



INDUSTRIAL ECOLOGY IN THE ASIA-PACIFIC CENTURY: INTERDISCIPLINARY SCIENCE FOR BUILDING SUSTAINABLE INDUSTRIAL SYSTEMS AND HUMAN SETTLEMENTS



**The Joint 11th International Society For Industrial
Ecology (ISIE) Socio-Economic Metabolism Section
Conference and The 4th ISIE Asia-Pacific Conference**



17 TO 19 NOVEMBER 2014

Melbourne Exhibition Centre
Clarendon Auditorium, Level 2
2 Clarendon Street
South Wharf VIC 3006
Australia

PROGRAM



**National
Institute for
Environmental
Studies, Japan**

WELCOME TO OUR CONFERENCE

Dear Conference Participants

Over the past two decades the Asia-Pacific region has experienced phenomenal success in human development, poverty alleviation and economic development. This has come at a cost, however, of rapidly rising natural resource use, and growing waste flows and emissions, contributing to climate change and putting stress on supply systems. The region is currently going through a huge industrial transformation, expanding cities and building infrastructure with more growth to come over the next few decades. This creates exciting opportunities for Industrial Ecology research to inform policies and practices that may guide industrial systems and human settlements. They could be organised in ways which further enhance human wellbeing but with less impact on the environment and resource base.

The role of this meeting is to bring together the knowledge base and facilitate discussion about how our research can contribute to a sustainable future in Asia and the Pacific.

Welcome to Melbourne. Enjoy the conference and your stay.

Heinz Schandl, Sarah King and Tsuyoshi Fujita (Organisers)

ABOUT THE CONFERENCE

The joint conference brings together leading international academics and practitioners involved in Industrial Ecology research and application as well as delegates with an interest in how environmental concerns interact with economic activities.

Our conference focuses on industrial ecology problems and solutions in Asia and the Pacific, the most economically dynamic world region and largest user of natural resources.

The conference promotes the use of industrial ecology in research, education, policy, community development, and industrial practices to allow for development outcomes and practices based on the best available science. The conference will help to bring forth the latest science, ideas, models, solutions and practice in the field through a fabulous line-up of speakers and invaluable networking opportunities.

OPENING BY LORD MAYOR OF MELBOURNE

The conference will be opened by the Lord Mayor of Melbourne, Mr Robert Doyle. He is a Principal at The Nous Group, a management consultancy business based in Melbourne and, since 2007, has been Chairman of Melbourne Health (The Royal Melbourne Hospital).

Robert is President of the Lord Mayor's Charitable Foundation, Chairman of the Royal Melbourne Hospital Foundation and a Trustee of the Shrine of Remembrance. Robert is also an Ambassador for Odyssey House, a drug and alcohol abuse rehabilitation facility, an Ambassador for SecondBite, a not-for profit organisation committed to making a positive difference by distributing fresh food to the disadvantaged and homeless, an ex-officio member of Cancer Council Victoria and an Ambassador for Field of Women, a charity raising awareness of breast cancer, an Ambassador for the White Ribbon Day Foundation, an international day for the elimination of violence against women, an Ambassador for the Juvenile Diabetes Research Foundation, the Honorary President of the Melbourne Region of the Scout Association and a Board member of the Plumbing Industry Climate Action Centre (PICAC) Ltd.

In 2010 Robert was made a Fellow of Monash University.

Robert recently joined the United Nations Advisory Committee of Local Authorities (UNACLA) as a committee member.

A Member of Victoria's Parliament for 14 years, Robert was Leader of the Opposition and Leader of the Liberal Party for four years. He has also been Shadow Minister for Health and, in government, Parliamentary Secretary for Health.



BROAD PROGRAM

Monday, 17 November 2014

8:00–9:00 am	Registration	Clarendon Foyer
9:00–10:30 am	Conference Opening and Welcome to Country by the Lord Mayor of Melbourne and Keynote Presentations from Manfred Lenzen and Peter Laybourne	Clarendon Auditorium
10:30–11:00 am	Coffee Break	Clarendon Foyer
11:00–12:30 pm	4 Parallel Sessions	Clarendon Rooms C, D and E and Auditorium
12:30–2:00 pm	Lunch Break (plus Social Footprints Lab project meeting in Clarendon Room C)	Clarendon Foyer
2:00–3:30 pm	4 Parallel Sessions	Clarendon Rooms C, D and E and Auditorium
3:30–4:30 pm	Poster Session and Coffee Break	Clarendon Foyer
4:30–6:00 pm	4 Parallel Sessions	Clarendon Rooms C, D and E and Auditorium
6:00–7:00 pm	Business Meeting ISIE Sections	Clarendon Rooms C, D and E and Auditorium

Tuesday, 18 November 2014

8:00–9:00 am	Networking	Clarendon Foyer
9:00–10:30 am	Keynote Presentations from Stefan Bringezu, Hiroki Tanikawa, and tbd	Clarendon Auditorium
10:30–11:00 am	Coffee Break	Clarendon Foyer
11:00–12:30 pm	4 Parallel Sessions	Clarendon Rooms C, D and E and Auditorium
12:30–2:00 pm	Lunch Break (plus ISIE students' meeting in Clarendon Room C)	Clarendon Foyer
2:00–3:30 pm	4 Parallel Sessions	Clarendon Rooms C, D and E and Auditorium
3:30–4:30 pm	Poster Session and Coffee Break	Clarendon Foyer
4:30–6:00 pm	4 Parallel Sessions	Clarendon Rooms C, D and E and Auditorium
7:00–10:00 pm	Conference Dinner	Melbourne Aquarium

Wednesday, 18 November 2014

8:00–9:00 am	Networking	Clarendon Foyer
9:00–10:30 am	Keynote Presentations from Thomas Graedel, Arnold Tukker and Marina Fischer-Kowalski	Clarendon Auditorium
10:30–11:00 am	Coffee Break	Clarendon Foyer
11:00–12:30 pm	Joint Sessions of ISIE and AIEN	Clarendon Rooms C, D and E and Auditorium
12:30–2:00 pm	Lunch Break	Clarendon Foyer
2:00–3:30 pm	4 Parallel Sessions	Clarendon Rooms C, D and E and Auditorium
3:30–4:00 pm	Coffee Break	Clarendon Foyer
4:00–4:30 pm	Conference Close	Clarendon Auditorium



KEYNOTE SPEAKERS

Our distinguished keynote speakers for the conference include:

Professor Stefan Bringezu

Director, Material Flows and Resource Management
Wuppertal Institute,
Germany



Stefan Bringezu is Director at the Wuppertal Institute, heading the Research Group on Material Flows and Resource Management, and Professor for Sustainable Resource Management at the Center for Environmental Systems Research (CESR) at the University of Kassel where he also co-chairs the Sustainable Resources Futures group. Biologist by training, PhD in ecosystems analysis. He has worked on chemicals assessment, supply systems and environmental planning; lectured at several universities, initiated scientific networks (ConAccount, cofounder of ISIE), and pioneered on methods such as MFA and derived indicators; member of various advisory boards, Member of the International Resource Panel (co-chair working group land and soil); his main subject is analysis of socio-industrial metabolism and related land use and the instruments to sustain resource supply, use and waste management.

Stefan Bringezu has authored many scientific publications. A key book is:

S. Bringezu, R. Bleischwitz (contr. Eds.) (2009): Sustainable Resource Management – Global Trends, Visions and Policies. Greenleaf Publishers, Sheffield.

www.greenleaf-publishing.com/productdetail.kmod?productid=2920

Conference presentation title:

How much resource extraction would be safe? Approaches to determine a safe operating space of mineral and biomass use.

Professor Marina Fischer-Kowalski

Professor of Social Ecology
Alpen Adria University,
Austria



Marina Fischer-Kowalski founded and was long-term director of the Institute of Social Ecology in Vienna, where she teaches as professor of the Alpen Adria University. Her background is in sociology (Ph.D. at Vienna University). She has taught at Griffith (Australia), Roskilde (Denmark), Yale University (USA) and the Universidad Federal de Rio de Janeiro (Brazil). She was president of the International Society of Industrial Ecology, and currently she is President of the International Society for Ecological Economics. As expert member of UNEP's International Resource Panel, she became lead author to its publication, Decoupling resource use and environmental impacts from economic growth (2011). She is interested in social metabolism across history, on global, national and local scales, and investigates how it relates to social dynamics (quality of life, equity, division and quality of labour, time use) and to environmental change. She works on transitions in complex systems and engages in transdisciplinary sustainability research.

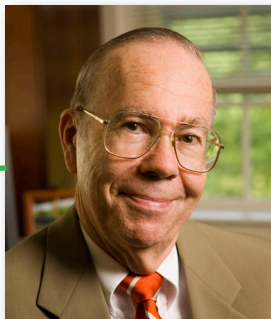
She has published about 300 articles, and her most recent books are Socioecological transitions and global change: trajectories of social metabolism and land use. Cheltenham: Elgar (2007) and Ester Boserup's Legacy on Sustainability. Springer (2014).

Conference presentation title:

The social metabolism in the Anthropocene: modes of subsistence, population size, and human impact on Earth.

Professor Thomas Graedel

Director of the Center for
Industrial Ecology
Yale University, USA



Thomas E Graedel is the Director of the Center for Industrial Ecology and Clifton R. Musser Professor of Industrial Ecology at the School of Forestry & Environmental Studies at Yale University. His research is centred on developing and enhancing industrial ecology, the organizing framework for the study of the interactions of the modern technological society with the environment. His textbook, *Industrial Ecology*, co-written with B R Allenby of AT&T, was the first book in the field. His current interests include studies of the flows of materials within the industrial ecosystem and the development of analytical tools to assess the environmental characteristics of products, processes, the service industry, and urban infrastructures.

Conference presentation title

**The Criticality of Metals: An
Interdisciplinary Perspective.**

Mr Peter Laybourn

Chief Executive
International Synergies Limited



Peter Laybourn is the founder of International Synergies. He graduated with a degree in Economics and Ecology from the University of Southampton and spent 18 years in the aerospace manufacturing industry as contracts and commercial manager at GEC Marconi, Smiths Industries and Meggitt Aviation & Marine. He also worked as sustainability consultant of Shell Exploration and Production, before completing a second degree in Environmental Management. He established the Business Council for Sustainable Development-UK in 2002 and held the position of Deputy Chief Executive for four years before leaving to establish International Synergies. Peter was inspired to create the company's flagship project, the National Industrial Symbiosis Programme (NISP) after learning of the By-Product Synergy programs operating in the Gulf of Mexico in 1999 run by the US Business Council for Sustainable Development. Peter is the driving force behind International Synergies, and works tirelessly to advocate the benefits of industrial ecology and symbiosis around the world and is a retained expert witness on a number of European Panels and most recently initiated the formation of the European Industrial Symbiosis Association (EUR-ISA) which aims to accelerate the wide-scale implementation of industrial symbiosis across Europe.

Conference presentation title:

**Origin and international expansion
of the National Industrial
Symbiosis Programme (NISP®).**

KEYNOTE SPEAKERS

Our distinguished keynote speakers for the conference include:

Professor Manfred Lenzen

Professor of Sustainability Research
The University of Sydney



Manfred Lenzen is Professor of Sustainability Research with the ISA group in the School of Physics at the University of Sydney. He has a PhD in Nuclear Physics and 15 years of experience in renewable energy technologies, life-cycle assessment, and carbon footprinting. His current research interests revolve around the application of input-output analysis to global environmental problems. To this end he has recently published an article about international trade driving global species threats in the journal *Nature*. He currently leads two research initiatives aimed at developing a collaborative research platform to building large-scale physically-extended global multi-region input-output frameworks, employing advanced computation and a cloud environment. He is Associate Editor for the *Journal of Industrial Ecology*, and is the Editor-in-Chief of the journal *Economic Systems Research*.

Conference presentation title:

A vision for enhanced collaboration in Industrial Ecology.

Professor Hiroki Tanikawa

Environmental Systems Research, Graduate School of Environmental Studies
Nagoya University, Japan



Hiroki Tanikawa is a Professor in the Graduate School of Environmental Studies,

Nagoya University, Japan. He completed his Doctor of Engineering degree at Kyushu University in 2000 and has supervised many PhD and masters students. Material stock and flow analysis and its related topics have been his main research interests for over twenty years. Professor Tanikawa has authored many scientific publications.

Conference presentation title:

Weight of Cities – Material Stock and Flow Analysis based on spatial database over time.

Professor Arnold Tukker

Professor of Industrial Ecology and Director of the Institute of Environmental Sciences
Leiden University



Arnold Tukker is the Professor of Industrial Ecology and Director of the Institute of Environmental Sciences (CML) at Leiden University for 70% of his time. Until 1 October 2013 he was business line manager in Societal Innovation and Economy at TNO, a large not-for-profit research organisation in the Netherlands, where he retains a 30% position as senior researcher. He is also a part time professor of Sustainable Innovation at NTNU, Trondheim, Norway. Arnold has set up prominent EU projects in the field of sustainable product design (SusProNet) and sustainable consumption and production (SCORE!) and was core member of the €10 million Dutch Knowledge Network on Sustainable System Innovations. He currently co-ordinates a string of major programs of some €15 million with some 20 key European research institutes in the field of resource efficiency, including constructing the world's most ambitious and detailed global energy/resource/economic input-output databases and models (EXIOBASE). He has authored 6 books, 47 refereed papers and 7 special issues on sustainability research. He has been engaged with the work of the UN on the Green Economy Initiative, the Resource Panel, the Ten Year Framework of Programs on Sustainable Consumption and Production, and Sustainable Development Goals.

POSTER PRESENTATIONS

List of posters on display in the Clarendon Foyer:

Poster Title	Main Presenter	All Authors
Economy-wide Material Flow Analysis for Sustainable Resource Management in Myanmar	Kyaw Nyunt Maung	Kyaw Nyunt Maung, Cherry Myo Lwin, Keijiro Okuoka, Hiroki Tanikawa, Seiji Hashimoto
Development of the quality-oriented End-of-Life vehicle scrap recycling system focusing on steel alloying elements	Hajime Ohno	Hajime Ohno, Kazuyo Matsubae, Nakajima Kenichi, Yasushi Kondo, Shinichiro Nakamura, Tetsuya Nagasaka
(Late cancellation)		
(Late cancellation)		
Pressure Swing Adsorption Model for CO ₂ separation process	Liyang Liu	Liyang Liu, Tao Du, Shuai Che
Critical Materials – A Literature Review	Yanya Jin	Yanya Jin, Junbeum Kim, Bertrand Guillaume
Analysis of the changes in land use by surface mining with satellite images	Yasunori Iwatsuki	Yasunori Iwatsuki, Kenichi Nakajima, Shinsuke Murakami, Hiroya Yamano
Cost, Energy and Global Warming Potential (GWP) Impact of Future Lighting Systems in EU 27	Yanya Jin	Yanya Jin, Junbeum Kim, Bertrand Guillaume
China's carbon footprint: a regional perspective on the effect of transitions in consumption and production patterns	Hiroki Tanikawa	Xin Tian, Miao Chang, Chen Lin, Hiroki Tanikawa
Research of dynamic mechanism and evolutionary path of phosphorus resource-based industrial cluster	Shujie Ma	Shujie Ma, Shanying Hu, Dingjiang Chen
(Late cancellation)		
Corporate Social Responsibility: theories of the firm perspective	Ming-Lang Tseng	Ming-Lang Tseng and Anthony SF Chiu
Stocks, Flows and System Dynamics of Coal Seam Gas Exploitation in Queensland, Australia	Annie McCabe on behalf of Milton Uba de Andrade Jr	Milton Aurelio Uba de Andrade Junior, Anthony Halog, Sebastião Roberto Soares
An Impact Analysis of the Infrastructure Construction Investment Based on Water I-O Table in China	Feng Shi	Feng Shi, Fanping Kong, Yiling Guo, Akio Onishi, Hiroki Tanikawa
(Late cancellation)		

Poster Title	Main Presenter	All Authors
An Interdisciplinary LCA & SD Hybrid Approach for Supporting Policy Framework for Sustainable Photovoltaic Cell Implementation in Australia	Annie McCabe	Annie McCabe, Anthony Halog
A vision for enhanced collaboration in Industrial Ecology	Thomas Wiedmann	The University of Sydney, UNSW Australia, The University of Queensland, The University of Melbourne, Griffith University, CSIRO, The University of South Australia, University of Ballarat, University of Technology Sydney, University of Wollongong
(Late cancellation)		
Stimulating the evolving patterns of eco-industrial systems in network structured multi-agent models	Pi-Cheng Chen	Pi-Cheng Chen, Hwong-wen Ma
Impact quantity: a new dimension to measure the evolution of industrial symbiosis	Xavier Gabarrell Durany	Miriã Camargo Felicio, Daniel Capaldo Amaral, Xavier Gabarrell Durany
Can We Feed the World? An Integrated Framework for Sustainability Assessment of a Production System in the Actual Production System of the Australian Food Industry	Annie McCabe on behalf of Murilo Pagotto	Anthony Halog, Murilo Pagotto
Where do you do your groceries? Linking household food waste to Seoul's food retail environment	Keith Lee	Keith Lee
(Late cancellation)		

ORAL PRESENTATIONS

Monday 11.00 am

Session	Presentation Title	Main Presenter	All Authors
Clarendon Room D (Session Chair: SHI LEI)			
1A1	Examining the physical economy of China during 1995–2010: A decoupling analysis	Heming Wang	Heming Wang, Fengmei Ma, Seiji Hashimoto, Qiang Yue, Tao Du, Zhongwu Lu
1A2	Realising industrial ecology potential within Australian minerals sector: internal and external barriers	Glen Corder	Glen Corder, Artem Golev, Saleem Ali
1A3	(Late cancellation)		
1A4	Comparison of National and Urban Metabolisms from 1980 to 2009	André Pina	André Pina, Michal Monit, Luís Santos, João Rodrigues, Samuel Niza, Paulo Ferrão

Clarendon Auditorium (Session Chair: RUTH LANE)

1B1	Towards a Unified Accounting and Modelling Framework for Industrial Ecology	Stefan Pauliuk	Stefan Pauliuk, Guillaume Majeau-Bettez, Daniel B Müller, Edgar Hertwich
1B2	The Global Industrial Ecology Virtual Laboratory	Arne Geschke	Arne Geschke, Manfred Lenzen
1B3	Uncertainty Quantification (UQ) in Life Cycle Assessments	Lynette Cheah	Lynette Cheah
1B4	A hybrid model to evaluate climate policies with regard to resource intensive industries	Patrick Breun	Patrick Breun, Magnus Fröhling, Frank Schultmann

Clarendon Room E (Session Chair: DAMIEN GIURCO)

1C1	Exploring resource efficiency enhancements through eco-industrial measures within the production and recycling network of the German metal industries	Magnus Fröhling	Magnus Fröhling, Frank Schultmann
1C2	Achieving sustainable industry and urban development: planning and assessment on industrial and regional symbiosis in China	Liang Dong	Liang Dong, Tsuyoshi Fujita, Minoru Fujii, Satoshi Ohnishi, Takuya Togawa, Huijuan Dong
1C3	Development of integrated GIS database and its application to energy-material circulation system design	Takuya Togawa	Takuya Togawa, Tsuyoshi Fujita, Minoru Fujii, Yujiro Hirano, Satoshi Ohnishi, Liang Dong
1C4	Social transitions in eco-industrial development: From eco-towns to a regional symbiosis in Japan	Satoshi Ohnishi	Satoshi Ohnishi, Tsuyoshi Fujita, Minoru Fujii, Liang Dong, Huijuan Dong

Clarendon Room C (Session Chair: TIM BAYNES)

1D1	Urban metabolism and the question of scale: An examination of the trade-offs between off-island and on-island waste and energy recovery strategies in Honolulu, Hawai'i	Clare Gupta	Clare Gupta, Jooyoung Park
1D2	Waste Management and Recycling in the Near Future: Use of Material Flow/Stock Models with Scenarios in Japan	Tomohiro Tasaki	Tomohiro Tasaki, Seiji Hashimoto, Rokuta Inaba, Chihiro Kayo, Keisuke Nansai, Minoru Fujii, Takashi Fujii, Shigesada Takagi, Minoru Yoshikawa, Yuichi Moriguchi, Masahiro Osako
1D3	(Late cancellation)		

Monday 2.00 pm

Session	Presentation Title	Main Presenter	All Authors
Clarendon Room D (Session Chair: STEFAN BRINGEZU)			
2A1	MFA-based potential analysis on eco-efficiency index of China's cement and cement-based materials industry	Wei Wang	Wei Wang, Di Jiang, Dingjiang Chen, Zengbo Chen, Wenji Zhou, Bing Zhu
2A2	Evaluation of the metabolism of cork sector in the Iberian Peninsula: an environmental view	Xavier Gabarrell	Jorge Sierra-Pérez, Jesús Boschmonart-Rives, Xavier Gabarrell
2A3	Resource Decoupling in a Developing Country – economy wide Material Flow Analysis of Bangladesh	Shinsuke Murakami	Shinsuke Murakami, Takahiro Komatsu, Hiroki Tanikawa, Mohammad Mosharraf Hossain, Ryu Koide
2A4	Japanese, Australian, and Chinese resource productivity: Effects of material-use intensity and demand structure of goods and services on national resource productivity	Arata Ito	Arata Ito, Jim West, Heming Wang, Heinz Schandl, Qiang Yue, Tao Du, and Seiji Hashimoto
Clarendon Room E (Session Chair: TSUYOSHI FUJITA)			
2C1	Study of the energy performance of eco-industrial parks in China: From the perspective of energy infrastructure	Jinping Tian	Jinping Tian, Luju Chen
2C2	Proposing Retrofitting an Industrial Park in an Eco-Industrial Park in Brazil: Beyond the Material Exchange	Jose Carlos Lázaro da Silva Filho	Jose Carlos Lázaro da Silva Filho, Domenico Ceglia, Mônica Cavalcanti Sá de Abreu
2C3	Eco-industrial Development in Korea: An update of Eco-industrial Park Program (2005–2013)	Hung-Suck Park	Jinwoong Baek, SangHyeop Cha, Shishir Kumar Behera, Sangyoon Lee, Junghoon Kim, Hung-Suck Park
2C4	A Theoretical Framework on Ecological Management for Industrial Resource	FanPing Kong	FanPing-Kong, YongFei-Jia
Clarendon Room C (Session Chair: SABRINA SPATARI)			
2D1	TMR of Material Production and Recycling for Bottom-up Decoupling	Eiji Yamasue	Eiji Yamasue, Kenichi Nakajima, Shinsuke Murakami, Kazuyo Matsubae, Keiichi N Ishihara
2D2	Sustainability assessment of recycled water for direct and indirect potable reuse in Western Australia	Biji Kurup	Biji Kurup, Humbulani V Tshiguvho, Wahidul Biswas
2D3	Study on the stability of solid waste resourcing industrial chain by material flow analysis: a case study of multi-resource utilization of high alumina coal fly ash	Chenye Wang	Chenjian Yu, Huiquan Li, Bo Chen, Xiaoping Jia, Jingfeng Zhang, Xinjuan Hou
2D4	Sustainable logistics network of wood flow from cascade utilization	Mohammad Sadegh Taskhiri	Mohammad Sadegh Taskhiri, Matthias Garbs, Jutta Geldermann

ORAL PRESENTATIONS

Monday 4.30 pm

Session	Presentation Title	Main Presenter	All Authors
Clarendon Room D (Session Chair: THOMAS WIEDMANN)			
3A1	New approach to track the international trade of material flows within the GHG quantification of recycling	Xavier Gabarrell	Eva Seigné Itoiz, Carles M Gasol, Joan Rieradevall, Xavier Gabarrell
3A2	Visualizing Global Material Flow of Neodymium, Platinum and Cobalt Associated with Use of Durable Goods in Japan and Detecting Hotspots in the Supply Chains	Yasushi Kondo	Yasushi Kondo
3A3	Market Power and Asymmetric Dependencies in Global Commodity Trade Networks	Peter-Paul Pichler	Peter-Paul Pichler, Helga Weisz, Hannes Kutza
3A4	The Inequality Footprints of Nations	Ali Alsamawi	Ali Alsamawi, Joy Murray, Manfred Lenzen
Clarendon Auditorium (Session Chair: REID LIFSET)			
3B1	Material flow in a circular economy	Jonathan Cullen	Jonathan Cullen
3B2	Efficient material management on an Ecoland	Jonathan Busch	Jonathan Busch, Katy Roelich, David Dawson, Julia K. Steinberger, Phil Purnell
3B3	(Late cancellation)		
3B4	Social Sustainability Dimensions of Biofuel Supply at Small Scale	Sabrina Spatari	Ghasideh Pourhashem, Theresa Selfa, Akwasi A Boateng, Sabrina Spatari
Clarendon Room E (Session Chair: KAZUYO MATSUBAE)			
3C1	Food Metabolism at the household level: towards a better accounting of consumption practices	Loïc Leray	Loïc Leray, Marlyne Sahakian, Laura Burger Chakraborty, Suren Erkman
3C2	Community-based tools for Extended Producer Responsibility	Xin Tong	Xin Tong, Jingyan Li, Dongyan Tao
3C3	Environmental Aspect of Product Space Suggests Countries' Future Sustainability	Lei Shi	Yang Li, Lei Shi
Clarendon Room C (Session Chair: LISELOTTE SCHEBEK)			
3D1	Measuring the contemporary dissipation rates of metals during use	Luca Ciacci	Luca Ciacci, Barbara Reck, Thomas E Graedel
3D2	Analysis of energy saving potential of resources recycling industry in China	Xiaoxu Song	Xiaoxu Song, Shanying Hu, Dingjiang Chen, Zhiguo Chen
3D3	Estimating carbon emission and reduction potential in Yellow River Delta High-efficient Eco-economic Zone, China	Yutao Wang	Yutao Wang
3D4	Dissipative losses of critical materials in prospective product-centric material flow analyses	Till Zimmermann	Till Zimmermann

Tuesday 11.00 am

Session	Presentation Title	Main Presenter	All Authors
Clarendon Room D (Session Chair: MARINA FISCHER-KOWALSKI)			
4A1	Urban carbon accounting using the Industrial Ecology Virtual Laboratory	Thomas Wiedmann	Thomas Wiedmann, Guangwu Chen, Hazel Rowley
4A2	Economic and environmental impact assessment of Chinese high alumina fly ash utilization industry based on material flow analysis	Qiang Li	Qiang Li, Li Hui-quan, Bo Chen, Shaopeng Li, Chenye Wang
4A3	Land constraints associated with future food and biofuel demands	Seiji Hashimoto	Seiji Hashimoto, Kento Tamura, Naoki Yoshikawa, Koji Amano
4A4	Dwelling Stock Dynamics for Energy Demand Reduction and Climate Change Mitigation	Luis Felipe Vásquez Correa	Luis Felipe Vásquez, Amund N Løvik, Nina Holck Sandberg, Daniel B Müller
Clarendon Auditorium (Session Chair: TOMOHIRO TASAKI)			
4B1	World Steel Stock and Demand towards 2050	Reina Kawase	Reina KAWASE and Yuzuru MATSUOKA
4B2	(Late cancellation)		
4B3	Material Flow Analysis as a Tool for Urban Planning: Brisbane Case Study	Monika Jaiswal	Monika Jaiswal, Anthony Halog
4B4	Elaborating the history of our cementing societies: an in-use stock perspective	Gang Liu	Gang Liu, Amund N. Løvik, Daniel B. Müller
Clarendon Room E (Session Chair: KAZUYO MATSUBAE)			
4C1	Using Environmentally Extended Input-Output analysis (EEIO) to compare the environmental impacts of different types of food consumption	Michalis Hadjikakou	Michalis Hadjikakou, Thomas Wiedmann
4C2	End-users in a sustainable infrastructure transition: Towards integrated infrastructure services	Sally Russell	Christof Knoeri, Sally Russell, Julia K Steinberger, Katy Roelich
Clarendon Room C (Session Chair: SEIJI HASHIMOTO)			
4D1	How should we recycle scrap steel from End-of-Life vehicles in terms of TMR?	Eiji Yamasue	Eiji Yamasue, Kazuyo Matsubae, Kenichi Nakajima, Ichiro Daigo, Shinsuke Murakami, Keiichi N Ishihara
4D2	Utilization of rice residues for energy in Cambodia	Erik Ahlgren	Erik O Ahlgren, Pooja Ramamurthi
4D3	The environmental impact and economic value of food waste in Australia; a state by state examination: an Input-Output approach	Beatriz Reutter	Beatriz Reutter, Christian Reynolds, Steven Kenway, Joe Lane, Julia Piantadosi, John Boland
4D4	Biofuels from algae – a hybrid life-cycle assessment	Arunima Malik	Arunima Malik, Manfred Lenzen, Bojan Tamburic, Joe Lane

ORAL PRESENTATIONS

Tuesday 2.00 pm

Session	Presentation Title	Main Presenter	All Authors
Clarendon Room D (Session Chair: EIJI YAMASUE)			
5A1	Uncovering the provincial disparity of Chinese water footprint and trade balance	Huijuan Dong	Huijuan Dong, Yong Geng, Tsuyoshi Fujita, Minoru Fujii, Zuoxi Liu, Liang Dong, Satoshi Ohnishi
5A2	Integrated Carbon Metrics: A multi-scale life cycle approach to assessing, mapping and tracking carbon outcomes for the built environment	Judith Schinabeck	Judith Schinabeck, Thomas Wiedmann, Hazel Rowley, Soo Huey Teh
5A3	The carbon footprint of Australian cities	Guangwu Chen	Guangwu Chen, Thomas Wiedmann
5A4	Methods for Determining Transboundary Greenhouse Gas Footprints of Urban Infrastructure for Large and Small Cities in China	KangKang Tong	KangKang Tong, Andrew Fang, Yuanchao Hu, Stephanie Johns, Anu Ramaswami
Clarendon Auditorium (Session Chair: KEISUKE NANSAI)			
5B1	(Late cancellation)		
5B2	(Talk moved to session 4A1)		
5B3	(Late cancellation)		
Clarendon Room E (Session Chair: JONATHAN CULLEN)			
5C1	Knowledge and attitudes as explanatory factors in household water and electricity consumption	Walter Reinhardt	Walter Reinhardt
5C2	Production and consumption comparison of conventional and local horticulture: cradle-to-farm gate and cradle-to-consumer analysis of tomato production in Almeria and Barcelona (Spain)	Xavier Gabarrell	Esther Sanyé-Mengual, Jordi Oliver-Solà, Juan Ignacio Montero, Joan Rieradevall, Xavier Gabarrell
5C3	Exploring energy futures for remote Australian communities	Tira Foran	Tira Foran, David Fleming, Bruno Spandonide
5C4	(Late cancellation)		
Clarendon Room C (Session Chair: YASUSHI KONDO)			
5D1	Exergetic and Life-Cycle Assessment of Bio-oil Production from Forest Residue using Fast Pyrolysis	Sabrina Spatari	Ghasideh Pourhasdem, Joseph Keedy, Sabrina Spatari, Nelson Macken, Akwasi A Boateng, Charles A Mullen
5D2	A study on the cost-effective energy recovery system from municipal solid wastes	Minoru Fujii	Minoru Fujii
5D3	(Late cancellation)		
5D4	E-Waste in Brazil: Analyzing the Legal Situation and the Actors of the Reverse Logistic	José Carlos Lázaro da Silva Filho	Jose Carlos Lázaro da Silva Filho, Ariella Burali do Campos Kobal, Sandra Maria Santos

Tuesday 4.30 pm

Session	Presentation Title	Main Presenter	All Authors
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Clarendon Room D (Session Chair: GANG LIU)

6A1	Assessing the critical material constraints on low carbon infrastructure transitions	Jonathan Busch	Katy Roelich, Jonathan Busch, David Dawson, Christof Knoeri, Phil Purnell, Julia K Steinberger
6A2	Variations in nickel use over time and implications for stocks and recycling	Thomas E Graedel	Barbara Reck, Thomas E Graedel
6A3	Quantifying the critical metals in conventional passenger vehicles using input-driven and output-driven approaches: A comparative study	Eliette Restrepo	Xiaoyue Du, Eliette Restrepo, Rolf Widmer, Patrick Wäger
6A4	Supply of critical raw materials to the European Union: Insights from the DESIRE project	Stefan Pauliuk	Stefan Pauliuk, Sebastiaan Deetman, Edgar Hertwich, René Kleijn

Clarendon Auditorium (Session Chair: THOMAS WIEDMANN)

6B1	Modeling in-use stocks and lifespan distribution of consumer durables to forecast generation of end-of-life products in various countries	Masahiro Oguchi	Masahiro Oguchi, Atsushi Terazono, Tomohiro Tasaki, Gen Kobayashi, Shigesada Takagi
6B2	MEFISTO – Material and Energy Flows Integrated with Stocks	Tim Baynes	Tim Baynes
6B3	Regional assessment of LUC and GHG Emissions from Biofuels using scenario techniques	Liselotte Schebek	Liselotte Schebek, Rina Resnawati, Yalda Cikovani, Uwe Lahl
6B4	Dynamic Analysis of Hidden Material Flow and Anthropogenic Disturbance Based on Digital Elevation Models	Keisuke Yoshida	Keisuke Yoshida, Keiji Ookuoka, Hiroki Tanikawa

Clarendon Room E (Session Chair: ICHIRO DAIGO)

6C1	Wealth from waste in the circular economy: New business models	Nick Florin, Samantha Sharpe	Damien Giurco, Samantha Sharpe
6C2	Improving resource efficiency through economic instruments – lessons learned from a comparison between Vietnam and Germany	Henning Wilts	Henning Wilts, Martin Hirschnitz-Garbers
6C3	(Late cancellation)		
6C4	The Relationship between Socioeconomic Development and Wood Resource Consumption	Chihiro Kayo	Chihiro Kayo, Seiji Hashimoto, Midori Mizukami, Shigesada Takagi, Hiroyasu Oka

Clarendon Room C (Session Chair: SARAH KING)

6D1	Regional Symbiosis and cyclical use of Construction Materials	Keiji Ookuoka	Keiji Ookuoka, Hiroki Tanikawa
6D2	Business Models for Industrial Symbiosis	Graham Aid	Graham Aid
6D3	Industrial Symbiosis, regional economic development, and regional identity	Wouter Spekkink	Wouter Spekkink

ORAL PRESENTATIONS

Wednesday 2.00 pm

Session	Presentation Title	Main Presenter	All Authors
Clarendon Room D (Session Chair: TIRA FORAN)			
7A1	The Norwegian Phosphorus Balance: Identifying key drivers and potentials for reducing consumption and losses	Helen Hamilton	Helen A Hamilton, Eva Brod, Ola S Hanserud, Magnus I Vestrum, Franciska S Steinhoff, Daniel B Müller, Helge Brattebø
7A2	(Late cancellation)		
7A3	IO-based phosphorus and nitrogen flow analysis focusing on the demand and supply structure in Asia	Kazuyo Matsubae	Kazuyo Matsubae, Masafumi Mizoguchi, Kenichi Nakajima, Keisuke Nansai and Tetsuya Nagasaka
7A4	Supply security footprint of critical metals related to household consumption	Yosuke Shigetomi	Yosuke Shigetomi, Keisuke Nansai, Susumu Tohno
Clarendon Room E (Session Chair: HIROKI TANIKAWA)			
7C1	What are the drivers of material stock accumulation?	Tomer Fishman	Tomer Fishman, Hiroki Tanikawa, Heinz Schandl
7C2	Characteristics of observation year based distributions – time-series change of building lifespan in Japan	Ichiro Daigo	Ichiro Daigo, Kohei Iwata, Masahiro Oguchi, Yoshikazu Goto
7C3	Urban Mining: Characterizing the Non-Housing Building Stock	Liselotte Schebek	Liselotte Schebek, Yunbo Li, Hans Joachim Linke, Britta Miekley, Christoph Motzko, Benjamin Schnitzer, Jan Wöltjen
7C4	The ferrous find: Counting iron and steel stocks in China	Tao Wang	Tao Wang, Seiji Hashimoto
Clarendon Room C (Session Chair: HUNG SUCK PARK)			
7D1	A synopsis of the capabilities required to apply industrial symbiosis in practice	Robin Branson	Robin Branson
7D2	Industrial Symbiosis Networks – Can we do better?	Sarah King	Sarah King, Simon Dunstall, Melanie Ayre, Florian Stock
7D3	Developing a governance model for establishing industrial symbiosis	Amanda Louise Hill	Amanda Louise Hill, Arne Remmen
7D4	Networks for Innovation in Industrial Ecology	Simon Wright	Simon Wright, Samantha Sharpe, Damien Giurco

ISIE & AIEN JOINT WORKSHOP SESSIONS

Wednesday 11:00 am–12:30 pm

AUSTRALASIAN
INDUSTRIAL ECOLOGY
17 – 19 NOVEMBER 2014 CONFERENCE
MELBOURNE CONVENTION & EXHIBITION CENTRE



The aim of these joint sessions is to bring together the conferences of the International Society for Industrial Ecology (ISIE) and the Australasian Industrial Ecology Network (AIEN). By doing so we bring together stakeholders from academia, industry, local government, state and federal government and regulators.

Each of the four sessions will address an important topic in the field of Industrial Ecology, however the key underlying questions considered by all four sessions are similar:

- How do we bridge the gap between academia, industry and the policy community?
- What should the future look like?
- What mechanisms will get us there?

Each panel session will be chaired and host a diverse panel of four to five stakeholders. Each presenter will speak for five minutes on the topic, with questions and discussion following. At noon, all conference participants will gather in the main auditorium for topic summaries and concluding remarks.

Each presenter will be asked a question that is relevant to the topic, but which draws on the speaker's experience. Each speaker will talk for five minutes, with questions following.

Workshop format

- | | |
|----------------|---|
| 11:00–11:30 am | Speaker presentations |
| 11:30–11:50 am | Q&A plus discussion |
| 11:50–12:00 pm | All participants gather in the auditorium |
| 12:00–12:20 pm | Five minutes feedback from each topic chair |
| 12:20–12:30 pm | Concluding remarks by conference chairs |



ISIE & AIEN JOINT WORKSHOP SESSIONS

1. SUSTAINABLE CITIES – FACILITATION OF INDUSTRIAL ECOLOGY PRECINCTS IN THE URBAN ENVIRONMENT

Location: Clarendon Room C

Chair: Tim Baynes, CSIRO

Rapporteur: Karin Hosking, CSIRO

Presenters: Academia: Arnold Tukker (Netherlands)

Academia: Thomas Wiedmann, UNSW

Business: Garbis Simonian, Hunter Industrial Park

Business: Tashia Dixon, Brooklyn Industrial Site, Brimbank City Council

Policy: Rob Moore, Manager Urban Design and Docklands, City of Melbourne

Cities create a unique window of opportunity for sustainable low carbon living and development. Investing in urban planning and design, sustainable urban infrastructure and transport networks will markedly reduce the resource and carbon intensity of cities while increasing livability and health. Cities are also economic and industry hubs and offer spaces for green precincts and eco-industrial parks that can work well together when policy settings support processes of urban-industrial symbiosis and resource circulation. Opportunities are not restricted to greenfield sites but also exist for urban grey- and brownfield sites which require vision, planning and redesign. Redesigning outdated urban and industrial spaces is particularly relevant for the host city Melbourne and the AIEN technical tour visit to Brooklyn Industrial Site and Fishermans Bend. Urban sustainability is an important topic for the Asia-Pacific region with its fast growing cities and urban populations. What are the needs for planning greenfield development and industrial renewal? How can academia support the design of sustainable cities and sustainable precincts? How can the business community contribute to greening cities and urban industries? What role does policy have in supporting the sustainable planning and development of cities? Facilitating Industrial Systems and Material Flows – what are the different models that support Industrial Symbiosis?

2. FACILITATING INDUSTRIAL SYSTEMS AND MATERIAL FLOWS – WHAT ARE THE DIFFERENT MODELS THAT SUPPORT INDUSTRIAL SYMBIOSIS?

Location: Clarendon Auditorium

Chair: Sarah King, CSIRO

Rapporteur: Colin Barker, Advitech

Presenters: Academia: Sabrina Spatari (United States)

Academia: Yasushi Kondo (Japan)

Business: Robin Branson, Qubator

Business: Peter Laybourn, International Synergies

Policy: Steve Beaman, Director of Waste and Resource Recovery, NSW EPA

The Asia-Pacific region has seen dramatic growth in its industrial capacity and has become the workshop of the world, exporting products and services globally. This has increased the environmental pressure of industries in the region. Yet many industries and industrial processes have high potential for reducing natural resource inputs and for reducing waste and emissions. This session focuses on the implementation of successful industrial symbiosis models from around the world and looks into the institutional and governance arrangements that support successful eco-innovation of industries. What works and what doesn't? How are industry stakeholders best engaged in the short- and long-term for successful exchanges? What investments are required and what is the role for policy and academia in establishing IS? Importantly for the host nation – what model is suitable for Australia?

3. THE CIRCULAR ECONOMY – WHAT IS THE ROLE OF INDUSTRIAL ECOLOGY IN SUSTAINABLE DESIGN, CONSUMPTION AND RESOURCE RECOVERY?

Location: Clarendon Room D **Chair:** Marina Fischer-Kowalski (Austria) **Rapporteur:** Walter Reinhardt, ANU

Presenters: Academia: Seiji Hashimoto (Japan)
Academia: Bing Zhang (China)
Business: Steve Morris, Close the Loop
Business: Kelvin Davies, Nextek
Policy: Grant Musgrove, ACOR

Investing in human development and reducing poverty in the Asia-Pacific region has been very successful over the past few decades, but has come at the price of increasing environmental pressures and impacts. New policy directions including the circular economy, sustainable production and consumption and the green economy have emerged in many countries. This session will cover both macro and micro perspectives on the evolution of the circular economy. What are the macro policy settings, institutions and governance arrangements which support the circular economy? How can macro-economic settings best guide a transition to sustainable production and consumption? How important is product design and disassembly? How do the tools Life Cycle Assessment and Input-Output analysis support the goals of a circular economy?

4. INDUSTRIAL ECOLOGY OF MINING AND PRIMARY RESOURCES – WHAT DOES THE FUTURE HOLD?

Location: Clarendon Room E **Chair:** Anna Littleboy, CSIRO **Rapporteur:** Artem Golev, UQ

Presenters: Academia: Damien Giurco, UTS
Academia: Liselotte Schebek (Germany)
Business: Michael Deutscher – General Manager, Umicore Marketing
Services Business: Ron Robinson, SRS Recycling
Policy: Rose Read, Mobile Muster

All economic activities are fuelled by natural resources and many industrial processes rely on non-renewable resources from the mining and energy sector. While these sectors and resources usually experience short term business cycles represented by price fluctuations, the long term global trend is of significantly increasing demand for resources. The Asia-Pacific region increasingly depends on resources from abroad to fuel this growth. How can primary resources be supplied in ways that are economically, socially and environmentally responsible? How can recycling and reuse of materials contribute to resource sustainability? Does the emerging field of 'urban mining' as a means of deriving additional value from waste streams such as electronic waste (which is rich in rare earths, gold, copper and palladium) offer suitable solutions? What is required to make this transition? How do resource rich countries like Australia make this transition? What tools does academia have to support this transition? Who is leading the way and how can we learn from them?



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