Society, ISDRS).<sup>7</sup> The annual international conferences (such as the 2007 event in Västerås and the 2008 conference in New Delhi) are used as platforms to debate the first submissions prior to the journal peer review processes.

<sup>1</sup> In: Cerin, P., Dobers, P. & Schwartz, B. 2007. *13th Annual International Sustainable Development Research Conference. Critical Perspectives on Health, Climate Change and Corporate Responsibility*. June 10-12, 2007 at Mälardalen University in Västerås, Sweden. Conference Proceedings (Abstracts). Mälardalen University, Sweden. P. 160

<sup>2</sup> -- P. 159

<sup>3</sup> -- P. 158

<sup>4</sup> -- P. 231

<sup>5</sup> Conference website <http://www.eki.mdh.se/sdconf07/>

Website of Track 10 <http://www.eki.mdh.se/sdconf07/track10/>

<sup>6</sup> Conference website <http://www.14aisdrc2008.com>

<sup>7</sup> ISDRS website <http://www.isdrs.org>.

Participation as members (Matti Melanen & Jouni Korhonen) in the Guest Editorial Team, Special Issue on "The Role of Academia In Regional Sustainability Initiatives", *Journal of Cleaner Production*, 2007-2008

Referee activities (peer-reviewed international scientific journals)

Jouni Korhonen:

- reviewer of about 50 scientific articles in *Progress in Industrial Ecology* (Editor-in-Chief), *Journal of Cleaner Production* (Associate Editor), *Business Strategy and the Environment*, *Sustainable Development*, *Corporate Social Responsibility and Environmental Management* and the *International Journal of Innovation and Sustainable Development* (Member of the editorial board).

Matti Melanen:

- three reviews for *Journal of Cleaner Production*, one review for *Progress in Industrial Ecology*

Laura Sokka:

- two reviews for *Journal of Industrial Ecology*, one review for *Journal of Environmental Management*

Reviewer activities

Eva Pongrácz's application for docentship "Industrial Environmental Engineering, Especially Industrial Ecology and Resources Management in Production Processes", University of Oulu, Technical Faculty, reviewers Jouni Korhonen & Matti Melanen, January 17, 2007

Appointment process of the Professor of Environmental Engineering at the Helsinki University of Technology, reviewer Matti Melanen, February 22, 2007

Website of the project

A website (in English) for the project has been published in October 2007: [www.environment.fi/syke](http://www.environment.fi/syke) (> Finnish Environment Institute > Research > Production and Consumption > Themes and projects ... > Industrial symbiosis system boundaries)<sup>8</sup>

#### PROGRESS MADE IN RELATION TO THE PROJECT PLAN

ÅA team has succeeded in utilizing the extensive peer-review networks at its disposal (PIE, JCP, ISDRS etc.) and secured an international cross-disciplinary expert brain-storming process on the actual concept of industrial symbiosis. Already strategic guidelines for this process have been openly debated in a large special issue of *Journal of Cleaner Production* (Elsevier Science) including 14 peer-reviewed contributions from international authors. Thus the team has read widely and is in the process of preparing manuscripts. At SYKE, PhD student Laura Sokka was on maternity leave until August 31, 2007. Planned activities from her part were thus slightly delayed. This was however effectively compensated by the Västerås Track 10 arrangement, the ISSB presentations given in this Track and the manuscript submitted to the *PIE* journal special issue by developing one of these presentations to a scientific paper (see above). As planned, Kymenlaakso's sector-level monetary and physical I-O tables were updated for year 2005 by the end of October (University of Oulu, docent Ilmo Mäenpää and his team, as subcontractor). UPM-Kymmene Corporation, Kymi paper mill was chosen as the ISSB in-depth case-study "industrial symbiosis" that will be modelled in 2008 following the project plan. Moreover, the usability of life-cycle information in the communication to stakeholders and especially consumers has been considered, and the role of information in the strive for better environmental performance through industrial symbioses and marketing environmentally sound products of industrial symbioses will be further analyzed.

Helsinki, January 15, 2008

Jouni Korhonen and Matti Melanen

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<sup>8</sup> ISSB website <http://www.environment.fi/default.asp?contentid=254826&lan=en&clan=en>