EcoBalance 2014
The 11th International Conference on EcoBalance

PROGRAM
Creating benefit through life cycle thinking
27–30 October 2014, Tsukuba, Japan

Organized by
The Institute of Life Cycle Assessment, Japan
## Schedule Overview

### October 27, Monday
- **18:00 - 20:00**
  - Welcome Party (Restaurant Espoir)

### October 28, Tuesday
- **10:00 - 12:00**
  - Opening Plenary (Main Convention Hall)
- **12:00 - 13:30**
  - Lunch (Multi Purpose Hall) (90 min)

#### Session 13:30 - 14:50
- **Room 101: [28A3]** Sustainability in the Chemical Industry-1
- **Room 102: [28B3]** Tsukuba special session
- **Room 201: [28C3]** Global Food Security and Corporate Practices from Life Cycle Perspectives-1
- **Room 202: [28D3]** Green ICT-1

#### Session 14:50 - 15:10
- **Break (20 min)**

#### Session 15:10 - 16:30
- **Room 101: [28A4]** Sustainability in the Chemical Industry-2
- **Room 102: [28B4]** Material Flow Analysis
- **Room 201: [28C4]** Global Food Security and Corporate Practices from Life Cycle Perspectives-2
- **Room 202: [28D4]** Green ICT-2

#### Session 16:50 - 18:00
- **Poster Session (Room 101, 102)**
- **Banquet (Okura Frontier Hotel Tsukuba)**

### October 29, Wednesday
- **09:00 - 10:20**
  - Room 201: [29C1] The Practical Challenge for Sustainable Industry-1
  - Room 202: [29D1] LCA Methodology
  - Room 303: [29E1] Behavior & Policy
  - Room 405: [29F1] Sustainability of Materials and Industries-1
  - Room 406: [29G1] Energy-1

#### Session 10:20 - 10:40
- **Break (20 min)**

#### Session 10:40 - 12:00
- **Room 201: [29C2]** The Practical Challenge for Sustainable Industry-2
- **Room 202: [29D2]** Supply Chain Risk Management
- **Room 303: [29E2]** Policy & Visualization
- **Room 405: [29F2]** Sustainability of Materials and Industries-2
- **Room 406: [29G2]** Energy-2

#### Session 12:00 - 13:30
- **Lunch (Multi Purpose Hall) (90 min)**

#### Session 13:30 - 16:00
- **Room 201: [29C3]** The Practical Challenge for Sustainable Industry-3
- **Room 202: [29D3]** City & Building
- **Room 303: [29E3]** Agriculture & Foods
- **Room 405: [29F3]** Sustainability of Materials and Industries-3

#### Session 14:50 - 15:10
- **Break (20 min)**

### October 30, Thursday
- **09:00 - 10:20**
  - Room 102: [30B1] Waste Management & Recycling-1
  - Room 201: [30C1] The Practical Challenge for Sustainable Industry-4
  - Room 202: [30D1] Water-1

#### Session 10:20 - 10:40
- **Break (20 min)**

#### Session 10:40 - 12:00
- **Room 101: [30A2]** Sustainable Resource Management-2
- **Room 201: [30C2]** The Practical Challenge for Sustainable Industry-5
- **Room 202: [30D2]** Water-2

#### Session 12:00 - 13:30
- **Lunch (Multi Purpose Hall) (90 min)**

#### Session 13:30 - 16:00
- **Closing Plenary (Convention Hall 300)**

#### Session 16:15 - 18:00
- **Farewell Party (INCAROSE)**
Contents

Preface ................................................................. 5
Organizing Committee ............................................. 6
International Advisory Board ..................................... 7
Sponsors ............................................................ 8
Financial Supports .................................................. 8
Cooperating Government Offices ............................... 8
Cooperating Organizations ............................. 8
Exhibitors .......................................................... 9
Session List ......................................................... 10
Invited Speakers ................................................... 11
Maps ............................................................... 12

Program ............................................................... 15
Plenary Sessions ................................................ 17
Oral Sessions ...................................................... 18
October 28, Tuesday .............................................. 18
October 29, Wednesday ........................................... 22
October 30, Thursday ............................................. 27
Poster Session .................................................... 30
Dear Friends and Colleagues,

Welcome to Tsukuba, the birthplace of EcoBalance!

In the name of the Organizing Committee, I would like to welcome each of you to EcoBalance 2014 in Tsukuba, Japan, from 27 to 30 October 2014.

The theme of EcoBalance 2014 is “Creating Benefit through Life Cycle Thinking.” We would like to invite a wide range of participants to share their quests for benefits from life-cycle thinking, and are thus organizing special sessions that focus on sustainability and practical challenges in industry. In recognition of the fact that the benefits sought are diverse, contributions from other sectors are also welcome to identify advantages beyond mere financial considerations in the increasingly globalized supply chain under quickly changing circumstances. In line with previous EcoBalance conferences, therefore, we are keeping our broad scope, including socio-economic metabolism, industrial symbiosis, sustainable resource management, life-cycle management, socio-economic approaches to sustainability, and life-cycle assessment.

Held biennially since 1994, EcoBalance is one of the oldest and most established international conferences on the methodologies and practices of sustainability, based on life-cycle thinking. In commemoration of this twenty-year history of the EcoBalance conferences, we are organizing, in addition to our regular keynote lectures and sessions, a special panel discussion on the prospect of further promoting life-cycle thinking in the next twenty years.

I would like to take this opportunity to thank the people of Tsukuba for joining us and supporting this conference. In the Tsukuba special session, we will introduce pioneering policies and activities that are taking place in Tsukuba, and discuss how these should proceed.

I would like to express my sincere gratitude to all of the participants in EcoBalance 2014. We hope and believe that the conference will be a fruitful opportunity for you to present your research results, network with a wide range of participants, and accomplish our aim of “Creating Benefit through Life Cycle Thinking.”

We look forward to seeing you during your time here.

Sincerely,

Yasushi Kondo
Chair of EcoBalance 2014
Organizing Committee

Chair

Yasushi Kondo

Waseda University, Japan

Vice-chairs

Yasuhiro Fukushima

Tohoku University, Japan

Shinsuke Murakami

The University of Tokyo, Japan

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University of Tsukuba, Japan

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Yasushi Umeda

The University of Tokyo, Japan

Naoki Yoshikawa

Ritsumeikan University, Japan
## International Advisory Board

<table>
<thead>
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<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
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<td>Martin Baitz</td>
<td>PE International AG, Germany</td>
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<td>Vienna University of Technology, Austria</td>
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<td>The Joint Graduate School of Energy and Environment, King Mongkut's University of Technology Thonburi, Thailand</td>
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<td>Collaborating Centre on Sustainable Consumption and Production, Germany</td>
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<td>Bo Weidema</td>
<td>Aalborg University, Denmark</td>
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<td>Marc-Andree Wolf</td>
<td>maki Consulting, Germany</td>
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- LCA Society of Japan (JLCA)

**Gold Sponsor:**
- PRé Consultants

**Bronze Sponsors:**
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- Toshiba Corporation
- Hitachi, Ltd.
- Nissan Motor Co. Ltd.

Financial Supports

- City of Tsukuba

- The Japan World Exposition 1970 Commemorative Fund, KANSAI OSAKA 21st Century Association
- Tsukuba Tourist and Convention Association
- Watanabe Memorial Foundation for the Advancement of New Technology

Cooperating Government Offices

- Ministry of Agriculture, Forestry and Fisheries
- Ministry of Education, Culture, Sports, Science and Technology
- Ministry of Economy, Trade and Industry
- Ministry of Land, Infrastructure and Transport
- Ministry of the Environment

Cooperating Organizations

<table>
<thead>
<tr>
<th>Architectural Institute of Japan</th>
<th>Industries Association</th>
</tr>
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<tbody>
<tr>
<td>Center for Environmental Information Science</td>
<td>Japan Chain Stores Association</td>
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<td>Communications and Information network Association of Japan</td>
<td>Japan Chemical Fibers Association</td>
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<td>Green Purchasing Network (GPN)</td>
<td>Japan Chemical Industry Association (JCIA)</td>
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<td>Japan Aluminium Association</td>
<td>Japan Electronics and Information Technology Industries Association</td>
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<td>Japan Association for Chemical Innovation</td>
<td>Japan Environment Association</td>
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<td>Japan Association for Techno-innovation in Agriculture, Forestry and Fisheries</td>
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<td>Japan Packaging Institute</td>
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Japan Petrochemical Industry Association
Japan PVC Environmental Affairs Council
Japan Society for Atmospheric Environment
Japan Society of Civil Engineers
Japan Society of Energy and Resources
Japan Society of Material Cycles and Waste Management
Japan Society of Powder and Powder Metallurgy
Japanese Consumers’ Co-operative Union
Japanese Society of Agricultural Machinery and Food Engineers
Japanese Society of Farm Work Research
Japanese Society of Soil Science and Plant Nutrition
JSPS 143rd Committee on Process Systems Engineering
Manufacturing Science and Technology Center
National Institute for Materials Science
Nippon Association of Consumer Specialists
Pesticide Science Society of Japan
Petroleum Association of Japan
Plastic Waste Management Institute
Research Institute of Innovative Technology for the Earth
Society for Environmental Economics and Policy Studies
Society of Environmental Science, Japan
SOKEIZAI Center
The Agricultural Society of Japan
The Building Center of Japan
The Ceramic Society of Japan
The Committee for the Promotion of Recycling of Construction By-Product
The Engineering Academy of Japan
The High Pressure Gas Safety Institute of Japan
The Institute of Electrical Engineers of Japan
The Iron and Steel Institute of Japan
The Japan Electrical Manufacturers’ Association
The Japan Gas Association

The Japan Institute of Energy
The Japan Institute of Light Metals
The Japan Institute of Metals and Materials
The Japan Iron and Steel Federation
The Japan Petroleum Institute
The Japan Reinforced Plastics Society
The Japan Rubber Manufacturers Association
The Japan Society for Composite Materials
The Japan Society for Precision Engineering
The Japan Society for Technology of Plasticity
The Japan Society of Industrial Machinery Manufacturers
The Japan Society of Mechanical Engineers
The Japan Wood Research Society
The Japanese Society for Biomaterials
The Japanese Society for Food Science and Technology
The Materials Research Society of Japan (MRS-J)
The Mining and Materials Processing Institute of Japan (MMIJ)
The Society for Risk Analysis Japan

The Society of Chemical Engineers, Japan
The Society of Heating, Air-Conditioning and Sanitary Engineers of Japan
The Society of Materials Science, Japan
The Society of Polymer Science, Japan
The Society of Rubber Science and Technology, Japan
The Surface Finishing Society of Japan

Thermal and Nuclear Power Engineering Society
Union of EcoDesigners

Vinyl Environmental Council
Water Reuse Promotion Center
Wood Technological Association of Japan
Ministry of Agriculture, Forestry and Fisheries
Ministry of Education, Culture, Sports, Science and Technology
Ministry of Economy, Trade and Industry
Ministry of the Environment

Exhibitors
TCO2 Co., Ltd.
PE Asia corporation
ifu Hamburg GmbH
Session List

► Plenary Sessions
  Opening Plenary
  Closing Plenary

► Special Sessions
  Tsukuba Special Session
  Sustainability in the Chemical Industry
  Global Food Security and Corporate Practices from Life Cycle Perspectives
    Global Strategies on Agriculture, Food, and Nutrients
    Evaluating Management Practices
    Resource Management in Agriculture
  Green ICT
  Sustainability of Materials and Industries
    Evaluation of Urban Mining
    State-of-the-Art of Research and Developments in Ecomaterials for Low Carbon Society
    Technologies and Assessments for Recovering Materials from Urban Mining
  The Practical Challenge for Sustainable Industry
    Challenges, Experiences and Lessons
    Organizational LCA (O-LCA): Concepts and Methodologies
    Organizational LCA (O-LCA): Lessons from Application Studies
    Sustainable value chain management by MFCA
    Keys for the breakthrough in business
  Sustainable Resource Management

► General Sessions
  Estimating the Contribution to Avoided Emissions
  Material Flow Analysis
  E-waste
  Driving innovation
  LCA Methodology
  Supply Chain Risk Management
  City & Building
  Behavior & Policy
  Policy & Visualization
  Agriculture & Foods
  Energy
  Waste Management & Recycling
  Water
Invited Speakers

Keynote 1  Values of life cycle thinking
Junko Edahiro (Institute for Studies in Happiness, Economy and Society; Environmental Journalist, Japan)

Keynote 2  Business strategies and environmental visions in the Hitachi
Ryuichi Otsuki (Hitachi, Ltd., Japan)

Keynote 3  Life cycle based sustainability solutions: How successful companies turn sustainability solutions into company benefit and business value
Martin Baitz (PE International AG, Germany)

Closing  EcoBalance+20
Matthias Finkbeiner (Technische Universität Berlin, Germany)
Guido Sonnemann (University of Bordeaux, France)
Kohmei Halada (National Institute for Materials Science, Japan)
Atsushi Inaba (Kogakuin University, Japan)

28A3-1  Decision-support tools for designing sustainable chemical products and processes
Konrad Hungerbühler (ETH Zurich, Switzerland)

28B3-2  Hydrocarbon production from microalgae and its potential commercial use
Makoto M Watanabe (University of Tsukuba, Japan)

28B3-3  Mobility robot technologies in AIST for green innovation
Osamu Matsumoto (National Institute of Advanced Industrial Science and Technology, Japan)

28C3-1  Japanese nitrogen footprint model for the prediction of nitrogen loss to the environment
Hideaki Shibata (Hokkaido University, Japan)

28C3-3  Scientific robustness of including indirect land use change into life cycle assessment
Matthias Finkbeiner (Technische Universität Berlin, Germany)

28C4-2  Environmental impacts of organic rice farming in Thailand by using life cycle assessment to support policy decision on sustainable agriculture
Rattanawan Mungkung (Kasetsart University, Thailand)

28C4-3  Water footprint assessment of crops cultivation in Kurdistan Region, Iraq
Marlia Mohd Hanafiah (National University of Malaysia, Malaysia)

28C4-4  Life cycle assessment of biogas production in small-scale household digesters in Vietnam
Van Thi Khanh Vu (National Institute of Animal Sciences, Viet Nam)

28D3-1  Analyzing the carbon emissions of cloud computing facilities
Kendra Tupper (City of Boulder, U.S.A.)

29C2-1  A new direction for LCA: Organizational LCA
Matthias Finkbeiner (Technische Universität Berlin, Germany)
Atsushi Inaba (Kogakuin University, Japan)

29F2-2  Ultra-high temperature materials for higher-efficiency energy conversion of heat engines
Kyoosuke Yoshimi (Tohoku University, Japan)

29F2-3  Advanced green innovation discovered by self-healing ceramics
Wataru Nakao (Yokohama National University, Japan)

29F3-1  Minor rare metals concentration from e-waste by combining novel comminution and physical separation
Shuji Owada (Waseda University, Japan)

29F3-2  Metal recovery from urban mines by hydrometallurgical methods
Mikiya Tanaka (National Institute of Advanced Industrial Science and Technology, Japan)

30C1-1  Material flow cost accounting: Simple approach, untapped opportunities, upcoming tasks
Bernd Wagner (University of Augsburg, Germany)
Conference Rooms

1st Floor

- Lunch Hall
- Exhibition
- Registration Desk
- Welcome Party
  <Restaurant Espoir>
- Entrance
- Session (28A)
  (29 poster)
  (30A)
- Coffee Counter
- Session (28B)
  (29 poster)
  (30B)
- Smoking Area
- Way to Main Convention Hall

2nd Floor

- Main Convention Hall
  Entrance
- Way to Main Convention Hall
- Session (28C)
  (29C)
  (30C)
- Session (28D)
  (29D)
  (30D)
- Opening Plenary
Conference Rooms

3rd Floor

3rd Floor

3rd Floor

3rd Floor

3rd Floor

Closing Plenary

Session (29E)

3rd Floor

4th Floor

4th Floor

4th Floor

4th Floor

Session (29G)

Session (29F)

Coffee Counter (29 AM)

Conference Rooms
Banquet and Farewell Party

**Banquet (Room “Subaru”, 1F Annex, Okura Frontier Hotel Tsukuba)**

- **Banquet and Farewell Party**
- **Conference Site**
- **Farewell Party (INCAROSE)**

- 10 min. walk
- 5 min. walk
Program
## Opening Plenary

**Opening Ceremony and Keynote Lectures (Main Convention Hall) 10:00–12:00 October 28, Tuesday**

**Chair:** Y. Fukushima  
Vice-chair of EcoBalance 2014

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
<th>Speaker/Details</th>
</tr>
</thead>
</table>
| Opening address        | 10:00–10:05 | Yasushi Kondo  
Chair of EcoBalance 2014                                                        |
| Welcome address        | 10:05–10:10 | Kenichi Ichihara  
Mayor, City of Tsukuba                                                             |
| **Keynote 1**          | 10:10–10:50 | **Values of life cycle thinking**  
Junko Edahiro  
Institute for Studies in Happiness, Economy and Society; Environmental Journalist, Japan |
| **Keynote 2**          | 10:50–11:30 | **Business strategies and environmental visions in the Hitachi**  
Ryuichi Otsuki  
Chief Strategy Officer, Information & Telecommunication Systems Company, Hitachi, Ltd., Japan |
| **Keynote 3**          | 11:30–11:50 | **Life cycle based sustainability solutions: How successful companies turn sustainability solutions into company benefit and business value**  
Martin Baitz  
Director Content, PE International, Germany |
| Closing address        | 11:50–12:00 | Shinsuke Murakami  
Vice-chair of EcoBalance 2014                                                      |

## Closing Plenary

**Special Panel Discussion and Closing Ceremony (Convention Hall 300) 13:30–16:00 October 30, Thursday**

**Chair:** N. Itsubo

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<thead>
<tr>
<th>Event</th>
<th>Time</th>
<th>Speaker/Details</th>
</tr>
</thead>
</table>
| **EcoBalance+20**              | 13:30–15:00 | Matthias Finkbeiner  
Professor, Department of Environmental Technology, Technical University of Berlin; Chairperson, ISO/TC 207/SC 5 Life Cycle Assessment  
Guido Sonnemann  
Professor, ISM-CyVi, University of Bordeaux; Co-founder and former Programme Officer, the UNEP/SETAC Life Cycle Initiative  
Kohmei Halada  
NIMS Invited Researcher, Research Center for Strategic Materials, National Institute for Materials Science; President, The Institute of Life Cycle Assessment, Japan  
Atsushi Inaba  
Professor, Department of Environmental and Energy Chemistry, Kogakuin University; Former President of The Institute of Life Cycle Assessment, Japan |
| **Closing ceremony**           | 15:00–16:00 |                                                                                 |
## Oral Sessions

### October 28, Tuesday

**28A3 (Room 101) 13:30−14:50 October 28, Tuesday**

### Sustainability in the Chemical Industry-1

**Chair**: H. Sugiyama and M. Yoshikiyo

#### 28A3-1 (invited)

**Decision-support tools for designing sustainable chemical products and processes**

Konrad Hungerbühler, Stavros Papadokonstantakis

ETH Zurich

#### 28A3-3

**Development of the risk-based management system for chemicals throughout the supply chain**

Fumiaki Shono, Satoshi Tokushige

Japan Chemical Industry Association

#### 28A3-4

**Chemicals management for sustainability in small and medium-sized enterprises**

Emi Kikuchi-Uehara, Yasunori Kikuchi, Masahiko Hirao

The University of Tokyo

### 28A4 (Room 101) 15:10−16:30 October 28, Tuesday

### Sustainability in the Chemical Industry-2

**Chair**: H. Sugiyama and M. Yoshikiyo

#### 28A4-1

**The use of LCA as a metrics in advancing and scaling up green chemistry research: The case of black liquor**

Amandine Foulet, Hervé Deleuze, Philippe Garrigues, Guido Sonnemann

University of Bordeaux

#### 28A4-2

**Sulphur distribution to products in wet biomass gasification**

Kenji Koido, Yutaro Watanabe, Kiyoshi Dowaki

Tokyo University of Science

#### 28A4-3

**Estimating reduction of environmental load for resource recovery from plastic waste by LCA methodology and plastic waste processing pathways**

Akihiro Izumi, Hajime Munekuni

Plastic Waste Management Institute

#### 28A4-4

**Applying c-LCA for challenges to global warming at Asahi Kasei Corp.**

Junich Nakahashi

Asahi Kasei Corporation

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**28A5 (Room 101) 16:50−18:10 October 28, Tuesday**

### Estimating the Contribution to Avoided Emissions

**Chair**: A. Inaba

#### 28A5-1

**Guideline on quantifying and reporting the avoided emissions of products**

Motozo Yoshikiyo, Kiyoshi Kasai

Japan Chemical Industry Association

#### 28A5-2

**Establishment of Kawasaki mechanism, the certification program of avoided emissions outside Kawasaki city**

Shoichiro Tsuruta\(^1\), Masayuki Kanzaki\(^2\), Akikazu Kobayashi\(^3\), Toshifumi Takamizawa\(^4\), Ichiro Daigo\(^5\)

\(^1\)Japan Environmental Management Association for Industry, \(^2\)City of Kawasaki, \(^3\)The University of Tokyo

#### 28A5-3

**Program for assessing the contribution of business activities to avoided emissions in Shiga Prefecture, Japan**

Maki Ogura\(^1\), Takeshi Matsuda\(^1\), Ryota Iti\(^1\), Madoka Kaito\(^2\), Kazuomi Okuda\(^2\)

\(^1\)Pacific Consultants Co., Ltd., \(^2\)Shiga Prefecture

#### 28A5-4

**Neutralize CO\(_2\) emissions by product contributions**

Ryo Yokoyama, Tetsuya Kuwashima, Yasuyuki Fujioka, Masaru Hirose

TDK Corporation

### 28B3 (Room 102) 13:30−14:50 October 28, Tuesday

### Tsukuba Special Session

**Chair**: K. Okajima

#### 28B3-1

**Introduction: Tsukuba Environmental Style “SMILe”**

Tomokazu Ueta

City of Tsukuba

#### 28B3-2 (invited)

**Hydrocarbon production from microalgae and its potential commercial use**

Makoto M Watanabe

University of Tsukuba

#### 28B3-3 (invited)

**Mobility robot technologies in AIST for green innovation**

Osamu Matsumoto

National Institute of Advanced Industrial Science and Technology

**Discussion**

14:40−14:50
Oral Sessions

28B4 (Room 102) 15:10 – 16:30 October 28, Tuesday

**Material Flow Analysis**  
Chair: W.R. Poganietz

**28B4-1**  
15:10 – 15:30  
**Spatial cluster analysis of global metal flows**  
Shigemi Kagawa, Keisuke Nansai, Yasushi Kondo  
1Kyushu University, 2National Institute for Environmental Studies, 3Waseda University

**28B4-2**  
15:30 – 15:50  
**Impact of resource-use intensity of goods and services and demand structure on national resource productivity: Time series analysis for 10 countries**  
Arata Ito, Seiji Hashimoto  
Ritsumeikan University

**28B4-3**  
15:50 – 16:10  
**Selection of products for remanufacturing based on the designs of end of life products**  
Aditi D Joshi, Surendra M Gupta, Tetsuo Yamada  
1Northeastern University, 2The University of Electro-Communications

**28B4-4**  
16:10 – 16:30  
**Mathematical formulation of urban mines design problem**  
Shinsuke Kondoh, Hitoshi Komoto, Keijiro Masui  
National Institute of Advanced Industrial Science and Technology

28B5 (Room 102) 16:50 – 18:10 October 28, Tuesday

**E-waste**  
Chair: G. Sonnemann

**28B5-1**  
16:50 – 17:10  
**Sorted collection of used batteries and small home appliances by municipalities**  
Atsushi Terazono, Masahiro Oguchi, Tetsuo Yamada  
1National Institute for Environmental Studies, 2Tokyo Metropolitan Research Institute for Environmental Protection, 3Bureau of Environment, Tokyo Metropolitan Government

**28B5-2**  
17:10 – 17:30  
**Life cycle assessment of an automotive lithium-ion battery in large-scale commercial production**  
Hyung Chul Kim, Timothy J. Wallington  
Ford Motor Company

**28B5-3**  
17:30 – 17:50  
**The impact of demographic change in Japan on supply security footprint of critical metals**  
Yosuke Shigetomi, Keisuke Nansai, Susumu Tohno  
1Kyoto University, 2National Institute for Environmental Studies, 3JSPS Research Fellow

28B5-4  
17:50 – 18:10  
**Material flow analysis of heavy metals in contaminated soil: A case study on the polluted sites in Taoyuan County, Taiwan**  
Rong-Hua Lee, Yuh-Ming Lee  
National Taipei University

28C3 (Room 201) 13:30 – 14:50 October 28, Tuesday

**Global Food Security and Corporate Practices from Life Cycle Perspectives-1**  
Chair: K. Hayashi

**28C3-1** (invited)  
13:30 – 13:50  
**Japanese nitrogen footprint model for the prediction of nitrogen loss to the environment**  
Hideaki Shibata, Lia R Cattaneo, Allison M Leach, James N Galloway  
1Hokkaido University, 2University of Virginia

**28C3-2**  
13:50 – 14:10  
**Aggregation of biodiversity impacts across international value chains**  
Jan Paul Lindner, Laura Brethauer, Ulrike Bos, Rainer Luick, Michael Jäger  
1Fraunhofer IBP, 2University of Stuttgart, 3University of Applied Forest Sciences Rottenburg

**28C3-3** (invited)  
14:10 – 14:30  
**Scientific robustness of including indirect land use change into life cycle assessment**  
Matthias Finkbeiner  
Technische Universität Berlin

**28C3-4**  
14:30 – 14:50  
**Future perspectives on LCA in agriculture: Lessons from the research in Japan**  
Masanori Saito  
Tohoku University

28C4 (Room 201) 15:10 – 16:30 October 28, Tuesday

**Global Food Security and Corporate Practices from Life Cycle Perspectives-2**  
Chair: M. Saito

**28C4-1**  
15:10 – 15:30  
**Assessing impacts of land use change and management intensification: A life cycle perspective on agricultural production**  
Kiyotada Hayashi  
National Agriculture and Food Research Organization
Oral Sessions

28C4-2 (invited) 15:30−15:50
Environmental impacts of organic rice farming in Thailand by using life cycle assessment to support policy decision on sustainable agriculture
Rattanawan Mungkung, Patthra Pengthamkeerati, Ratna Chaichana, Saranya Watcharothai, Kittiwat Kitpakornsanti, Supachok Tapananont
Kasetsart University

28C4-3 (invited) 15:50−16:10
Water footprint assessment of crops cultivation in Kurdistan region, Iraq
Marlia Mohd Hanafah, Husniah Raheem Hamarash, Muhammad Muaz Aminordin, Shabbir Gheewala
1National University of Malaysia, 2The Joint Graduate School of Energy and Environment, King Mongkut’s University of Technology Thonburi, 3Ministry of Education, Thailand

28C5 (Room 201) 16:50−18:10 October 28, Tuesday
Global Food Security and Corporate Practices from Life Cycle Perspectives-3
Chair : H. Shibata

28C5-1 16:50−17:10
Resource logistics for sustainable management of agricultural nutrients
Kazuyo Matsubae, Kenichi Nakajima, Keisuke Nansai, Tetsuya Nagasaka
1Tohoku University, 2National Institute for Environmental Studies

28C5-2 17:10−17:30
Monetary and physically flow analyses on products of agriculture
Yuko Oshita, Yasunori Kikuchi
1Kobe University, 2The University of Tokyo

28C5-3 17:30−17:50
Evaluation of environmental improvement by introduction of eco-feed
Hongqin Yu, Hiroshi Yagita
Nippon Institute of Technology

28C5-4 17:50−18:10
Uncertainty analysis for greenhouse gas impact of feedstuff in Korea
Yoosung Park, Minhyeok Lee, Kunmo Lee
Ajou University

28D3 (Room 202) 13:30−14:50 October 28, Tuesday
Green ICT-1
Chair : M. Hara

28D3-1 (invited) 13:30−13:50
Analyzing the carbon emissions of cloud computing facilities
Kendra Tupper
City of Boulder

28D3-2 13:50−14:10
New key performance indicators for smart sustainable city
Jiro Nakamura, Minako Hara
NTT Energy and Environment Systems Laboratories

28D3-3 14:10−14:30
Social impact assessment of ICT services: Case study and tool realization
Julien Boisseau, Tomoko Tanaka, Ahmed Zeddam, Kazue Takahashi, Takashi Sawada
1Orange Japan, 2NTT Energy and Environment Systems Laboratories

28D3-4 14:30−14:50
Multiple environmental impact assessment method on biodiversity for industry
Kazue Ichino Takahashi, Eri Matsunaga, Takashi Sawada, Norihiro Itsubo, Masaharu Motoshita, Kayo Murakami
1NTT Energy and Environment Systems Laboratories, 2Tokyo City University, 3National Institute of Advanced Industrial Science and Technology, 4Kyoto University

28D4 (Room 202) 15:10−16:30 October 28, Tuesday
Green ICT-2
Chair : K. Tupper

28D4-1 15:10−15:30
Case study on effect of mechanics development of telecommunication product on material efficiency
Lauri Smalén, Elisabeth Dechenaux, Topi Volkov, Timo Galkin, Timo Junno, Heikki Karvinen, Marc Aubree
1Nokia Solutions and Networks, 2Orange Labs, 3Aalto University

28D4-2 15:30−15:50
Five IT thoughts from a waste management proof-of-concept project
Yukihisa Yonemochi, Takashi Sakairi, Hiroshi Horii, Tatsuya Ishikawa, Scott Trent, Heather D Achilles
IBM Research

28D4-3 15:50−16:10
Environmental footprint for IT equipment
Takaaki Kumazawa, Osamu Namikawa
Hitachi, Ltd.
Oral Sessions

28D4-4  16:10–16:30
Analysis of influence of ICT services including application-service and network-service on CO2 emission
Jiro Nakamura, Tomomi Nagao, Yuichiro Takei, Atsushi Sakurai, Shinsuke Hannoe, Keiichi Saito
NTT Energy and Environment Systems Laboratories

28D5 (Room 202) 16:50–18:10 October 28, Tuesday

Driving innovation
Chair: M. Sagisaka

28D5-1  16:50–17:10
Measuring social impacts of products: The Handbook of the Roundtable for Social Metrics
João Fontes, Mark Goedkoop, Anne Gaasbeek
PRé Consultants B.V.

28D5-2  17:10–17:30
Policies promoting ecodesign for energy and resource efficiency in Europe: Experiences, barriers and future options
Carl Johan Dalhammar
Lund University

28D5-3  17:30–17:50
Reverse flow of knowledge and the development of sustainable energy systems
Harald Ernst Otto
Polytechnic University of Marche

28D5-4  17:50–18:10
The international diffusion of environmental innovations: Streamlining the dissemination mechanisms across Asian nations
Helmut Friedrich Yabar\textsuperscript{1}, Michinori Uwasu\textsuperscript{2}, Keishiro Hara\textsuperscript{2}
\textsuperscript{1}University of Tsukuba, \textsuperscript{2}Osaka University
Oral Sessions

**October 29, Wednesday**

**29C1 (Room 201) 9:00—10:20 October 29, Wednesday**

**The Practical Challenge for Sustainable Industry-1**

Chair: M. Motoshita  
9:00—9:20

**29C1-1**  
Hitachi’s CO₂ visualization effort  
Tetsuichi Nomiyama, Hitoshi Maekawa  
Hitachi, Ltd.

**29C1-2**  
Challenges to biofuel production enhancing food production: A food and beverage alcohol company perspective  
Satoshi Ohara, Akira Sugimoto, Kazutoshi Kitai, Takaomi Yasuhara  
Asahi Group Holdings, Ltd.

**29C1-3**  
Experience of EPD process certification  
Lucia Rigamonti¹, Mario Grosso¹, Mino Leo Marucci²  
¹Politecnico di Milano, ²Reno De Medici S.p.A.

**29C1-4**  
Policy options for LCA deployment in automotive industry  
Annekatrin Lehmann¹, Matthias Finkbeiner³, Kirana Wolf⁴, Cees ten Broek²  
¹Technische Universität Berlin, ²World Steel Association

**29C2 (Room 201) 10:40—12:00 October 29, Wednesday**

**The Practical Challenge for Sustainable Industry-2**

Chair: M. Nakajima  
10:40—11:00

**29C2-1 (invited)**  
A new direction for LCA: Organizational LCA  
Matthias Finkbeiner¹, Julia Martinez-Blanco¹, Atsushi Inaba²  
¹Technische Universität Berlin, ²Kogakuin University

**29C2-2**  
Guidance on organizational LCA by the UNEP/SETAC Life Cycle Initiative  
Julia Martinez-Blanco¹, Sonia Valdivia², Ana Quiros³, Llorenc Milà i Canals⁴, Atsushi Inaba⁵, Matthias Finkbeiner³  
¹Technische Universität Berlin, ²World Resources Forum, ³ECOGLOBAL, ⁴Kogakuin University, ⁵UNEP-SETAC Life Cycle Initiative

**29C2-3**  
Activity to evaluate a positive impact of an organization  
Seiya Yamazaki, Hiroko Ioka, Takafumi Hashitani  
Fujitsu limited

**29C2-4**  
11:40—12:00  
Proposal for a supplementary calculation method for scope 3 emissions  
Sachiko Motoike, Hideki Sasaki, Hiroshi Onishi  
Panasonic Corporation

**29C3 (Room 201) 13:30—14:50 October 29, Wednesday**

**The Practical Challenge for Sustainable Industry-3**

Chair: M. Motoshita  
13:30—13:50

**29C3-1**  
Estimating multiple changes of GHG emissions on mitsubishi electric group’s supply chain; category11-possible variation of GHG during use stage  
Chie Uchiyama  
Mitsubishi Electric Corporation

**29C3-2**  
13:50—14:10  
What allocation method should be taken to provide the data for SCOPE3 by supplier to customer? An example of the printing company  
Hiromichi Sasaki, Nobuyasu Tanaka  
Sun Messe Co., Ltd.

**29C3-3**  
14:10—14:30  
Water consumption evaluation along the supply chain  
Junichi Nakahashi  
Asahi Kasei Corporation

**29C3-4**  
14:30—14:50  
Supply-chain environmental assessment for sustainable procurement  
Kenji Ohashi  
Shiseido Co., Ltd.

**29D1 (Room 202) 9:00—10:20 October 29, Wednesday**

**LCA Methodology**

Chair: Y-M. Lee  
9:00—9:20

**29D1-1**  
9:00—9:20  
GreenGDP study based on life cycle impact assessment of refinery sector in Thailand  
Kultida Kunanuntakij¹, Viganda Varabuntoonvit¹, Nanatee Vorayos², Thumrongrut Mungeharoen¹  
¹Kasetsart University, ²ChiangMai University

**29D1-2**  
9:20—9:40  
Fast screening of alternative life cycles and system optimization using flexibly linkable process subsystems  
Bernhard Steubing, Chris Mutel, Florian Suter, Stefanie Hellweg  
ETH Zurich
Oral Sessions

29D1-3  9:40–10:00
Investigation of the differences between static and probabilistic LCA/LCC results of different floor finishes
Gantner Johannes\textsuperscript{(1)}, William Fawcett\textsuperscript{(2)}, Matthias Fischer\textsuperscript{(3)}
\textsuperscript{(1)}University of Stuttgart, \textsuperscript{(2)}Cambridge Architectural Research Ltd, \textsuperscript{(3)}Fraunhofer IBP

29D1-4  10:00–10:20
Supporting uncertainty evaluation in prospective assessment of innovations: A case on ecological method in shrimp farming
Heng Yi Teah\textsuperscript{(1)}, Yasuhiro Fukushima\textsuperscript{(1)}, Motoharu Onuki\textsuperscript{(2)}
\textsuperscript{(1)}National Cheng Kung University, \textsuperscript{(2)}The University of Tokyo

29D2-1  10:40–11:00
Development of supply-chain matrix database with IDEA aiming for the application to consequential LCA
Kiyotaka Tahara\textsuperscript{(1)}, Masaharu Motoshita\textsuperscript{(1,3)}, Kotaro Kawajiri\textsuperscript{(1)}, Hiroki Hatayama\textsuperscript{(1)}, Chunyoul Baek\textsuperscript{(1)}, Tomohiko Ihara\textsuperscript{(1)}
\textsuperscript{(1)}National Institute of Advanced Industrial Science and Technology, \textsuperscript{(2)}The University of Tokyo, \textsuperscript{(3)}Technische Universität Berlin

29D2-2  11:00–11:20
Resolution of nuclear power plant construction conflicts: Argument of tsunami issues through concept mapping and lifecycle thinking
Ting-Fang Hsieh, Yuh-Ming Lee
National Taipei University

29D2-3  11:20–11:40
LCA system boundary selection using the industrial clustering analysis
Shunsuke Okamoto
Kyushu University

29D2-4  11:40–12:00
Assessing climate impact of industrial symbioses: A dynamic approach
François Dumoulin\textsuperscript{(1,2)}, Tom Wassenaar\textsuperscript{(1)}, Jean-Marie Paillat\textsuperscript{(1)}
\textsuperscript{(1)}CIRAD, \textsuperscript{(2)}ADEME

29D3-1  13:30–13:50
Towards a low-carbon future in China’s rural residential sector
Rui Xing, Tatsuya Hanaoka, Yuko Kanamori, Hancheng Dai, Toshihiko Masui
National Institute for Environmental Studies

29D3-2  13:50–14:10
Exploring intersection of product lifecycles: GHG emissions associated with vehicles and pavement influenced by pavement maintenance strategies
Yasuhiro Fukushima, Fitria, Shih-Hsien Yang
National Cheng Kung University

29D3-3  14:10–14:30
A cradle-to-cradle assessment framework for green building evaluation: Emphases on energy management and resource recovery
Chia-Lin Hsu, Yuh-Ming Lee
National Taipei University

29D3-4  14:30–14:50
A life cycle assessment of silica sand: Comparing the beneficiation processes
Anamarija Grbes
Faculty of Mining, Geology and Petroleum Engineering, Zagreb, Croatia

29E1-1  9:00–9:20
A life cycle thinking assessment framework for land reclamation policy in Taiwan
Lih-Ren Liu, Yuh-Ming Lee
National Taipei University

29E1-2  9:20–9:40
Constructing a system thinking model for climate policy making based on national GHG inventory
Yu-Tsang Lu, Yuh-Ming Lee
National Taipei University

29E1-3  9:40–10:00
Evaluating the change of psychological factors and pro-environmental behaviors through workshop about life cycle thinking and norms
Eri Aoki, Kiyo Kurisu, Keisuke Hanaki
The University of Tokyo
**Oral Sessions**

29E1-4  10:00−10:20  
People’s environmental consciousness in daily activities  
Ai Hiramatsu, Kiyo Kurisu  
The University of Tokyo

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29E2 (Room 303)  10:40−12:00  October 29, Wednesday  
**Policy & Visualization**  
Chair: K. Nansai

29E2-1  10:40−11:00  
Visualizing core structure of international carbon network associated with household consumption  
Yasushi Kondo  
Waseda University

29E2-2  11:00−11:20  
Life cycle inventory database and its applications to support public policy in Thailand  
Thumrongrut Mungcharoen1,2, Thumrongrut Mungcharoen1,3  
1National Science and Technology Development Agency.  
2National Electronics and Computer Technology Center.  
3National Metal and Materials Technology Center

29E2-3  11:20−11:40  
Thai CF Pro: A web-based program for evaluating carbon footprint of product  
Chantana Yuvaniyama1,2, Wanwisa Thanungkano1,3, Ruthairat Wisansuwannakorn1,4, Athiwat Jirajariyavech1, Thepchai Supnithi2, Nattapol Kritsuthikul1, Thumrongrut Mungcharoen1, 3  
1National Science and Technology Development Agency.  
2National Electronics and Computer Technology Center.  
3National Metal and Materials Technology Center

29E2-4  11:40−12:00  
Visualization of comprehensive environmental impacts  
Yoshinori Kobayashi, Kiyoshi Sanchira  
Toshiba Corporation

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29E3 (Room 303)  13:30−14:50  October 29, Wednesday  
**Agriculture & Foods**  
Chair: R. Mungkung

29E3-1  13:30−13:50  
Life cycle assessment of environmental impacts of crop residue management and manure application in Japanese rice cultivation  
Ai Leon, Yasuhito Shirato, Shin-ichi Yoshimatsu, Seiya Tsushima, Kazuyuki Yagi, Kazunori Kohyama  
The National Institute for Agro-Environmental Sciences

29E3-2  13:50−14:10  
Total material requirement of food production and related materials in Japan  
Eiji Yamase1, Kazuyo Matsubae2, Keiichi N Ishihara3  
1Kyoto University, 2Tohoku University

29E3-3  14:10−14:30  
Land use change related CO2 emissions in the LCA of biofuel-based electrification in Mali  
Joana Almeida1, Jeroen Degerickx2, Wouter M J Achten2, Bart Muys3  
1KU Leuven, 2Universite Libre de Bruxelles

29E3-4  14:30−14:50  
Ecoefficiency analysis of integrated and non-integrated crop, forestry and livestock production systems in the Brazilian Cerrado  
Marcela Porto Costa1,2, Sueli Aparecida de Oliveira1, Gerson Araujo de Medeiros3  
1FEE- Espace ECO Foundation-BASF, 2UNESP- Universidade Estadual Paulista Julio de Mesquita Filho -Sorocaba

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29F1 (Room 405)  9:00−10:20  October 29, Wednesday  
**Sustainability of Materials and Industries-1**  
Chair: Y. Matsuno

29F1-1  9:00−9:20  
How much does urban mining reduce the environmental burden?  
Kohmei Halada  
The National Institute for Material Science

29F1-2  9:20−9:40  
Designing strategic urban mining in Japan for criticality mitigation  
Hiroki Hatayama1, Kiyotaka Tahara1, Ichiro Daigo2  
1National Institute of Advanced Industrial Science and Technology, 2The University of Tokyo

29F1-3  9:40−10:00  
Comparison of end-of-life recycling rates of common metals in Japan  
Ichiro Daigo, Kohei Iwata, Yoshikazu Goto  
The University of Tokyo

29F1-4  10:00−10:20  
Framework and applications of time-series material flow and stock analysis  
Shotaro Nakanihshi, Jun Nakatani, Yuichi Moriguchi  
The University of Tokyo
Oral Sessions

29F2 (Room 405) 10:40−12:00 October 29, Wednesday

Sustainability of Materials and Industries-2
Chair : H. Kakisawa

29F2-1
10:40−11:00
Value added material flow analysis of NdFeB magnets in Denmark
Komal Habib, Henrik Wenzel
University of Southern Denmark

29F2-2 (invited)
11:00−11:20
Ultra-high temperature materials for higher-efficiency energy conversion of heat engines
Kyosuke Yoshimi
Tohoku University

29F2-3 (invited)
11:20−11:40
Advanced green innovation discovered by self-healing ceramics
Wataru Nakao
Yokohama National University

29F2-4
11:40−12:00
Environmental barrier coating on SiC fiber-reinforced SiC matrix composites for low pressure turbine in jet engine
Hideki Kakisawa
The University of Tokyo

29F3 (Room 405) 13:30−14:50 October 29, Wednesday

Sustainability of Materials and Industries-3
Chair : K. Halada

29F3-1 (invited)
13:30−13:50
Minor rare metals concentration from e-waste by combining novel comminution and physical separation
Shuji Owada, Chiharu Tokoro
Waseda University

29F3-2 (invited)
13:50−14:10
Metal recovery from urban mines by hydrometallurgical methods
Mikiya Tanaka1, Hirokazu Narita1, Tetsuo Oishi1, Takeshi Ogata1, Yuiko Tasaki Handa1, Kazuya Koyama1,2
1National Institute of Advanced Industrial Science and Technology, 2Chiba Institute of Technology

29F3-3
14:10−14:30
Development of new processes for precious metals recovery using organic aqua regia
Kana Umehara, Akihiro Yoshimura, Yasunari Matsuno
The University of Tokyo

29F3-4
14:30−14:50
A recycling system for poly (methyl methacrylate) in Japan
Yasunori Kikuchi1, Masahiko Hirao1, Hirokazu Sugiyama2, Stavros Papadokonstantakis2, Konrad Hungerbühler3, Takashi Ookubo3, Akinobu Sasaki5
1The University of Tokyo, 2ETH Zurich, 3Mitsubishi Rayon, Co., Ltd.

29G1 (Room 406) 9:00−10:20 October 29, Wednesday

Energy-1
Chair : K. Okajima

29G1-1
9:00−9:20
Life cycle inventory of energy technologies: Survey and application to energy scenarios
Andrew John Chapman, Benjamin Craig McLellan, Tetsuo Tezuka
Kyoto University

29G1-2
9:20−9:40
Network theory integrated life cycle assessment for an electric power system
Heetae Kim, Petter Holme
Sungkyunkwan University

29G1-3
9:40−10:00
Life cycle greenhouse gas emission and land use change impact on compressed natural gas as alternative vehicle fuel in Thailand
Worayut Saibutrong, Viganda Varabuntoonvit, Thumrongrut Mungcharoen
Kasetsart University

29G1-4
10:00−10:20
Life cycle assessment of biodiesel in Hong Kong
Ya Hong Dong, S. Thomas Ng
The University of Hong Kong

29G2 (Room 406) 10:40−12:00 October 29, Wednesday

Energy-2
Chair : K. Dowaki

29G2-1
10:40−11:00
Ecological effects from operating a biomass power plant
Akito Murano1, Satoshi Nakano1, Ayu Washizu1
1Waseda University, 2Toyo University, 3The Japan Institute for Labour Policy and Training
Oral Sessions

29G2-2  11:00–11:20
Load flexible power plant concepts: A comparative analysis from a life-cycle perspective
Witold Roger Poganietz\textsuperscript{1), Yasushi Kondo\textsuperscript{2), Hans-Joachim Gehrmann\textsuperscript{1), Shinichiro Nakamura\textsuperscript{2)\textsuperscript{)\textsuperscript{)}}
\textsuperscript{1)Karlsruhe Institute of Technology, \textsuperscript{2)Waseda University

29G2-3  11:20–11:40
An analysis of LCI and fuel cost due to Blue Tower process based on the low power purification system
Rui Ohkubo\textsuperscript{1), Mitsuo Kameyama\textsuperscript{2), Yutaro Watanabe\textsuperscript{1), Kenji Koido\textsuperscript{1), Kiyoshi Dowaki\textsuperscript{1)\textsuperscript{)\textsuperscript{)}}
\textsuperscript{1)Tokyo University of Science, \textsuperscript{2)Japan Blue Energy Co.,Ltd.

29G2-4  11:40–12:00
Small hydro power plants: A modular LCA approach for optimization
Beatrix F. Becker, Liselotte Schebek
Technische Universität Darmstadt
Oral Sessions

**October 30, Thursday**

*30A1: Room 101: 9:00–10:20 October 30, Thursday*

**Sustainable Resource Management-1**

Chair: B. McLellan

30A1-1

Global flow of nickel: Identifying its supply chain and implication for sustainable resource management

Kenichi Nakajima\(^1\), Keisuke Nansai\(^1\), Hiroya Yamano\(^1\), Kazuyo Matsubae\(^2\), Shinsuke MURAKAMI\(^2\), Yuto OHTSUKA\(^2\), Yasunori IWATSUKI\(^2\), Tetsuya NAGASAKA\(^2\)

\(^1\)National Institute for Environmental Studies, \(^2\)Tohoku University, \(^3\)The University of Tokyo

30A1-2

Sustainability of rare metal supply chains from unconventional resources

Glen D Corder\(^1\), Saleem Ali\(^1,3\), Artem Golev\(^1\), Benjamin C McLellan\(^1,2\)

\(^1\)The University of Queensland, \(^2\)Kyoto University, \(^3\)University of Vermont

30A1-3

Refinement of a simulation model to analyze the formation of urban mines with demonstrative experiments

Hitoshi Komoto, Shinsuke Kondoh, Keiijiro Masui

National Institute of Advanced Industrial Science and Technology

30A1-4

Quality-oriented end-of-life vehicle scrap recycling aimed at efficient utilization of steel alloying elements

Hajime Ohno\(^1\), Kazuyo Matsubae\(^1\), Kenichi Nakajima\(^3\), Yasaki Kondo\(^2\), Shinichiro Nakamura\(^2\), Tetsuya Nagasaka\(^1\)

\(^1\)Tohoku University, \(^2\)National Institute for Environmental Studies, \(^3\)Waseda University

*30B1: Room 102: 9:00–10:20 October 30, Thursday*

**Waste Management & Recycling-1**

Chair: Y. Oshita

30B1-1

Repercussion effects of final consumption on production and environmental loads using a China-Japan waste input-output table

Makiko Tsukui\(^1\), Chen Lin\(^2\)

\(^1\)Tokyo International University, \(^2\)Shandong University

30B1-2

The implementation of financial incentive on single-use takeout cup source reduction and recycling in Taiwan

Wei-Kai Yang, Ying-Hsuan Lin, Chih-Ku Chen

Sustainable Environmental Technology and Management Co., Ltd.

30B1-3

Environmental impacts assessment of plastic waste in Thailand

Unchalee Suwanmanee\(^1\), Thanawadee Leejarkpai\(^2\), Shintiphkorn Pongpinyopap\(^3\), Thumrongrut Mungcharoen\(^3\)

\(^1\)Srinakharinwirot University, \(^2\)National Metal and Materials Technology Center, \(^3\)Kasetsart University

30B1-4

Assessing environmental impact of fiber reinforced plastic table top product mixed with non-metallic fraction from printed circuit board waste

Sawanya Jareemil\(^1\), Suphaphat Kwonpongsagoon\(^1\), Premruede Kanchanapya\(^1\)

\(^1\)Mahidol University, \(^2\)National Metal and Materials Technology Center
Oral Sessions

30B2 (Room 102) 10:40–12:00 October 30, Thursday
Waste Management & Recycling-2
Chair : R. Inaba

30B2-1 10:40–11:00
WEEE management in Lombardia region (Italy): An LCA-based evaluation
Laura Biganzoli, Alida Falbo, Federica Forte, Lucia Rigamonti, Mario Grosso
Politecnico di Milano

30B2-2 11:00–11:20
Evaluation of environmental effects of recycling of waste from food supply chains using the integrated hybrid analysis
Tamon Maruyama, Jun Nakatani, Yuichi Moriguchi
The University of Tokyo

30B2-3 11:20–11:40
Life cycle assessment of municipal solid waste management towards sustainable development in developing countries: A case study of Hanoi metropolitan city, Vietnam
Thanh Trung Hoang1,2), Yabar Helmut1, Higano Yoshiro3)
1)University of Tsukuba, 2)Vietnam Institute of Meteorology, Hydrology and Environment

30B2-4 11:40–12:00
Climate co-benefit from improving food waste management: A case of small communities in Thailand
Amornchai Challcharoenwattana, Chanathip Pharino
Chulalongkorn University

30C1 (Room 201) 9:00–10:20 October 30, Thursday
The Practical Challenge for Sustainable Industry-4
Chair : M. Nakajima

30C1-1 (invited) 9:00–9:20
Material Flow Cost Accounting: Simple approach, untapped opportunities, upcoming tasks
Bernd Wagner
University of Augsburg

30C1-2 9:20–9:40
Extending raw material input evaluation in the MFCA framework through implementation of criticality assessments
Christoph Helbig, Christoph Kolotzek, Andrea Thorenz, Axel Tuma
University of Augsburg

30C1-3 9:40–10:00
Cost accounting instruments as components in a material flow analysis tool-chain
Andreas Moeller1, Martina Prox2)
1)Leuphana University Lueneburg, 2)ifu Hamburg GmbH

30C1-4 10:00–10:20
New challenge to develop sustainable value chain management by MFCA information
Michiyasu Nakajima, Asako Kimura
Kansai University

30C2 (Room 201) 10:40–12:00 October 30, Thursday
The Practical Challenge for Sustainable Industry-5
Chair : M. Finkbeiner

30C2-1 10:40–11:00
Integrating LCA into a design innovation method
Jeremy Faludi
University of California, Berkeley

30C2-2 11:00–11:20
Product and organisation environmental footprint: Challenges in theory and practice
Annekatrin Lehmann, Vanessa Bach, Matthias Finkbeiner
Technische Universität Berlin

30C2-3 11:20–11:40
20 years of LCA development, have we understood the user needs?
Mark Goedkoop
PRé Consultants B.V.

Discussion 11:40–12:00

30D1 (Room 202) 9:00–10:20 October 30, Thursday
Water-1
Chair : M. Motoshita

30D1-1 9:00–9:20
The significance of land use effects on groundwater resource availability in Japan
Masaharu Motoshita1,2), Stephan Pfister1), Brad Ridout4), Yuya Ono5), Kiyotaka Tahara1), Atsushi Inaba6)
1)National Institute of Advanced Industrial Science and Technology, 2)Technische Universität Berlin, 3)ETH Zurich, 4)The Commonwealth Scientific and Industrial Research Organisation, 5)Tokyo City University, 6)Kogakuin University

30D1-2 9:20–9:40
Human health impact models from water use: Comparing to better harmonize
Anne-Marie Boulay1, Masaharu Motoshita2), Stephan Pfister1), Cecile Bulle1), Manuele Margni1)
1)CIRAIG, Ecole Polytechnique, 2)National Institute of Advanced Industrial Science and Technology, 3)ETH Zurich
Oral Sessions

30D1-3  9:40–10:00
Functional mapping for sustainable consumption: An example through drinking water consumption
Sébastien M. R. Dente, Seiji Hashimoto
Ritsumeikan University

30D1-4  10:00–10:20
Economic water productivity of polylactic acid (PLA) production chain in Thailand
Shinatiphkorn Pongpinyopap\textsuperscript{1)}, Unchalee Suwanmanee\textsuperscript{2)}, Thumrongrut Mungcharoen\textsuperscript{1)}
\textsuperscript{1)}Kasetsart University, \textsuperscript{2)}Srinakharinwirot University

30D2 (Room 202) 10:40–12:00 October 30, Thursday

Water-2
Chair : A.-M. Boulay

30D2-1  10:40–11:00
Environmental life cycle emissions for vegetable oil microemulsion-based biofuels
Noulkamol Arpornpong\textsuperscript{1)}, Ampira Charoensaeng\textsuperscript{1)}, Virin Kittithammavong\textsuperscript{1)}, David A. Sabatini\textsuperscript{2)}, Sutha Khaodhier\textsuperscript{1)}
\textsuperscript{1)}Chulalongkorn University, \textsuperscript{2)}The University of Oklahoma

30D2-2  11:00–11:20
Life cycle assessment of biofuels and the issue of indirect land use change
Liselotte Schebek, Yalda Cikovani
Technische Universität Darmstadt

30D2-3  11:20–11:40
Evaluation of uncertainty in for- and background systems: A case study of municipal wastewater treatment plant
Hiroko Yoshida, Charlotte Schuetz, Thomas H Christensen
Technical University of Denmark

30D2-4  11:40–12:00
Basin-scale multi-objective optimization of water and wastewater systems considering global and regional impacts
Seiya Maki, Jun Nakatani, Kiyo Kurisu, Keisuke Hanaki
The University of Tokyo
Poster Sessions

P-001 Life cycle based sustainability solutions: How successful companies turn sustainability solutions into company benefit and business value
Martin Baitz\(^1\), Masahiro Osumi\(^2\), Hatori Yukiyoshi\(^3\), Harald Florin\(^1\)
\(^1\)PE International AG, \(^2\)PE Asia Corporation

P-002 Guidance to assess avoided emissions of GHGs
Atsushi Inaba\(^1\), Masaharu Motoshita\(^2\)
\(^1\)National Institute of Advanced Industrial Science and Technology, \(^2\)Kogakuin University

P-003 Life cycle inventory analysis for environmental footprints: Case study on skin-care and cosmetic products
Hsin-jui Wu, Yuh-Ming Lee
National Taipei University

P-004 Estimation of the workload of calculating GHG emissions of scope 3
Hideki Sasaki, Sachiko Motoike, Hiroshi Onishi
Panasonic Corporation

P-005 An adaptive implementation framework for constructing a green and livable environment
Hui-Ting Tang, Yuh-Ming Lee
National Taipei University

P-006 Application of life cycle assessment and economic rationality: A cost survey
Tomohiro Tasaki\(^1\), Koichi Shobatake\(^2\), Ken-ichi Nakajima\(^1\), Carl Dalhammar\(^3\)
\(^1\)National Institute for Environmental Studies, \(^2\)TCO2 Co. Ltd., \(^3\)Lund University

P-007 SCOPE3 of Kogakuin University
Atsushi Inaba\(^1\), Ko Miyata\(^1\), Koji Tanaka\(^2\)
\(^1\)Kogakuin University, \(^2\)es.feed

P-008 Life-cycle co-benefit of industrial and regional symbiosis: Environmental input-output analysis on typical resource dependent city in China
Liang Dong\(^1\)\(^2\), Tsuyoshi Fujita\(^1\), Minoru Fujii\(^1\), Satoshi Ohnishi\(^1\), Takuya Togawa\(^1\), Huijuan Dong\(^1\)
\(^1\)National Institute for Environmental Studies, \(^2\)Nagoya University

P-009 Symbiosis of OTEC deep water upwelling & ocean aquaculture
Leighton K. Chong, Tetsuzan Benny Ron
Blue Revolution Hawaii, Inc.

P-010 Projection of demand and supply change of first generation biomass
Yuri Hirako, Kenji Koido, Kiyoshi Dowaki
Tokyo University of Science

P-011 Decision supporting tool for sustainable dairy cow system
Chun-Youl Baek\(^1\), Kiyotaka Tahara\(^1\), Kun-Mo Lee\(^2\), Kyu-Hyun Park\(^3\)
\(^1\)National Institute of Advanced Industrial Science and Technology, \(^2\)Ajou University, \(^3\)Kangwon National University

P-012 Domestic consumption and household stock storage media in Japan
Junya Yano, Misuzu Asari, Shin-ichi Sakai
Kyoto University

P-013 Eco-efficiency assessment of ICT product systems: An example of set top box
Jun-Yi Chiang, Yuh-Ming Lee
National Taipei University

P-014 A visualization system for carbon footprint of products on mobile devices
Peijiang Zhao, Gun Suzuki, Koji Nagano, Kazuhiko Sato
Muroran Institute of Technology

P-015 Environmental potential benefits and risks of electronic invoicing systems and their implications: Mexican service company case study
Joaquina Niembro-Garcia\(^1\), Miguel Angel Fernandez-Medina\(^2\), Margarita Gonzalez-Benitez\(^3\)
\(^1\)Universidad Panamericana, \(^2\)Universitat Politècnica de Catalunya

P-016 Forecasting electricity consumption of the Japanese information and communications sector toward green of ICT
Yusuke Kishita\(^1\), Kohei Kuroda\(^1\), Yasushi Umeda\(^1\), Yohei Yamaguchi\(^1\), Yoshiyuki Shimoda\(^1\), Minako Hara\(^1\), Hiroki Oka\(^1\), Jiro Nakamura\(^1\)
\(^1\)Osaka University, \(^2\)The University of Tokyo, \(^3\)NTT Energy and Environment Systems Laboratories

P-017 Testing the FineChem tool
Jan Paul Lindner\(^2\), Ida Masoomi\(^1\)\(^2\), Florian Gehring\(^3\)
\(^1\)Fraunhofer IBP, \(^2\)University of Stuttgart
Program

Poster Sessions

P-018 A metric for system resilience based on the skills and knowledge of production plant personnel in the chemical industry
Hajime Eguchi1), Donal O'Donovan2)
1) Independent Consultant, 2) Cork Institute of Technology

P-019 Life cycle assessment of PVC products based on material flow analysis (MFA) in Thailand
Pomthong Malakul, Thanakorn Rodcharoen, Manit Nithitanakul
Chulalongkorn University

P-020 Sustainability of 3D printing vs. machining: Do machine type and size matter?
Jeremy Faludi, Rishi Ganeriwala, Brett Kelly, Toril Rygg, Chi Yang
University of California, Berkeley

P-021 Life cycle-based exergy analysis and its application to Japanese case
Ryota I1), Eiji Yamasue2), Shinsuke Murakami3), Jun Nakatani1), Takeshi Matsuda1), Ken Horiguchi1), Yuusuke Kousaka1), Rintarou Terada1), Kei Gomi2)
1) Pacific Consultants Co., Ltd., 2) Kyoto University, 3) The University of Tokyo

P-022 Compilation of embodied CO₂ emission inventory using China's input-output tables: Implication for environmental public utilities
Qian Zhang, Jun Nakatani, Yuichi Moriguchi
The University of Tokyo

P-023 Integration of material performance index for a comprehensive change-oriented LCA: The biopolymer case
Bruno De Benedetti, Pierluigi Freni, Paolo Tecchio, Sara Rollino
Politecnico di Torino

P-024 Environmental profile of stonepaper
Atsushi Inaba1), Nobuharu Shinozai1), Takumi Kawashima1), Masaharu Motoshita2)3)
1) Kogakuin University, 2) National Institute of Advanced Industrial Science and Technology, 3) Technische Universität Berlin

P-025 An environmental assessment case study of Rinnai Korea steam-oven product throughout developing the eco-design internal system
SungJoo Lee
Econetwork Co.

P-026 LCA for environmental policy in case of Japanese local governments
Yasuyoshi Taruta, Yoshiteru Nakamori
Japan Advanced Institute of Science and Technology

P-027 Biodegradability and environmental migration of PDMAS polymers in an anaerobic sequencing batch reactor
Zhiwei Liang, Shangyuan Yang, Yunlong Wang
Zhejiang University

P-028 Eco-design of tableware from palm fiber bio-composite
Singh Intrachootoo, Rattanawan Mungkung, Kanokon Hancharoen, Chiravoot Petchyen
Kasetsart University

P-029 Critical material footprint of household consumption
Stefan Pauliuk
NTNU

P-030 Life cycle assessment (LCA) of the supercritical production of barium titanate nanomaterials
Michael Tsang, Gilles Philippot, Cyril Aymonier, Guido Sonnemann
University of Bordeaux

P-031 Integration of geopolitical related criticality assessment for resources into the life cycle assessment framework
Eskinder Demisse Gemechu1), Christoph Helbig2), Guido Sonnemann1), Andrea Thorenz2), Axel Tuma3)
1) University of Bordeaux, 2) University of Augsburg

P-032 Exploring potentials of a data-intensive approach for sustainability quantification
Ali Kharrazi, Yarime Masaru
The University of Tokyo

P-033 Toward sustainable energy business using woody biomass in rural communities
Yusuke Kishita, Noriaki Nakatsuka, Yukari Fuchigami, Fumiteru Akamatsu
Osaka University

P-034 Combining product lifetime distribution analysis with multi-regional waste input-output analysis: A case study of automobiles in Japanese prefectures
Daisuke Nishijima1), Ryoji Hasegawa2), Kenichi Nakajima3), Shigemi Kagawa1)
1) Kyushu University, 2) Osaka International University, 3) National Institute for Environmental Studies
Poster Sessions

P-035  Urban metabolism, industrial structure and city sustainability based on data envelopment analysis: A case study of Taiwan's major cities
Wen-Chi Yang1, Yuh-Ming Lee2
1National ChengChi University, 2National Taipei University

P-036  System dynamics model for sustainability assessment of mineral resource consumption considering both environmental and resource constraints
Tatsuhiko Kawamoto, Shinsuke Murakami, Jiro Yamatomi
The University of Tokyo

P-037  Global supply chain analysis for sustainable utilization of nickel
Yuto Ohtsuka1, Hajime Ohno1, Kazuyo Matsubae1, Kenichi Nakajima1, Keisuke Nanai2, Tetsuya Nagasaka1
1Tohoku University, 2National Institute for Environmental Studies

P-038  Mining impact on the changes in land use measured by satellite images analysis
Yasunori Iwatsuki1, Kenichi Nakajima1, Hiroya Yamano2, Shinsuke Murakami1
1The University of Tokyo, 2National Institute for Environmental Studies

P-039  Potential self supply of local resources towards regional sustainability: Case study of Shinjo Village in Okayama Prefecture, Japan
Kazutoshi Tsuda1, Hirokazu Makino1, Keishiro Hara1, Michinori Uwasu1
1Osaka University, 2Independent

P-040  Applying TRIZ and concept mapping to green design: An example of green take-away packaging
Hui-Ting Tang, Yuh-Ming Lee
National Taipei University

P-041  Anthropogenic earth movement analysis based on geomorphological change by digital elevation model
Keisuke Yoshida, Kenji Sugimoto, Keijiro Ooku, Hiroki Tanikawa
Nagoya University

P-042  A review of methodology for critical materials evaluation
Lu-Yen Chen1, Jia-Huei Huang1, Mei-Chiun Chou2
1National United University, 2National Taiwan University

P-043  Modeling climate effects of biogenic carbon flows from forests and wood products at the national level
Bernhard Steubing1, Florian Suter1, Stefanie Hellweg1, Esther Thuring2, Golo Stadelmann3
1ETH Zurich, 2Swiss Federal Institute for Forest

P-044  Material flow analysis of the Swiss waste management system
Melanie Haupt, Carl Oskar Vadenbo, Bernhard Steubing, Stefanie Hellweg
ETH Zurich

P-045  Metrics for performance measurement of advanced repair-to-order, disassembly-to-order and refurbishment-to-order
Ammar Yahya Alqahtani1, Surendra M. Gupta2, Kenichi Nakashima1
1King Abdulaziz University, 2Northeastern University, Kanagawa University

P-046  The role of socio-economic factors in household solid waste management in Mumbai, India
Sangeeta Vinod Sharma1, Vinod Kumar Sharma2
1National Ecology and Environment Foundation, 2Indira Gandhi Institute of Development Research

P-047  An estimation of ship waste quantities at port: A case study in Haiphong, Vietnam
Thang Ngoc To, Takaaki Kato
The University of Kitakyushu

P-048  Optimal improvement of waste plastics recycling system in Tianjin based on environmental evaluation and GIS
Richao Cong1, Toru Matsumoto1, Takamasa Hayashi2, Wenchao Li3
1The University of Kitakyushu, 2NTT DATA Institute of Management Consulting, Inc., 3Nankai University

P-049  Life cycle assessment of reuse system for surgical gowns
Naoki Yoshikawa1, Nobumitsu Kitanishi1, Koji Amano1, Koji Shimada1
1Ritsumeikan University, 2Takasago Thermal Engineering Co., Ltd.

P-050  Bulk material flow analysis of MSW management in Nongkaem transfer station region of Bangkok
saravane Singtong, Chanathip Pharino Chulalongkorn University

P-051  Analysis of contamination of impurities in steel recycling
Chihiro Murayama, Ichiro Daigo, Yoshikazu Goto
The University of Tokyo
Poster Sessions

P-052 Evaluation of the recyclability of concrete rubble using total material requirement index
Keijiro Okuoka, Hiroki Tanikawa
Nagoya University

P-053 Study on methane oxidation activity and methanotrophic bacteria community composition of Festuca ovina rhizosphere in a simulated landfill bio-cover soil
Yunlong Wang
Zhejiang Academy of Agricultural Sciences

P-054 Matching reused products with users considering their satisfaction
Yuki Yamamori, Keisuke Nanjo, Hiroyuki Hiraoka
Chuo University

P-055 Analysis of benefits of introducing integrated waste management approach in developing countries: Case study in Kathmandu City
Rajeev Kumar Singh, Helmut Yabar, Yoshihiro Higano, Takeshi Mizunoya
University of Tsukuba

P-056 A system dynamic assessment of municipal solid waste recycling and its contribution to sustainable development
Wen-Chi Yang, Yuh-Ming Lee
National Taipei University

P-057 Life cycle inventory analysis of biogas utilization from sewage treatment plants: A case study on Dihua Sewage Treatment Plants
Jie Yang, Yuh Ming Lee
National Taipei University

P-058 Review of excessive packaging restriction implementation in Taiwan
Chih-Ku Chen\textsuperscript{1),} Hsin-Ying Chuang\textsuperscript{1),} Wei-Kai Yang\textsuperscript{1),} Chin-Wei Tang\textsuperscript{1)
\textsuperscript{1)Sustainable Environmental Technology and Management Co., Ltd.,} \textsuperscript{2)International Solid Waste Association,} \textsuperscript{3)Taiwan Packaging Design Association

P-059 Estimation of operational efficiency of municipal solid waste collection alternatives by LCA/ LCC methodologies in Danang City, Vietnam
Trang Thi Thu Do, Yasuhiro Matsui, Thanh Phuc Nguyen, Anh Thi Yen Tran
Okayama University

P-060 International interdependencies analysis using detailed Asian international input-output table
Hiroshi Yamaguchi, Hiroshi Yamaguchi, Norihiro Itsubo
Tokyo City University

P-061 Study on framework of life cycle sustainability assessment and social life cycle assessment: As a subject of biorefinery
Tomoko Fuchigami\textsuperscript{1),} Xiao-Zheng Sun\textsuperscript{2),} Yutaka Gench\textsuperscript{3)\textsuperscript{1)The University of Tokyo,} \textsuperscript{2)National Institute of Advanced Industrial Science and Technology

P-062 Global scale fate factor of nitrogen for aquatic eutrophication using water circulation model
Masaharu Motoshita\textsuperscript{1),} Norihiro Itsubo\textsuperscript{2)\textsuperscript{1)Tokyo City University,} \textsuperscript{2)National Institute of Advanced Industrial Science and Technology

P-063 Methodology to assess sustainability of biomass utilisation in East Asia
Yuki Kudoh\textsuperscript{1),} Masayuki Sagisaka\textsuperscript{1),} Sau Soon Chen\textsuperscript{2),} Jessie C. Elauria\textsuperscript{3),} Shabbir H. Gheewala\textsuperscript{4),} Udin Hasanudin\textsuperscript{5),} Jane Romero\textsuperscript{6),} Vinod K. Sharma\textsuperscript{7),} Xunpeng Shi\textsuperscript{8),} \textsuperscript{1)National Institute of Advanced Industrial Science and Technology,} \textsuperscript{2)SIRIM Berhad,} \textsuperscript{3)University of the Philippines Los Baños,} \textsuperscript{4)The Joint Graduate School of Energy and Environment, King Mongkut's University of Technology Thonburi,} \textsuperscript{5)University of Lampung,} \textsuperscript{6)Asian Development Bank,} \textsuperscript{7)Indira Gandhi Institute of Development Research,} \textsuperscript{8)National University of Singapore

P-064 New version of simple LCA software including a comprehensive inventory database (IDEA)
Kuan Jay Bartel, Kiyotaka Tahara
National Institute of Advanced Industrial Science and Technology

P-065 Land use, an important midpoint category indicator in agriculture: How should we deal with it?
Takahiro Nakashima, Shoko Ishikawa
National Agriculture and Food Research Organization

P-066 Setting method of the evaluation boundary from the viewpoint of uncertainty management in LCA for transport infrastructure provision
Ryoko Morimoto\textsuperscript{1),} Hirokazu Kato\textsuperscript{1),} Naoki Shibahara\textsuperscript{2),} Yuki Masuda\textsuperscript{3)\textsuperscript{1)Nagoya University,} \textsuperscript{2)Japan Environmental Management Association for Industry,} \textsuperscript{3)JR-Central Consultants Company,} \textsuperscript{4)Nagoya University (former)

P-067 Uncertainty analysis for infrastructure LCA
Hirokazu Kato\textsuperscript{1),} Yuki Masuda\textsuperscript{2),} Naoki Shibahara\textsuperscript{1),} Ryoko Morimoto\textsuperscript{3),} Koh Kanai\textsuperscript{4)\textsuperscript{1)Nagoya University,} \textsuperscript{2)JR-Central Consultants Company,} \textsuperscript{3)Japan Environmental Management Association for Industry,} \textsuperscript{4)Nagoya University (former)
Poster Sessions

P-068 Calculation and comparison of weighting factors based on different approaches in LCIA
Ryosuke Yokoi\textsuperscript{1}, Jun Nakatani\textsuperscript{1}, Masaharu Motoshita\textsuperscript{2}, Yuichi Moriguchi\textsuperscript{1}
\textsuperscript{1}The University of Tokyo, \textsuperscript{2}National Institute of Advanced Industrial Science and Technology

P-069 Spatial variation of health damage factors for PM\textsubscript{2.5} on a continent level
Longlong Tang\textsuperscript{1}, Tatsuya Nagashima\textsuperscript{1}, Kouichi Hasegawa\textsuperscript{2}, Toshimasa Ohara\textsuperscript{1}, Kengo Sudo\textsuperscript{1}, Norihiro Itsubo\textsuperscript{1}
\textsuperscript{1}National Institute for Environmental Studies, \textsuperscript{2}Chuden CTI Co., Ltd.

P-070 The role of world structural changes on CO\textsubscript{2} emissions
Kayoko Shironitta, Kayoko Shironitta, Shunsuke Okamoto, Shigemi Kagawa
Kyushu University

P-071 Pedagogical training for environmental education based on life cycle thinking for engineers
Hatsuna Tadaka\textsuperscript{1}, Shinya Matsumoto\textsuperscript{1}, Reiko Tomaru\textsuperscript{1}, Chiake Fukasawa\textsuperscript{1}
\textsuperscript{1}Yokohama National University, \textsuperscript{2}Sanden Kankyo Mirai Zaidan

P-072 Eliminating mottainai product features for our sustainable society
Masatsugu Kitamura, Hidataka Hayashi
EcoDesign Promotion Network

P-073 Environmental performance of biodiesel productions using waste cooking oil
Shogo Eguchi\textsuperscript{1}, Shigemi Kagawa\textsuperscript{1}, Sangwon Suh\textsuperscript{2}, Yuki Kudoh\textsuperscript{1}
\textsuperscript{1}Kyushu University, \textsuperscript{2}University of California, Santa Barbara

P-074 Life cycle CO\textsubscript{2} emission of wind energy at optimum locations in the world
Kotaro Kawajiri
National Institute of Advanced Industrial Science and Technology

P-075 Life cycle environmental impacts of electricity from renewable sources in Turkey
Burcin Attilgan, Adisa Azapagic
The University of Manchester

P-076 Water-based life cycle assessment of power generation and supply in Thailand
Tomohiro Okadera\textsuperscript{1}, Shabbir H. Gheewala\textsuperscript{2,3}
\textsuperscript{1}National Institute for Environmental Studies, \textsuperscript{2}The Joint Graduate School of Energy and Environment, King Mongkut's University of Technology Thonburi, \textsuperscript{3}Ministry of Education, Thailand

P-077 The concept of efficiency in the context of sustainable energy consumption: Theoretical considerations and legacy
Harald Ernst Otto
Polytechnic University of Marche

P-078 Life cycle energy and environmental assessment of the production and utilization of compressed biogas (CBG) in Thailand
Pomthong Malakul\textsuperscript{1,2}, Seksan Papong\textsuperscript{2}, Thawatch Chatrupong\textsuperscript{3}
\textsuperscript{1}Chulalongkorn University, \textsuperscript{2}National Metal and Materials Technology Center, \textsuperscript{3}PTT Public Company Limited

P-079 Analysis of the socio-economic and environmental benefits of introducing technology innovation and regulations in the energy sector in China: A regional case study
Qian Zhou, Helmut Yabar, Takeshi Mizunoya, Yoshiro Higano
University of Tsukuba

P-080 Externality assessment of NIMBY facilities incorporating distance effects: A case study on the construction of the Longmen Nuclear Power Plant
Ya Chen Tasi, Yuh-Ming Lee
National Taipei University

P-081 The concept of efficiency in the context of sustainable energy consumption: Current practice and shortcomings
Harald Ernst Otto
Polytechnic University of Marche

P-082 Evaluating the greenhouse gas emissions and the life cycle cost of thermoelectric generators for passenger automobiles
Yusuke Kishita, Yuji Ohishi, Michinori Uwasu, Masashi Kuroda, Hiroyuki Takeda, Keishiro Hara
Osaka University
Program

Poster Sessions

P-083 A proposal of the eco-efficiency of the fuel cell co-generation system of "Ene-Farm" in consideration of LCCO2 emission and metal resources depletion
Yusuke Jinno, Kenji Koido, Kiyoshi Dowki
Tokyo University of Science

P-084 Cost, CO2 emission and energy consumption of bioethanol production from a lignocellulosic energy crop, Erianthus sp. by SRB-CaCCO process
Takahiro Orikasa¹, Ken Tokuyasu², Masakazu Ike², Rui Zhao¹, Mitsuru Gau¹, Shoji Koide¹, Takeo Shima²,³
¹Iwate University, ²National Food Research Institute, NARO, ³NARO Kyushu Okinawa Agricultural Research Center, ⁴Chiba University

P-085 Comparative analysis of energy use and CO2 emissions between life cycles of compressed natural gas and thermal energy gas for final use in light vehicles
Mauro Pereira Hill, Rogerio De Aragao Bastos Do Valle, Bruna Vaz Duarte
Federal University of Rio de Janeiro

P-086 Evaluation of power interchange potential and supply-demand balance of distributed generation in Kinki
Daisuke Fukuhara, Naoki Yoshikawa, Koji Amano, Koji Shimada
Ritsumeikan University

P-087 A framework to assess impacts of grid mix changes in Japan using input-output tables
Shunichi Hienuki¹, Yuki Kudoh²,³, Hiroki Hondo⁴
¹Yokohama National University, ²National Institute of Advanced Industrial Science and Technology

P-088 Analysis of environmental loads and benefits of a bio-coke production factory: A case study in Osaka
Yukari Fuchigami¹, Keishiro Harai, Takeo Kita², Michinori Uwassh, Shuji Kurimoto³
¹Osaka University, ²Osaka Prefecture Forest Owners Association

P-089 Input-output analysis of introducing smart grid systems in Japan
Satoshi Nakano¹, Ayu Washizu²
¹Waseda University, ²The Japan Institute for Labour Policy and Training

P-090 Benefits of biogas projects from local and global perspectives
Aya Heiho, Hiroki Hondo, Yue Moriizumi
Yokohama National University

P-091 Carbon footprint labelling certification of railway operating service in Korea
Jae-Young Lee¹, Woo-Sung Jung¹, Cheul-Kyu Lee¹, Hee-Man Kim²
¹Korea Railroad Research Institute, ²Korea Railroad Corporation

P-092 A review of the life cycle assessment of nearly zero-energy residential buildings
Markus Weilenberger¹, Werner Jensch², Werner Lang³
¹University of Applied Sciences Munich, ²Technical University Munich

P-093 An aggregative assessment of environmental impacts on reservoir catchments imposed by public construction projects: A case study on Feitsui Reservoir
Yu-An Lin, Yuh-Ming Lee
National Taipei University

P-094 Environmental impacts of portland cement manufacturing and developed process with alternative technologies in Thailand
Unchalee Suwanmanee¹, Suthida Authayanun¹, Worayut Saibuatrong², Viganda Varabuntoonvit², Thumrongrut Mungcharoen²
¹Srinakharinwirot University, ²Kasetsart University

P-095 Eco-benefit analysis of multifunctional building products
Michael Jäger¹, Johannes Gantner², Sarah Homolka², Hannes Krieg³
¹University of Stuttgart, ²Fraunhofer Institute for Building Physics IBP

P-096 Development of a combined LCA and LCC tool for refurbishment measures of districts
Rafael Horn¹, Johannes Gantner¹, Michael Baumann¹
¹University of Stuttgart, ²Fraunhofer IBP

P-097 A study on environmental impact of Korean wooden house using life cycle assessment
Whi-Lim Son, Joo-Saeng Park, Moon-Jae Park
Korea Forest Research Institute
### Poster Sessions

**P-098** Macro analysis of life cycle CO₂ from urban passenger transport systems in Asian developing countries  
Kei Ito¹, Naoki Shibahara², Hirokazu Kato³, Koh Kanai³  
¹Nagoya City Hall, ²Japan Environmental Management Association for Industry, ³Nagoya University

**P-099** Estimation method of the change in life cycle CO₂ from mass transit system applying microscopic traffic flow simulation  
Naoki Shibahara¹, Ryoko Morimoto⁴, Nozomi Kudo⁵, Hirokazu Kato³  
¹Japan Environmental Management Association for Industry, ²National Traffic Safety and Environment Laboratory, ³Nagoya University, ⁴Nagoya University (former)

**P-100** Net CO₂ emissions by the change of consumption in consequential LCA  
Kotaro Kawajiri¹, Masaharu Motoshita¹, Tomohiko Ihara², Hiroki Hatayama¹, Kiyotaka Tahara¹  
¹National Institute of Advanced Industrial Science and Technology, ²Technische Universität Berlin, ³The University of Tokyo

**P-101** Modeling consumer’s choice and its GHG implication under simultaneous consideration of available income and time  
Koji Takase¹, Yasushi Kondo³  
¹Shizuoka University, ³Waseda University

**P-102** Determinants of environment-conscious behavior in eating habits  
Tomohiko Ihara¹, Wakana Zaima¹, Hideaki Kurishima³  
¹The University of Tokyo, ²Shibaura Institute of Technology

**P-103** Product differentiation and eco-behavior by using carbon footprint  
Akai Kenju, Haruaki Tamura, Nishino Nariaki  
The University of Tokyo

**P-104** Analysis of the effects of low-carbon technologies and individual activity schedule on carbon dioxide emissions  
Chika Ishida¹, Hiroyoshi Morita³, Yoshimi Kanaoka⁵, Hirokazu Kato¹  
¹Nagoya University, ²Urban Renaissance Agency, ³Nippon Engineering Consultants Company

**P-105** Emission metrics for climate policies and their implications to life cycle assessment  
Katsumasa Tanaka  
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**P-106** Evaluating the relationship between agricultural workers and agricultural residues production: A case study in the Hyogo Prefecture  
Tomohiro Tabata, Yukako Sakon  
Kobe University

**P-107** Land constraints associated with future food and biofuel demands  
Kento Tamura, Naoki Yoshikawa, Koji Amano, Seji Hashimoto  
Ritsumeikan University

**P-108** Web-based system development for GHG emission from livestock sector  
Guen-Young Lee⁶, Sung-Mo Yeon⁶, Kun-Mo Lee⁶, Yoo-Sung Park³  
³WECOS, ⁶Ajou University

**P-109** Greenhouse gas emission of rice production system in the Philippines based upon life cycle inventory analysis  
Elmer G. Bautista², Masanori Saito⁵  
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**P-110** A proposal of the CF index of rice in consideration of consumer’s health condition  
Takashi Oi, Kenta Shiozawa, Kenji Koido, Kiyoshi Dowaki  
Tokyo University of Science

**P-111** LC-CO₂ analysis on a fresh tomato in consideration of quality degradation  
Sho Ushikubo, Keisuke Nishimoto, Eidelweis Adrijanji Putri, Kenji Koido, Kiyosi Dowaki  
Tokyo University of Science

**P-112** Influence of management practices on life cycle greenhouse gas emissions from rice production in Yamagata Prefecture, Japan  
Katsushi Yokoyama¹, Kiyotada Hayashi²  
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P-113 Potential reductions in life-cycle greenhouse gas emissions from paddy rice production: Assessing the influence of puddling, transplanting density, and irrigation depth
Motoko Shimura\textsuperscript{1}, Hidehiro Takahashi\textsuperscript{1}, Chiharu Ito\textsuperscript{3}, Makoto Shibuya\textsuperscript{2}, Kiyotada Hayashi\textsuperscript{3}, Kenji Matsumori\textsuperscript{1}
\textsuperscript{1}NARO Western Region Agricultural Research Center, \textsuperscript{2}Akita Prefectural Agricultural Experiment Station, \textsuperscript{3}NARO Agricultural Research Center

P-114 Life cycle CO\textsubscript{2} emission of konjac production via an overwintering methodology in Gunma, Japan
Kenji Koido, Yusuke Akaike, Yousuke Isshi, Keisuke Ide, Shou Ushikubo, Masanori Kou, Kenta Komiyama, Katsuya Shimizu, Takumi Minami, Kiyoshi Iwasaki
Tokyo University of Science

P-115 Low-carbon footprint Thai pork sausage by biogas system application at pig farms
Apiwan Suwannatee\textsuperscript{1}, Rattanawan Mungkung\textsuperscript{1}, Shabbir Gheewala\textsuperscript{2}
\textsuperscript{1}Kasetsart University, \textsuperscript{2}The Joint Graduate School of Energy and Environment, King Mongkut's University of Technology Thonburi

P-116 Life cycle cost analysis of willow production on small-scale field
Hidetsugu Morimoto\textsuperscript{1}, Shigeru Satoh\textsuperscript{3}, Kimiharu Ishizawa\textsuperscript{3}, Takeshi Arai\textsuperscript{1}
\textsuperscript{1}Tokyo University of Science, \textsuperscript{2}Kyoto Prefectural University, \textsuperscript{3}Miyagi University of Education

P-117 Life cycle inventory analysis for small scale trawl fishery in Sendai Bay
Kazuhiro Watanabe\textsuperscript{1}, Kiyotaka Tahara\textsuperscript{2}
\textsuperscript{1}Miyagi Prefecture Kesenuma Regional Promotion Office, \textsuperscript{2}National Institute of Advanced Industrial Science and Technology

P-118 Improving the environmental efficiency of woody biomass utilization: Focusing on the manufacturing of high value-added products in Maniwa, Japan
Moon Dami, Kitagawa Naomi, Genchi Yutaka, Sagisaka Masayuki
National Institute of Advanced Industrial Science and Technology

P-119 Potential for energy saving of dairy farming system dependent upon land utilization
Tatsuo Hishinuma
Utsunomiya University

P-120 Substance flow analysis on agricultural nutrients focusing on nitrogen and phosphorus
Takashi Yamamoto\textsuperscript{1}, Masafumi Mizoguchi\textsuperscript{3}, Kazuyo Matsubae\textsuperscript{1}, Kenichi Nakajima\textsuperscript{3}, Keisuke Nansai\textsuperscript{1}, Tetsuya Nagasaka\textsuperscript{1}
\textsuperscript{1}Tohoku University, \textsuperscript{2}National Institute for Environmental Studies

P-121 Combining duo technique of MFA and GIS for evaluating nitrogen flux in the agricultural system: Case study in Kuala Terengganu region
Latifah Abdul Ghani\textsuperscript{1}, Noor Zalina Mahmood\textsuperscript{2}, Nora'aini Ali\textsuperscript{2}
\textsuperscript{1}Universiti Malaysia Terengganu, \textsuperscript{2}University of Malaya

P-122 Water security and socio-economic metabolism in China: Toward an integrated assessment
Tao Wang, Seiji Hashimoto
Ritsumeikan University

P-123 Water footprint assessment of machine tool
Jahau Lewis Chen\textsuperscript{1}, Yen-Bou Chen\textsuperscript{3}, Hua-Chih Huang\textsuperscript{2}
\textsuperscript{1}National Cheng Kung University, \textsuperscript{2}TRI

P-124 Evaluation of water use in paddy-rice production on the basis of differential water footprint
Susumu Uchida
Ibaraki University

P-125 Development of water footprint inventory database of Asian countries
Soya Iida, Yuya Ono, Norihiro Itsubo
Tokyo City University