Industrial Symbiosis Eco-Industrial Development Section Update

international society for industrial ecology

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This update service is provided by the Industrial Symbiosis Eco–Industrial Development Section of the International Society for Industrial Ecology. We welcome your announcements, call for papers and announcements of academic publications, corrections, insights and feedback.

The Section board consists of Marian Chertow (Professor, Yale U., USA) , Weslynn Ashton (Board Secretary and Assistant Professor, Illinois Inst. Technology, USA), Ankit Aggarwal (Student, TU Munich, Germany, Student Member), Professor Shi Han (Board Treasurer and Assistant Professor, City U of Hong Kong, China) , Rachel Lombardi (Research fellow U. Birmingham, UK and practitioner with NISP), and Peter Lowitt (FAICP, practitioner, Devens Enterprise Commission USA and board Chair). The board serves for a two year period from 2011-2013.

- Communications: this committee will work on establishing protocols for communicating with members and be responsible for sending out updates. The group should examine the various existing communications platforms and determine how best to communicate with members of the section and non-members. An active linked in discussion group has been one result of this initiative. (http://www.linkedin.com/groups?about=&gid=1845383&trk=anet_ug_grppro). We encourage you to join up and add to the discussion. The active exchange of ideas on this site ranges from discussions of orange by-products as a source for biofuel to discussions of parallels' between the financial and climate crisis (see below for a summary of this update's topics).
- Programming and events: this committee will work on defining (co-)sponsorship of events, assist in planning events; determining ways goals and deliverables for the section, examining ways to fund initiatives such as PhD student exchanges or graduate consortium events. The *9th Annual Industrial Symbiosis Research Symposium (ISRS)* will take place on October 19, 2012, in Tianjin Economic-Technological Development Area (TEDA), about 150 km southeast of Beijing. ISRS will be followed by the *3rd ISIE Asia-Pacific Meeting* to be held in Tsinghua University, Beijing on October 20-21,

2012, which will focus on theme "*Asia-Pacific Toward Eco-Industrial Development".* http://www.cern.org.cn/.

- Database and information sharing: this committee will work on determining the best means of sharing information about projects and synergies, utilizing existing platforms or suggesting new ones, and working together to organize this initiative. We need volunteers for this committee.

Linked In Questions and IS Case Studies: Much thanks to Ines Costa for jump-starting this group. The following are some of the recent postings. Be sure and go to our Linked-in site for more in depth information on these and other items. This effort assists the Section in implementing our communications plan.

Member Graham Aid asks: Active vs Passive IS Facilitation: "Does anyone have specific data showing the success rates (using metrics such as transfers created) regarding passive (such as web based waste exchanges) and active facilitation (such as quick win workshops or strategic brokering)? Also interesting could be resources input / weighted consequential connections." This conservation has generated a healthy exchange on the listserv over the past month, with numerous commentators chiming in on the subject. It morphed into a discussion of business facilitation models for waste management firms leading to some interesting exchanges. Jon Roberts followed up with a discussion of an article calling for the waste management companies to transform their operations or "die out."

Jon Roberts also started a discussion on the role of industrial symbiosis as a driver for the circular economy.

Ines Costa reported on the release of a new European Environmental Indicators Report. She asks "Do we live in a Green Economy? "
Here is the link to the report. http://www.eea.europa.eu/publications/environmental-indicator-report-2012

Conferences, workshops, courses and other events

- 2013 International Society for Industrial Ecology Society Conference, 2013, Ulsan, Korea
- International Working Conference on Applied Industrial Symbiosis (IWCAIS) is scheduled for June 12-14, 2012 in Birmingham, UK. See above for more information
- Leo Baas invites colleagues to the 18th Greening of Industry Network (GIN) conference in Linköping, Sweden, during 21-24 October, 2012. The website of the GIN 2012 conference is developed. A reference group with representatives of

industry, government and university, chaired by the County Governor, is currently working on the organization of on-site workshops as integrated part of the GIN2012 conference. All information about the GIN2012 conference, can be found on www.gin2012.se

- Manila: Professor Anthony SF Chiu invites colleagues to the 9th (Elsevier) International Conference on International Society for Business Innovation and Technology Management (ISBITM) in Microtel Mall of Asia, Manila, Philippines during October 7-9, 2012. A reference group with representatives of industry, government and academe, chaired by the President of the ISBITM, is currently working with its Asia Pacific Regional chapter (APBITMS). Conference focuses on green business model and sustainable technology management, and is co-organized by Derby University, De La Salle University, and other partners. All information about the ISBITM Manila conference can be found on www.apbitms.org.

- Sustainable Innovation 2012 Call for Papers
  Resource Efficiency, Innovation and Lifestyles
  Part of the 'Towards Sustainable Product Design' series of conferences
  17th International Conference
  October 2012
  Germany
  Conference website: **Sustainable Innovation 2012**

  - Electronics Goes Green 2012+ Joint International Conference and Exhibition. September 9 – 12, 201

  - ReuseConex 2012 (10/18-20/12): *ReuseConex 2012*, the 2nd National Reuse Conference & Expo, w
    Oregon. The Reuse Alliance Portland Chapter's Steering Committee will be spearheading the event p
    exhibit, sponsor, or attendee), please contact us at reuseconex@reusealliance.org.

  - US Eco Industrial Development networking event September 12-14, 2012 to be held at Devens Conf
    Development projects are invited to attend a gathering to establish a network in order to share inform
    papers and proposals for presentations can be found at www.devensec.com/sustain.html

  - The Swiss Federal Office of the Environment will conduct a workshop on Eco-Innovation Parks (inc
    Bern.

  - 2012 Int'l Society for Business Innovation & Tech Mgt Conf. Jul 1-3, 2012, Genting Resort, Malaysia

- 10th Int'l Society for Business Innovation & Tech Mgt Conf. Jan 20-22, 2013, Taipei, Taiwan (Elsevi
- Now – July 29, 2012 Detroit, Michigan USA Museum of Contemporary Art is holding an exhibit on t
  factories and "Factories can be in cities because they're cleaner and greener. We don't need as large a
  that there's room for industrial symbiosis," says curator Nina Rappaport. "Most of the factories in citi
  And this is part of why Rappaport stresses the "vertical" part of "Vertical Urban Factory." Because th

potential for them to pile into the same space. The exhibition proposes an urban factory that integrate within it to save resources or reuse the wastes of their neighbors. Rappaport envisions a factory withi manufacturers of today but also engenders a new crop of manufacturing businesses that don't have to suggesting exists today, but she argues that architects and planners and engineers could potentially cr the city."

Publications and presentations of interest:

- A selection of previously published articles on industrial symbiosis has been compiled at http://jie.yale.edu/symbiosis. Included in the compilation is a comprehensive list of all articles and columns published in the Journal of Industrial Ecology on industrial symbiosis.
- **A New Approach to Industrial Waste Recycling in Turkey: Industrial Symbiosis in Iskenderun Bay** by E. Alkaya*, M. Böğürcü, F. Ulutaş*, G. N. Demirer

  Industrial symbiosis (IS) represents that two or more industrial operations, which are preferably close to each other physically and work independently, form long-term partnerships and work in solidarity to increase resource efficiency, environmental performance and competitiveness.
  In Turkey, the IS approach is being realized within the scope of the project "Industrial Symbiosis Project in Iskenderun Bay – Implementation Phase" between 2011 and 2012. The project is carried out by Technology Development Foundation of Turkey (TTGV) with the consultancy of Middle East Technical University (Turkey) and International Synergies Limited Company (United Kingdom). Financed by the Baku-Tbilisi-Ceyhan Pipeline Company (BTC Co.), the general objective of the project is the introduction of IS into the area of Iskenderun Bay (Adana, Mersin, Iskenderun and Osmaniye), as a mechanism to increase the collaboration and solidarity between companies for the purpose of achieving both environmental and economical improvement in the region, as well as creating a background for a national program.
  The identification of symbiotic relations (IS opportunities), implementation of feasibility studies and realization of pilot applications are the backbone of the project. For this purpose a regional network of companies was established as a result of company visits and interactive workshops, in which potential synergies (symbiosis options) were developed.

  The benefits of the project will consist of both economical and environmental gains particularly underlining amount of waste reductions, resource savings, landfill diversions and decreases in CO_2 emissions, etc. The paper was presented at an International Reuse and Recycling Conference.

- "Process analysis of the dynamics of eco-industrial park's development: a case study of TEDA in China" by Chang Yu of TU Delft

  Abstract

In the last two decades, eco-industrial park (EIP) has become a policy-driven attempt to apply the principles of industrial ecology and sustainable development (Gibbs, 2009) to reduce the environmental impact of economic activities. The core of EIP is industrial symbiosis (IS) i.e. engaging traditionally separated industries in a collective approach for competitive advantage involving physical exchange of materials and by-products, shared management of common utilities and infrastructure to provide process water, energy or common treatment of effluents and wastes (Chertow, 2000). The eco-transformation of an industrial park doesn't come about overnight. By contrast, it is a progressive process embedded in a socio-technical context and requires the fundamental changes through the co-evolution of technological and institutional systems (Dijkema and Basson, 2009). However, the relevant methodologies and approaches about EIP can't well understand how the changes unfold in the micro level during the development of an EIP system.

This research aims to understand what drives the changes of an EIP and to illustrate how the changes unfold over time. Authors believe that the approach would provide a novel view to illustrate the dynamic process of EIPs. This paper is outlined as follows. Section 2 introduces the reasons for adapting the process analysis to study an EIP's development. Then the literature review is provided about IS and EIP, which generates a list of the key activities promoting or hindering the development of an EIP as well as the indicators for tracing the activities through time. In section 3, the approach is applied to a Chinese case-Tianjin Economic-technological Development Area (TEDA) to analyze how these key activities enable or hinder the eco-transformation of TEDA. In the end, we conclude the pattern of TEDA based on the process analysis and discuss about the limitation and outlook of this research.

To better understand what drives the changes of an EIP and how the changes unfold during the development, this research adapts process analysis which aims to capture and explain the two different types of forces and mechanisms that can influence the change and development. Process is defined as a sequence of events that describe how things change over time. The point of process analysis is to obtain the meaningful insights into the changes unfolding over the duration of a subject's existence (

Poole et al., 2000). The advantage of this approach is the rich qualitative information about the processes, meanwhile its quantitative characteristic also overcomes the drawback of the individual case study lacking of generalizability. The reasons why we consider to adapt process analysis are that: (1) A considerable number of comprehensive overview and cross-case studies elaborate the drivers and barriers influencing an EIP's development, such as the active participation of stakeholders, regional learning, financial incentives and regulations. However, it is still not quite clear how these factors work over time at the EIP system level. (2) Although case studies detailedly explain about what happened during the development of these industrial parks, the narrative analysis

is context-specific, lacking of a framework to structure the empirical materials to extract the patterns for comparison and generalization. Thus authors adapt process analysis which can structure the key activities influencing the changes of EIP systems even in different institutional set-ups, as well as map the dynamic process of the system development for general explanations.

In order to investigate the important factors promoting or hindering IS/EIP projects, 44 journal papers are reviewed to seek these elements and classify them into different groups of key activities for tracing the related events in the empirical research, i.e. company activity, informational activity, technical facilitating, economic and financial enabling, institutional activity. The role of each key activity is further explained in the paper. Moreover, in order to trace these activities from the empirical materials, we use a list of indicators to map the events influencing the changes of an EIP.

In the case study, this research investigates a Chinese EIP-TEDA who started the eco-transformation since 2000. After years' effort, the embryo by-product exchanges have emerged within the four main industries including electronics & telecommunications, automobile, food & beverage and biomedicine. Moreover, the utility sharing is gradually enhancing on water cycle system, cogeneration and garbage power plant. During the goal-directed development, various activities and changes took place in TEDA in the aspects of actor participation, infrastructure enabling and institutional intervention. To illustrate the change process of TEDA, we build the database with the historical events from 2000 to 2011 and the events are structured by the 5 groups of key activities mentioned above.

The results of TEDA case reveal a typical top-down model in China that planning comes first and the incentives from preferential policies. But several new characters in TEDA imply the bottom-up signs, such as the positive participation of companies and NGOs. In the aspect of process analysis, this research shows that the approach is useful to analyze the EIP's development, because it is able to access to the details of processes and generalize the causal patterns. While the limitations are that the data sample size is relatively small, meanwhile it requires the massive data analysis to transform the empirical materials into event data.

- Christof Deckmyn student of the University of Ghent presented a poster entitled "Dynamical optimisation of energy grid on eco-industrial parks." The poster addresses the use of storage and renewable energy generation using microgrids for eco industrial parks not connected directly to the grid.
- The ISIE newsletter is available online at: http://is4ie.org/Resources/Documents/ISIENL12.2.pdf
- The Atlantic online featured an article on China's Evolving Sustainability Effort which discussed the circular economy and eco-industrial development.
- Aliénor Marion authored an article in EcoCity Notes about Chinese EcoCities and focused on the Eco-City of Guiyang and the "Pilot project of the eco-industrial park in Kaiyang: The park consists of four priority areas: phosphorous chemical

industry, coal chemical industry, chloro-alkali, power stations, and system recovery of by-products. This eco-industrial park aims to achieve the transformation of traditional, highly resource-consuming industries into high-tech actors, to reinforce the benefits of industrial agglomeration, to improve the economic viability of businesses, to use resources more efficiently, and to improve the ecological environment and to maintain social stability."

- Elle Stapleton has a piece on her blog examining the concept of Industrial Eco-Systems and Eco-Industrial Parks.

Eco-Industrial Development and Industrial Symbiosis in Practice:

Eco-Industrial Projects:

COUNTRY: USA

Massachusetts: The Devens Eco-Efficiency Center and Devens Enterprise Commission announced a call for presentation ideas for their fall event. Plans are being made for the September 12-14, 2012 US Eco Industrial Park networking event at Devens. Interested parties should contact Peter Lowitt at peterlowittatdevensec.com. Additionally, New England Studios announced that they will be building four new sound stages at Devens to facilitate movie and television production in Massachusetts. A regional E-911 facility also held a ground breaking and will be located in a former Army child care facility at Devens.

North Carolina: Charlotte – ReVenture Park announced that over 90 tons of steel and scrap metal from an abandoned textile dye manufacturing facility will be recycled and reused through transformation into new metal products and sculpture as part of the redevelopment of the site into Charlotte's first Eco Industrial Park. Click here to watch a video clip of recycling crews in action. This video is HD quality and free for your use thanks to good folks at ReVenture Park.

Iowa: Eddyville and Fort Dodge both are homes to Cargill facilities which also use their "over the fence development model" of industrial symbiosis around ethanol production facilities.

Nebraska: Blair – Jim Laneof BioFuels Digest writes that Novozymes will open a $200 million facility in Blair, Nebraska, making enzymes for biofuels. Locating near a Cargill plant which has been exploring what they call "over the fence development model", similar to Industrial Symbiosis. "In Blair, Cargill's corn-based, wet mill ethanol plant provides a base load corn grind, and the availability of starch, dextrose, steam, and wastewater treatment, for example, begins to provide the shared manufacturing infrastructure base that attracts other partners. More partners, more companies to share the economics and to utilize, for example, excess process heat and steam.

Accordingly, Cargill's own Natureworks opened a plant in the extended Balir campus in 2002, with a nameplate capacity of 300 million pounds (140,000 metric tons) of Ingeo biopolymer. In 2003, NatureWorks built the world's largest lactic acid manufacturing facility to feed its polymer plant. Evonik arrived as well, and is In producing the feed amino acid L-lysine, and has announced a two-phase expansion of the Blair, Nebraska, plant to an annual capacity of 280,000 metric tons, on track to be completed by this summer."

Texas: Baytown – Jim Lane also writes that Exxon Mobil's huge Industrial Symbiosis operations (this is part of the well documented Houston Ship Channel Industrial Symbiosis including the largest oil refinery in the US at 560,000 barrels a day) will be expanding with the addition of an ethylene production facility . Exxon will use the ethylene for two new 650,000 ton plants being constructed in nearby Mont Belview.

COUNTRY: Thailand
COUNTRY: Malaysia
COUNTRY: United Kingdom Birmingham hosted the International Working Conference Industrial Symbiosis which produced recommendations for EU Policy changes to facilitate Industrial Symbiosis and recommendations for incorporation into the RIO+20 conference.

Northern Ireland: Excellent results are being reported for firms participating in the industrial symbiosis program delivered by Invest Northern Ireland. "World leading premium drinks manufacturer Diageo is among the companies that Invest Northern Irelands Industrial Symbiosis Service has helped to implement a zero waste to landfill policy" a news release reports.

COUNTRY: Azerbaijan
COUNTRY: Australia
COUNTRY: China. Dongguan Eco Industrial Park announced that Gestamp Automocio, a Spanish auto parts manufacturer will open a $120 Million facility in the park. Also the Jilin Chemical Engineering Circular Economy Park in Northeast China's Jilin province is touting their application of industrial symbiosis and recycling.

COUNTRY: Sweden
COUNTRY: Nepal
COUNTRY: Philippines
COUNTRY: Vietnam
COUNTRY: Canada Alberta's Industrial Heartland has placed their Eco-Industrial Development Master Plan on the web at http://www.industrialheartland.com/index.php?option=com_content&view=article&id=110:eco-industrial-plan&catid=46&Itemid=185

COUNTRY: Belgium
COUNTRY: Switzerland
COUNTRY: Norway

COUNTRY: Denmark.

COUNTRY: Netherlands
COUNTRY: Finland
Country: Bahamas
COUNTRY: Brazil Brazil becomes the second country in the world to establish a National Industrial Symbiosis Program. The announcement was made during the RIO + 20 conference in late June.
COUNTRY: Japan
COUNTRY: Korea
COUNTRY: Nigeria
COUNTRY: Germany
COUNTRY: Hungary and Slovakia
COUNTRY: India
COUNTRY: Trinidad and Tobago
COUNTRY: Romania
COUNTRY: Singapore.
COUNTRY: South Africa.
COUNTRY: Turkey The Technology Development Foundation of Turkey, operates an Industrial Symbiosis program with and for Turkish Industries. Information on their programs can be found at http://www.ttgv.org.tr/en (for TTGV in general)
http://www.ttgv.org.tr/en/environmental-activities (for our environmental activities)
http://www.ecoefficiency-tr.org/ (for eco-efficiency programme)
http://www.endustriyelsimbiyoz.org/ (for industrial symbiosis, only in turkish for the present time; just for giving an idea).
Thanks to Ferda Ulutas for providing the information on the program.

Professional Changes and Opportunities: