

ISIE-SEM Conference 2022: Detailed Programme (September 16, 2022)

Standard presentation time is 12 minutes plus 3 minutes discussion.
Please prepare your presentation in MS Powerpoint or PDF format.

Monday, 19.09.2022

Mo 09.15-09.45 **Welcome** Room 0.001

Mo 09.45-10.30 **Keynote: Paul Ekins (University College London, UK)** Chair: Stefan Giljum Room 0.001
"Towards a low-carbon, resource-efficient economy: the economics of transition"

Mo 10.30-11.00 **Coffee break**

Mo 11.00-12.30 **Parallel Sessions**

Special Session: Transforming urban metabolism (1) Chair: Nina Eisenmenger Room 0.001

The global and urban material stock of roads Lola Rousseau
 The consumption-based material-footprint of the building and transport sector of Vienna Jakob Lederer
 Learning from the past for the transformation towards sustainability: urban sprawl in Vienna and surrounding between 1984-2018 Anna-Katharina Brenner
 A potential solution for overcoming regional, spatially explicit data unavailability of built environment stocks: deep learning based pilot estimation in Japanese metropolii Zhiwei Liu
 A review of spatial characteristics influencing circular economy in built environment Ning Zhang

Special Session: Global physical input-output analysis (1) Chair: Martin Bruckner Room 0.002

The footprint of food consumption and the role of the socioeconomic status Simon Grabow
 Evolution and environmental consequences of Latin American wood trade patterns from 1997 to 2017 Zully Rosadio
 Consequential MRIO modelling Bo Weidema
 Challenges and Added Value of the Getting The Data Right MRIO Project Jannick Schmidt

Special Session: Nexus approaches in social metabolism research Chair: Helmut Haberl Room 1.001

Nexus approaches in socioecological metabolism research: where do we stand? Helmut Haberl
 Analysing the stock-flow-service nexus by linking building stock and industry modelling Meta Thurid Lotz
 Operationalizing the stock-flow-service nexus for economy-wide material and energy flow analysis - empirical and prospective analysis for the USA Jan Streeck
 Bridging service systems, circularity and decarbonisation: insights from UK mobility transitions Gabriel Carmona
 Control data vs. reported data in the assessment of industrial plants' resource efficiency Ana Morgado
 Modelling dynamic material stocks and flows for Spain with the MODESLOW Integrated Assessment Model Emmanuel Aramendia

Mo 12.30-14.00 **Lunch** WU Mensa

Mo 14.00-15.30 **Parallel Sessions**

Special Session: Transforming urban metabolism (2) Chair: Fridolin Krausmann Room 0.001

Assessing Nutrient Circularity Readiness in South American Metropolitan Areas Alma Fleitas
 The urban biomass sprawl: An analysis of Vienna's biomass metabolism and its global environmental impacts Lisa Kaufmann
 Assessing Vienna's material and carbon footprint from a circular economy perspective Nina Eisenmenger
 Territorialising circularity Cecilia Furlan
 Open science in urban metabolism: building a science-policy-practice interface Aristide Athanassiadis

	Special Session: Global physical input-output analysis (2)	Chair: Martin Bruckner	Room 0.002
	A Multi-Regional Energy Physical Supply Use Table Framework For Energy Analysis Exploring the French economy with physical supply-use tables The global trade flow network of zinc Commodity-level footprinting for policy makers The digitalization of production and the social-ecological transformation	Emmanuel Aramendia Alexandre Borthomieu Leon Rostek Chris West Steven Knauss	

	Regular Session: Energy transition	Chair: Kazuyo Matsubae	Room 1.001
	The Energy and carbon inequality corridor for a 1.5°C compatible and just Europe The energy inequality corridor for a 1.5° C compatible and just Europe II Potential and challenges of critical materials under the IEA's Net-Zero Emission by 2050 scenario Indonesian Coal Bed Methane, The Environmental Consequences of New Energy Development in Indonesia Household Energy Transition and Demographic Transition in the Global South: Linkages and Opportunities for Sustainable Development Modeling the raw material requirements of the German energy transition	Ingram S. Jaccard Peter Paul Pichler Yanan Liang Imam Eko Setiawan Camille Belmin Antonia Loibl	

Mo 15.30-16.00 **Coffee break**

Mo 16.00-17.00 **SEM Section General Assembly**
Moderated by SEM Section Chair Hiroki Tanikawa **Room 0.001**

Mo 19.00-21.30 **Keynote (at BOKU): Ilona Otto (Karl-Franzens-Universität Graz, Austria)**
"Socio-metabolic class conflicts in the Anthropocene" **Chair: Nina Eisenmenger, Willi Haas** **Festsaal BOKU**

Tu **Tuesday, 20.09.2022**

Tu 09.00-10.30 **Plenary discussion: Reducing resource use: needs and constraints at different scales**
Thomas Madreiter (Planning Director, City of Vienna, Austria)
Meadhbh Bolger (Resource Use Campaigner, Friends of the Earth Europe, Belgium)
Markus Ossberger (Infrastructure Manager, Vienna Public Transport, Austria) **Chair: Sabine Dworak** **Room 0.001**

Tu 10.30-11.00 **Coffee break**

Tu 11.00-12.30 **Parallel Sessions**

	Special Session: Built environment futures towards low energy and material demands (1)	Chair: Tomer Fishman	Room 0.001
	Spatially explicit scenarios for the stock dynamics and environmental impact of building materials From resource extraction to manufacturing and construction: flows of stock-building materials in 177 countries from 1900 to 2016 Material stock and flow analysis and resource efficiency assessment of non-metallic minerals in Japan Scenarios for low embodied building energy – global potential for the use of timber in long-lived construction materials Global low energy and material scenarios for buildings Projection of Urban Mine Availability with Big Demolition Waste Data and Probability Distribution of Building Lifetime and Material intensities	Janneke van Oorschot Barbara Plank Naho Yamashita Stefan Pauliuk Alessio Mastrucci Pi-Cheng Chen	

Regular Session: Circular economy (1)	Chair: Willi Haas	Room 0.002
<p>MessageIX-materials: representation of material flows in an integrated assessment model</p> <p>Circular Design for Steel Products</p> <p>Future simulation of urban metabolism considering in-use and obsolete stock: Case study on Kitakyushu City, Japan</p> <p>Geography of the circular economy of tomorrow</p> <p>Consumer-to-Business Selling: Advancing Second-Hand Markets to Extend Product Use Phases</p>	<p>Gamze Unlu</p> <p>Wiebke Hagedorn</p> <p>Masato Morita</p> <p>Tanya Tsui</p> <p>Christoph Ratay</p>	

Regular Session: MFA methods and applications	Chair: Hiroki Tanikawa	Room 1.001
<p>A scalable approach to modelling detailed and complete material flow systems: the Physical Resources Observatory system</p> <p>The influence of socio-economic metabolism in resource decoupling: a comparative study of four European countries</p> <p>A map of all the material flows in the UK: from raw material extraction to use</p> <p>Beyond production and consumption: using throughflows to untangle the global trade of externalities</p>	<p>Rick Lupton</p> <p>Sónia Cunha</p> <p>José Azevedo</p> <p>Timothé Beauflis</p>	

Tu 12.30-14.00 **Lunch** **WU Mensa**

Tu 14.00-14.45 **Keynote: Sina Leipold (UFZ / Centre for Environmental Research, Germany)** **Chair: Nina Eisenmenger** **Room 0.001**
"Pooling evidence is not enough - How narratives can help us transform science and society to sustainability"

Tu 14.45-16.15 **Parallel Sessions**

Special Session: Built environment futures towards low energy and material demands (2)	Chair: Alessio Mastrucci	Room 0.001
<p>A building-level database and energy model for efficient retrofit of the European Union's building stock</p> <p>What matters most to building material intensity? Random forest based evidence from China</p> <p>Building material intensity coefficients estimations for the entire world</p> <p>Plastic cycles in buildings and infrastructure: a stylized model on PVC use in Germany</p> <p>Towards transferability and comparability of material intensity coefficients in bottom-up material stock studies: a data collection template</p> <p>Revealing university building stock materials using industry and private sources and material stock analysis in northeastern US city, Philadelphia</p>	<p>Nikola Milojevic-Dupont</p> <p>Ruirui Zhang</p> <p>Tomer Fishman</p> <p>David Laner</p> <p>Maud Lanau</p> <p>Kimberlee Zamora</p>	

Regular Session: Circular economy (2)	Chair: Andi Mayer	Room 0.002
<p>How decarbonization with CE-strategies of increasing circularity alters Austrian social metabolism till 2040</p> <p>Applying the EU Circular Economy Monitoring Framework at the urban level - The case of Umeå, Sweden</p> <p>Scaling up Circular economy to catalyse decarbonization and reindustrialization: A prospective study for France</p> <p>Monitoring Framework for the Use of Natural Resources</p> <p>Island and Indigenous Systems of Circularity: How Hawai'i Can Inform the Development of Universal Circular Economy Policy Goals</p>	<p>Willi Haas</p> <p>Asterios Papageorgiou</p> <p>Antoine Teixeira</p> <p>Philip Nuss</p> <p>Kamana Beamer</p>	

Special Session: Envisioning sustainable material and energy metabolism in a low-carbon future	Chair: Zhi Cao / Takuma Watari / Fanran Meng	Room 1.001
<p>Envisioning sustainable material cycles in a carbon-neutral future</p> <p>Material footprint implications of low carbon technologies</p> <p>Material and energy demand from buildings in response to Japan's decarbonization transition: considering non-linear substitution elasticities</p> <p>Material flow analysis and greenhouse gas emissions of petrochemicals sector in the UK</p> <p>Decarbonization pathways for the residential sector in the United States</p>	<p>Zhi Cao</p> <p>Stefan Pauliuk</p> <p>Yiyi JU</p> <p>Fanran Meng</p> <p>Peter Berrill</p>	

Tu 16.15-16.45 **Coffee break**

Tu 16.45-18.00 **Parallel Sessions**

Workshop: Socio-metabolic research for public policy **Organiser: Stijn van Ewijk** **Room 0.001**

Socio-metabolic research can play a greater role in policymaking by investigating how specific policy measures influence socio-economic metabolisms. Such policy-specific investigations require methodological advancements, new data types, and the bridging of disciplinary gaps between industrial ecology and the policy sciences. After a short introduction, participants will work on questions regarding the use of industrial ecology for policymaking. The intended outcome is a set of key insights and immediate next steps to enhance the role of socio-metabolic research in policymaking. Participants with any level of knowledge of SEM and public policy are welcome to join this session.

Special Session: First ODYM MFA software User and Developers meeting **Chair: Stefan Pauliuk** **Room 0.002**

Modelling economy-wide material stocks of buildings, infrastructure and machinery for multiple material cycles and end-uses around the world
Monte Carlo simulation with ODYM in MaTrace-multi
Investigating trends in product lifetimes using dynamic MFA

Dominik Wiedenhofer
Christoph Helbig
Kamila Krych

Special Session: Supporting paradigm shifts in socio-economic metabolism by statistical entropy **Chair: Philippe Nimmegeers** **Room 1.001**

The second law of thermodynamics for material flows: an introduction to material flow analysis and statistical entropy analysis
Statistical entropy analysis as an engineering tool for the circular economy of battery materials
Supporting paradigm shifts to accelerate disruptive material innovations by statistical entropy: towards universal plastics recyclability indicators
Statistical entropy analysis to assess material circularity of wood cascading use

Helmut Rechberger
Rodrigo Serna
Philippe Nimmegeers
Kranti Navare

Tu 19.30-22.30 **Conference Dinner (at TU Wien)** **Kuppelsaal TU**

Wednesday, 21.09.2022

We 09.00-09.45 **Keynote: Ramzy Kahhat (Pontifical Catholic University of Peru)** **Chair: Johann Fellner** **Room 0.001**
"How much plastic do we throw into the sea? Mapping and quantifying marine plastics in the Global South"

We 09.45-11.00 **Poster session and coffee break** **Rooms 1.002, 1.003, 1.004**

We 11.00-12.30 **Parallel Sessions**

Regular Session: Novel SEM methods **Chair: Dominik Wiedenhofer** **Room 0.001**

Computational reproducibility and openness in IE research practice
Where does my footprint come from? Using Monte-Carlo simulations to estimate the geographical variance of Hybrid-LCA footprints.
An Integrated Framework for understanding the contribution of Ecosystem Services to Urban Metabolism Assessments. Case studies in London and Lima
Updated version of EXIOBASE hybrid, more detail and more transparency.
The socio-economic metabolism of European countries: drivers of resource productivity and decoupling

Peter Paul Pichler
Arthur Jakobs
Ursula Cardenas-Mamani
Stefano Merciai
Sónia Cunha

Regular Session: Food and biomass	Chair: Simone Gingrich	Room 0.002
Adaption of a large-scale second-generation bioethanol production network towards resilience The eating population: addressing food consumption in urban metabolism studies Process integration of innovative technologies into the forest-based sector in Austria Scenario analysis on Indian subcontinent's food phosphorus footprint by 2050 The hidden role of small-scale farming in our globalised food system Mapping conservation risks of global agricultural production and consumption	Martin Bruckler Barbara Redlingshöfer Marilene Fuhrmann Aurup Ratan Dhar Oliver Taherzadeh Nguyen Tien Hoang	

Regular Session: Carbon emissions and climate change	Chair: Stephan Lutter	Room 1.001
Estimating the Uncertainty of Greenhouse Gas Emission Accounts in Multi-Regional Input-Output Modelling Re-allocating carbon-emission responsibilities of capital investment along capital's full lifespan What influences the carbon footprint of government consumption expenditures? Structural decomposition analysis of carbon emissions in EU regions Drivers of emissions embodied in global metal consumption	Simon Schulte Quanliang Ye Hauke Ward Kanemoto Keiichiro Kajwan Rasul	

We 12.30-14.00 **Lunch** WU Mensa

We 14.00-16.00 **Parallel Sessions**

Special Session: Spatially explicit supply chain assessments	Chair: Stefan Giljum	Room 0.001
Mapping the land-use footprint of Brazilian soy embodied in international consumption: A spatially explicit input-output approach based on open data 'Do pasto ao prato': a citizen science initiative to (m)app the supply chain of cattle products within Brazil Footprint Accounting of the Bioeconomy – Needs and Challenges to Incorporate Environmental Thresholds and Future Projections Crop economic water scarcity driven by human consumption Biodiversity for trade models: what difference does metric choice make? Global metal supply chains induce significant tropical land use change through mining expansion The Global Trade Flows of Energy Transition Minerals and their Impacts on Forest Environments Estimating re-export pathways for physical commodity flows	Stefan Trsek Erasmus zu Ermgassen Hanna Helander Zhongxiao Sun Jonathan Green Stefan Giljum Sebastian Luckeneder Simon Croft	

Regular Session: Waste and recycling	Chair: Johann Fellner	Room 0.002
Evaluating the performance of plastic packaging waste management systems Environmental impact changes of global plastics waste trade during the Covid-19 What to do about plastics? Lessons from a study of UK plastics flows Digital platforms: end-to-end data integration of industrial symbiosis stages Past and future of steel scrap – a detailed analysis of the European scrap arisings and its quality Role of advanced construction technologies in limiting waste in the built environment	Sarah Schmidt Kai Li Andre Cabrera Serrenho Charalampos Manousiadis Sabine Dworak Tomer Fishman	

Regular Session: Electronics and mobility

A product-component framework for modelling stock dynamics and its application for Li-ion batteries and electric vehicles
How IOT contributes to accelerating the transformation of the logistic industry – a Chinese case study
Introducing mat-dp: a material demand projections model and its application to African electricity system projections
Electronics without emissions
The transformation of the passenger car market - Effects on the demand for aluminium and its carbon footprint

Chair: Stefan Pauliuk

Room 1.001

Fernando Aguilar Lopez
Suiting Ding
Karla Cervantes Barron
Jack Lynch
Romain Billy

Regular Session: Mining

Development of IO-based model for supply chain risk analysis focusing on tailing dam failures at mining sites
Exploring future pathways for the mining industry's global energy consumption
Mapping global mining land-use and its induced deforestation using earth observation

Chair: Stefan Pauliuk

Room 1.001

Tomoya Sugiyama
Emmanuel Aramendia
Victor Maus

We 16.00-16.30

Closing

Room 0.001