JOURNAL OF INDUSTRIAL ECOLOGY

Volume 26, Number 1 February 2022

The Official Journal of the International Society for Industrial Ecology (ISIE)

Special Issue on Data Innovation in Industrial Ecology

Guest editors: Guillaume Majeau-Bettez, Jean-Marc Frayret, Anu Ramaswami, Yang Li, and Niko Heeren

EDITORIAL

6 Data innovation in industrial ecology

Guillaume Majeau-Bettez, Jean-Marc Frayret, Anu Ramaswami, Yang Li, and Niko Heeren

METHODS, TOOLS, DATA, AND SOFTWARE

12 Dynamic exergy analysis: From industrial data to exergy flows

Charalampos Michalakakis and Jonathan M. Cullen

27 Machine learning-assisted industrial symbiosis: Testing the ability of word vectors to estimate similarity for material substitutions

Chris Davis and Graham Aid

44 Machine learning-based stocks and flows modeling of road infrastructure

Bobak Ebrahimi, Leonardo Rosado, and Holger Wallbaum

58 A scalable data collection, characterization, and accounting framework for urban material stocks

Hadi Arbabi, Maud Lanau, Xinyi Li, Gregory Meyers, Menglin Dai, Martin Mayfield, and Danielle Densley Tingley

72 Semisupervised machine learning classification framework for material intensity parameters of residential buildings

Xaysackda Vilaysouk, Savath Saypadith, and Seiji Hashimoto

88 Toward the development of subnational hybrid input–output tables in a multiregional framework

Edgar Towa, Vanessa Zeller, Stefano Merciai, Jannick Schmidt, and Wouter M. J. Achten

107 PIOT-Hub - A collaborative cloud tool for generation of physical input–output tables using mechanistic engineering models

Venkata Sai Gargeya Vunnava, Jaewoo Shin, Lan Zhao, and Shweta Singh

121 Correcting remaining truncations in hybrid life cycle assessment database compilation

Maxime Agez, Elliot Muller, Laure Patouillard, Carl-Johan H. Södersten, Anders Arvesen, Manuele Margni, Réjean Samson, and Guillaume Majeau-Bettez

134 Futura: A new tool for transparent and shareable scenario analysis in prospective life cycle assessment

P. James Joyce and Anna Björklund
A data framework for assessing social inequality and equity in multi-sector social, ecological, infrastructural urban systems: Focus on fine-spatial scales
Lara P. Clark, Samuel Tabory, Kangkang Tong, Joseph L. Servadio, Kelsey Kappler, Corey Kewei Xu, Abiola S. Lawal, Peter Wiringa, Len Kne, Richard Feiock, Julian D. Marshall, Armistead Russell, and Anu Ramaswami

Sustainability implications of artificial intelligence in the chemical industry: A conceptual framework
Mochen Liao, Kai Lan, and Yuan Yao

RESEARCH AND ANALYSIS

A field experiment on workplace norms and electric vehicle charging etiquette
Omar Isaac Asensio, Camila Z. Apablaza, M. Cade Lawson, and Sarah Elizabeth Walsh

This city is not a bin: Crowdmapping the distribution of urban litter
Andrea Ballatore, Teun Johannes Verhagen, Zhije Li, and Stefano Cucurachi

A mass balance approach to urban water analysis using multi-resolution data
Alissa G. Hastie, Christopher M. Chini, and Ashlynn S. Stillwell

Exploring machine learning techniques to predict deforestation to enhance the decision-making of road construction projects
Gustavo Larrea-Gallegos and Ian Vázquez-Rowe

A comparison study of bottom-up and top-down methods for analyzing the physical composition of municipal solid waste
Chuanbin Zhou, Shijun Ma, Xiao Yu, Zhuqi Chen, Jingru Liu, and Li Yan

Comparing the environmental performance of distributed versus centralized plastic recycling systems: Applying hybrid simulation modeling to life cycle assessment
Piya Kerdlap, Aloisius Rabata Purnama, Jonathan Sze Choong Low, Daren Zong Loong Tan, Claire Y. Barlow, and Seeram Ramakrishna

Material intensity database for the Dutch building stock: Towards Big Data in material stock analysis
Benjamin Sprecher, Teun Johannes Verhagen, Marijn Louise Sauer, Michel Baars, John Heintz, and Tomer Fishman

Creating multi-scale nested MRIO tables for linking localized impacts to global consumption drivers
Jacob Fry, Arne Geschke, Sarah Langdon, Manfred Lenzen, Mengyu Li, Arunima Malik, Ya-Yen Sun, and Thomas Wiedmann

Appending material flows to the National Energy Modeling System (NEMS) for projecting the physical economy of the United States
Kaixin Huang and Matthew J. Eckelman

Estimation of entity-level land use and its application in urban sectoral land use footprint: A bottom-up model with emerging geospatial data
Wei Xie, Huajun Yu, Yang Li, Min Dai, Xinyi Long, Nan Li, and Yutao Wang

Increasing the energy efficiency of a data center based on machine learning
Zhen Yang, Jinhong Du, Yiting Lin, Zhen Du, Li Xia, Qianchuan Zhao, and Xiaohong Guan

Potentials of big data for corporate environmental management: A case study from the German automotive industry
Grischa Beier, Julian Kiefer, and Jutta Knopf

Corporate carbon performance data: Quo vadis?
Timo Busch, Matthew Johnson, and Thomas Pioch

REVIEWER INDEX

JIE 2021 reviewers
Cover Image
The cover image, designed by Peter Hirsch and Yanin Kramsky, evokes a Sankey diagram, a type of flow chart widely used in industrial ecology in which the width of the arrows is proportional to the magnitude of material and energy flows. For a description of the history and methodology of Sankey diagrams, see the work of Mario Schmidt.
Disclaimer. The Publisher, the International Society for Industrial Ecology, and Editors cannot be held responsible for errors or any consequences arising from the use of information contained in this journal; the views and opinions expressed do not necessarily reflect those of the Publisher, the International Society for Industrial Ecology, and Editors, neither does the publication of advertisements constitute any endorsement by the Publisher, the International Society for Industrial Ecology, and Editors of the products advertised.

Copyright and Copying (in any format). Copyright © 2022, the International Society for Industrial Ecology. All rights reserved. No part of this publication may be reproduced, stored or transmitted in any form or by any means without the prior permission in writing from the copyright holder. Authorization to copy items for internal and personal use is granted by the copyright holder for libraries and other users registered with their local Reproduction Rights Organisation (RRO), e.g. Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923, USA (www.copyright.com), provided the appropriate fee is paid directly to the RRO. This consent does not extend to other kinds of copying such as copying for general distribution, for advertising or promotional purposes, for republication, for creating new collective works or for resale. Permissions for such reuse can be obtained using the RightsLink “Request Permissions” link on Wiley Online Library. Special requests should be addressed to: permissions@wiley.com.

For submission instructions, subscription, and all the latest information, visit http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1530-9290