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14-18th March 2022

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Program

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If you have any questions and/or troubles, please contact us.

3RINCs 2022 CONFERENCE SECRETARIAT
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14, March 2022, Mon.

Time	Special session and event	Genreal session A	Genreal session B	Creative session and seminor
13:00-14:00	Opening			
14:00-15:00	**Plenary lecture 1** Prof. Takeshi Fujiwara (Okayama University, Japan)			
15:00-16:00	**Plenary lecture 2** Mr. Shardul Agrawala (OECD)			
16:00-16:30	Break			
16:30-18:00	**Special session1** Circular Economy – Transformation of Policies to Actions			
18:00-18:15	Break			
18:15-20:10				**Creative session 1** Digital Transformation (DX) in the field of waste management towards the Circular Economy (CE)

15, March 2022, Tue.

c	Special session	Genreal session A	Genreal session B	Creative session
10:00-12:00				**Creative session 2** Disaster Waste Management - Developing a "Simulation-based training tool"
12:00-13:00	Break			
13:00-14:30		**Session A1** 3R, Waste management under the Pandemic of COVID-19	**Session B1** Thermochemical treatments for polymeric materials ●Sponsor presentation from Hitachi Zosen Corporation	
14:30-14:45	Break			
14:45-16:15		**Session A2** MSW characterization and management ●Sponsor movie from ecommit Co.,Ltd	**Session B2** Waste to energy ●Sponsor presentation from Mitsubishi Heavy Industries Environmental & Chemical Engineering Co.,Ltd.	
16:15-16:30	Break			
16:30-18:00	**Special session2** 2Rs – How to promote Actions and Policy for the 2Rs (Reduce and Reuse) Towards the Circular Economy ?			
18:00-18:15	Break			
18:15-19:45				**Creative session 3** Countdown to Expo 2025 Osaka Kansai Sustainable Procurement, Material Management and Resource Circulation in Megaevents

16, March 2022, Wed.

Time	Special session	Genreal session A	Genreal session B	Creative session
13:00-14:30		**Session A3** Plastic waste 1	**Session B3** Waste management technologies 1 ●Sponsor movie of JFE Engineering Corporation	
14:30-14:45	Break			
14:45-16:15		**Session A4** Plastic waste 2	**Session B4** Waste management technologies 2 ●Sponsor movie of NIPPON STEEL ENGINEERING Co.,Ltd and Mitsubishi Heavy Industries Environmental & Chemical Engineering Co.,Ltd.	
16:15-16:30	Break			
16:30-18:00	**Special session3** Decentralized technologies, equipment and its techno-economic assessment for MSW treatment			
18:00-18:15	Break			
18:15-19:15				**Creative session 4** Greening Health Care Waste Management: Policies and Good Practices

17, March 2022, Thu.

Time	Special session	Genreal session A	Genreal session B	Creative session
10:30-12:00	**Special session4** Material cycles in construction works			
	Break			
13:00-14:30		**Session A5** Systems, life cycle and substance flow analysis maru ●Sponsor movie of DOWA Holdings Co.,Ltd	**Session B5** Disaster, construction, and demolition waste management	
14:30-14:45	Break			
14:45-16:15		**Session A6** E-waste and ELV	**Session B6** Hazardous waste management	
16:15-16:30	Break			
16:30-18:00				
18:00-18:15	Break			
18:15-19:40				**Creative session 5** Latest development and future perspectives on Mercury waste management

18, March 2022, Fri.

Time	Special session and event	Genreal session A	Genreal session B	Networking session
13:00-14:30		**Session A7** Food loss and food waste management ●Sponsor presentation from TAKUMA Co.,Ltd	**Session B7** Waste landfill and disposal ●Sponsor movie of JFE Engineering Corporation	
14:30-14:45	Break			
14:45-16:15	**Special session5** Resource Circulation Strategy for Carbon Neutrality			
16:15-16:30	Break			
16:30-17:30	**Plenary lecture 3** Mr. Frank Van Woerden (The World Bank)			
17:30-18:00	Closing			

*** Time zone: UTC+0900 (Japan/Korea time)**

General sessions

***Each presentation consists of 10-minute oral presentation & 4-minute discussion.**

15, March 2022, Tue.

Session A1: 3R, Waste management under the Pandemic of COVID-19 (13:00-14:30, March 15th, Tue.)

Chair: Premakumara Jagath DICKELLA GAMARALALAGE, Director of Center Collaborating with UNEP on Environmental Technologies (CCET), Japan

A1-1 Evaluation of attitudes and knowledge toward waste separation at source behavior
Le Thi Thanh Loan, Vietnam National University of Agriculture, Vietnam

A1-2 Plastic consumption behavior and brand auditing: A case study in Thailand during the COVID-19
Pawan Kumar Srikanth, Asian Institute of Technology, Thailand

A1-3 COVID-19 waste management in Vietnam
Trang DT Nguyen, Ochanomizu University, Japan

A1-4 Impacts of COVID-19 on municipal solid waste management in Palestine
Rawan Tayeh, MoLG-JICA, Palestine

Session B1: Thermochemical treatments for polymeric materials (13:00-14:30, March 15th, Tue.)

Chair: Masaki Takaoka, Kyoto University, Japan

B1-1 Response surface methodology applied in xylan and polyethylene co-pyrolysis to predict product yields
Shengyu Xie, Tohoku University, Japan

B1-2 Effects of temperature on products distribution during pyrolysis of poly (lactic acid) and poly (3-hydroxybutylate-co-3-hydroxyhexanoate)
Zhuze Shao, Tohoku University, Japan

B1-3 Catalytic pyrolysis of real WEEE plastics in a continuous reaction system
Julio López, IMDEA Energy Institute, Spain

B1-4 Pyrolysis and vapor phase hydrodehalogenation of a WEEE plastic over Ni-based catalysts
Lidia Amodio, IMDEA Energy, Rey Juan Carlos University, Spain

B1-5 Thermo-chemical rubber devulcanization
Lucia Asaro, University of Mar del Plata and National Research Council (CONICET), Argentina

Movie of Hitachi Zosen Corporation

Session A2: MSW characterization and management (14:45-16:15, March 15th, Tue.)

Chair: Rajeev Kumar Singh, Policy Researcher, CCET, IGES, Japan

A2-1 Identifying determinant of waste separation behavior of Hanoi citizen with partial least square-structural equation modeling
Nguyen My Linh, Toyo University, Japan

A2-2 Challenges and opportunities in municipal solid waste management in Cambodia: Collection, treatment, and disposal
Dek Vimean Pheakdey, Hiroshima University, Japan

A2-3 Solid waste management strategies in Dili Timor-Leste using analytic hierarchy process
Rui Amandio Gomes Ferreira, Nagoya University, Japan

A2-4 The application of MSW viscoelastic properties to the trommel simulation
Noppharit Sutthasil, National Institute for Environmental Studies, Japan

A2-5 Integrated residential solid waste recycling management in urban city
Kian-Ghee Tiew, INTI International University, Malaysia

Movie of ecommit Co.,Ltd

Session B2: Waste to energy (14:45-16:15, March 15th, Tue.)
Chair: Teppei Nunoura, The University of Tokyo, Japan

B2-1 Effects of inoculum to substrate ratio on methane production during batch anaerobic process of tofu whey
Arini Wresta, Institut Teknologi Bandung (ITB), Indonesia

B2-2 Kinetic modeling and simulation for the production of biogas from malt wastes
Maryne Patrícia da Silva, Universidade Federal de Pernambuco, Brazil

B2-3 Developing an empirical model for heating value of MSW: Study in Dhaka City
Md. Shoriful Alam Mondal, Toyo University, Japan

B2-4 Biodrying of the wet- refuse-derived fuel for reducing moisture content and improving heating value
Abhisit Bhatsada, King Mongkut's University of Technology Thonburi, Thailand

B2-5 Compilation of environmental thermodynamics from material cycles through a field of methanation
Nobuhisa Watanabe, Osaka Institute of Technology, Japan

Presentation from Mitsubishi Heavy Industries Environmental & Chemical Engineering Co.,Ltd.

16, March 2022, Wed.

Session A3: Plastic waste 1 (13:00-14:30, March 16th, Wed.)
Chair: Richao Cong, The University of Kitakyushu, Japan

A3-1 Agricultural plastic waste management: adapting global practices to Canadian context
Francisco Araujo, University of Guelph, Canada

A3-2 Potentials for household plastic reduction based on photographic recording approach
Akira Sakano, Kyoto University, Japan

A3-3 How to predict the collection demands of industrial plastic waste-challenged from multiple facilities
Richao Cong, The University of Kitakyushu, Japan

A3-4 Modification of standard methods for biodegradability test of bioplastics under the composting condition
Geun-Yong Ham, National Institute for Environmental Studies, Japan

A3-5 Plastic weight conversion factor development of products consumed in Japanese households
Maheshwari Kalyanasundaram, Kyoto University, Japan

Session B3: Waste management technologies 1 (13:00-14:30, March 16th, Wed.)
Chair: Jinwon Park, Yonsei University, South Korea

B3-1 Adsorption of dispersed oil in water onto autoclaved aerated concrete grains in Vietnam
Akihiro Matsuno, Saitama University, Japan

B3-2 Simultaneous capture of CO_2/SO_2 gas using electrolysis of industrial wastewater
Won Yong Choi, Yonsei University, South Korea

B3-3 Biosurfactant production using palm oil as hydrophobic inducer and its potential application in wastewater treatment
Resa Setia Adiandri, Institut Teknologi Bandung, Indonesia

B3-4 Hierarchical nanoporous carbon derived from high-viscosity heavy fuel oil and its superior characteristics for novel energy applications
Chonlawat Akaramongkonlert, King Mongkut's Institute of Technology, Thailand

B3-5 Extraction of soluble manganese and potassium from selected biomass waste
Sylwia Oleszek, Kyoto University, Japan
Movie of JFE Engineering Corporation

Session A4: Plastic waste 2 (14:45-16:15, March 16th, Wed.)
Chair: Yuko Saito, Tohoku University, Japan

A4-1 Regional circulation scenarios of post-consumer plastic waste through feedstock recycling in an oil refinery
Jun Nakatani, The University of Tokyo, Japan
A4-2 Global plastic waste - transboundary movement and implications in ASEAN
Souphaphone Soudachanh, University of Natural Resources and Life Sciences, Austria
A4-3 Towards an inclusive circular economy (CE) in Asia: Proposal for a global agreement on plastics using an intervention framework
Vivek Anand ASOKAN, Institute for Global Environmental Strategies (IGES), Japan
A4-4 Review of plastic policies in Africa: Qualitative impact of policy structure on waste reduction
Isaac Omondi, Kyoto University, Japan

Session B4: Waste management technologies 2 (14:45-16:15, March 16th, Wed.)
Chair: Kazuyuki Oshita, Kyoto University, Japan

B4-1 Co-incineration effect of sewage sludge and municipal solid waste on the behavior of heavy metals
Minhsuan Chen, Kyoto University, Japan
B4-2 Mechanical and thermal properties of bottom ash-based porous geopolymer as thermal insulation material for construction
Paing Set Soe, Kasetsart University, Thailand
B4-3 Rheological characterization of drinking water treatment sludge at different water contents for reuse as a geomaterial
Juliana Keiko Tsugawa, University of Sao Paulo, Brazil
B4-4 Residues in cement-based composites: mapping of occurrence in Brazil
Julia Castro Mendes, Federal University of Ouro Preto, Brazil
Movie of NIPPON STEEL ENGINEERING Co.,Ltd
Movie of Mitsubishi Heavy Industries Environmental & Chemical Engineering Co.,Ltd.

17, March 2022, Thu.

Session A5: Systems, life cycle and substance flow analysis (13:00-14:30, March 17th, Thu.)
Chair: Toyohiko Nakakubo, Ochanomizu University, Japan

A5-1 Point system in participation of community waste separation: A panel data analysis in China
Sun Jie, Kyoto University, Japan
A5-2 Life cycle analysis for pulp molded products from perspective of alternatives to plastic packaging and containers
Yuka Mukai, Kyoto University, Japan
A5-3 Comprehensive analysis of co-incineration and thermal treatment function of dewatered sludge by waste incineration plant
Toyohiko Nakakubo, Ochanomizu University, Japan
A5-4 A panel data analysis of factors influencing atmospheric short-chain chlorinated paraffins concentrations in Japan
Junichiro Koshiba, Kyoto University, Japan
A5-5 Estimation of fossil carbon in wood adhesives and evaluation of the effects of reduction measures
Yasuhiro Hirai, Kyoto University, Japan

Movie of DOWA Holdings Co.,Ltd

Session B5: Disaster, construction, and demolition waste management (13:00-14:30, March 17th, Thu.)

Chair: Maria Antonia N. Tanchuling, University of the Philippines Diliman, Philippines

B5-1 Managing post-war demolition waste in Gaza strip: A case study on Gaza-Israel conflict in May 2021
Hatem AbuHamed, MoLG-JICA Project for Capacity Development of Solid Waste Management in Palestine, Palestine

B5-2 Content analysis of Philippine policies related to disaster waste management
Glenn Fernandez, Sichuan University, China

B5-3 Proposals for the 3Rs of disaster debris
Nagahisa Hirayama, Nagoya University, Japan

B5-4 A virtual assessment of solid waste management facilities in disaster affected municipalities of Nepal
Nirmal Babu Aryal, Aarambha Engineering and Development Initiatives Pvt. Ltd., Nepal

Session A6: E-waste and ELV (14:45-16:45, March 17th, Thu.)

Chair: Kannika Khwamsawat, Chulalongkorn University, Thailand; Vivek Anand ASOKAN, Institute for Global Environmental Strategies (IGES), Japan

A6-1 Alkaline hydrolysis of photovoltaic backsheets for fluorine recovery
Yoshinori Morita, Tohoku University, Japan

A6-2 Mineralogy analysis of waste LEDs and the recovery of valuable components
Zhenxing Zhang, China University of Mining and Technology, China

A6-3 Development of recycling systems and improvement of material and structure for electric bidet appliances in Korea
Jihwan Park, Korea Electronics Recycling Cooperative, South Korea

A6-4 Material flow analysis of WEEE dismantling in Thailand
Kannika Khwamsawat, Chulalongkorn University, Thailand

A6-5 LCA of WEEE dismantling into recycled materials in Thailand
Siriporn Borrirukwisitsak, Songkhla Rajabhat University, Thailand

A6-6 Distribution changes of motorcycles in the COVID-19 pandemic
Takumi Yamane, Tokyo City University, Japan

A6-7 Costs of EV transition: Projected waste generation and socio-environmental impacts of an ambitious EV policy in India
Vivek Anand ASOKAN, Institute for Global Environmental Strategies (IGES), Japan

A6-8 Materializing E-waste Challenges and Opportunities Hidden into It
Jyoti Giri, Tri-Chandra Multiple Campus, Tribhuvan University, Nepal

Session B6: Hazardous waste management (14:45-16:15, March 17th, Thu.)

Chair: Fumitake Takahashi, Tokyo Institute of Technology, Japan

B6-1 Image analysis of asbestos on the surface of wasted building materials by staining
Masaaki Tabata, Saga University, Japan

B6-2 Magnetic BEA-type zeolite synthesized via dry-gel conversion method: Studies on its synthesis conditions and antibiotics adsorption performance
Vanpaseuth Phouthavong, Nagoya University, Japan

B6-3 Estimation of the minimum mercury released into the environment from the uncontrolled dumping of broken medical thermometers in hospitals in Cameroon, Africa
Samuel Tetsopgang, Association Institute of Total Environment, Cameroon

B6-4 An expected anthropogenic mercury release from extraction and combustion of natural resources in China
Habuer, Okayama University, Japan
B6-5 Improper disposal of medical wastes in clinics: Repeatability of improper discharge
Daisuke Sugimoto, Tokyo Institute of Technology, Japan

18, March 2022, Fri.

Session A7: Food loss and food waste management (13:00-14:30, March 18th, Fri.)
Chair: Chen Liu, Research Manager, SCP, IGES, Japan

A7-1 Biogas digester use by combining livestock waste with food waste to minimize GHGs emissions in central Vietnam: An Alternative to informal food waste recycling
Thang Huong Hoang, The University of Kitakyushu, Japan
A7-2 Tracking food loss across international supply chain
Sebastien M.R. Dente, Ritsumeikan University, Japan
A7-3 Effect of different aeration intensities on organic matter decomposition during composting of model food waste
Thien-Phuc Nguyen, Tokyo Institute of Technology, Japan
A7-4 Life cycle analysis on municipal solid waste management using biodegradable PHBH garbage collection bags
Junya Yano, Kyoto University, Japan
Presentation from TAKUMA Co.,Ltd

Session B7: Waste landfill and disposal (13:00-14:30, March 18th, Fri.)
Chair: Hideki Yoshida, Muroran Institute of Technology, Japan

B7-1 Immobilization of chromium through microbially induced carbonate precipitation by ureolytic bacteria obtained from a waste landfill
Hiroki Kitamura, National Institute for Environmental Studies, Japan
B7-2 Attitude shift from reject to acceptance toward mercury emission risk with increase of duration time of mercury emission below environmental standard
Fumitake Takahashi, Tokyo Institute of Technology, Japan
B7-3 Plastic waste leakage from municipal landfill to terrestrial and aquatic environment: A case study in Thailand
Chart Chiemchaisri, Kasetsart University, Thailand
Movie of JFE Engineering Corporation

Material Flow Analysis of WEEE dismantling in Thailand

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Keywords: WEEE, material flow analysis, dismantling, WEEE management

INTRODUCTION

One of global fastest growing waste of the world is waste from electrical and electronics equipment (WEEE) or E-waste (Baldé CP, Forti V. et al., 2017). WEEE management is very important because of their valuable materials and toxic substances inside. Generally, waste pickers and dismantlers are interested only in valuable materials of WEEE whereas non-recyclable materials and toxic substances are discarded improperly. Extended Producer responsibility (EPR) has been proposed by stakeholders to encourage sustainable WEEE management system (PCD, 2018). To achieve this, material flow analysis (MFA) is one of the powerful tools for getting vital information (Cencic O., Rechberger, H., 2008). This study aims to determine amount, mass balance, material flow and composition of WEEE from informal dismantling in Thailand to provide supporting information to policy makers for WEEE management transformation in Thailand.

MATERIALS AND METHODS

Sample collection

This study focused on 5 types of WEEE due to their high volumes and their challenging management, e.g., television, refrigerator, computer, mobile phone and air conditioner. Twenty samples of each type of WEEE were collected for composition study. Both recyclable and non-recyclable materials were investigated, then data were used in material flow analysis.

WEEE estimation

This study used the consumption use model as shown inequation 1 to estimate volume of WEEE in Thailand because the lack of national data relevant to WEEE estimation (Ikhlayel M., 2016).

$$WEEE = \frac{H(t)N_h(t)W}{L} \qquad \text{equation 1}$$

Where WEEE is amount of WEEE generated in estimation year (ton), H(t) is the number of households, N_h (t) is the saturation level of EEE per household, W is the average WEEE weight, and L is the average lifespan.

Number of household (H) was received from National Statistical Office (NSO). Data of each studied EEE (electrical and electronics equipment) such as number per household at each income range, lifespan and stock were obtained from previous study (Borriruksitsak S., Khwamsawat K. et al., 2021). Then, WEEE generation in Thailand was estimated.

Material flow analysis

Material compositions and volume of WEEE coupled with Program STAN v.2.801 were used in material flow analysis of WEEE mechanical dismantling with simple hand tools in Thailand.

RESULTS AND DISCUSSION

WEEE composition

Data of WEEE compositions were obtained by dismantling from informal sector. The results found that the main components of all studied WEEE were iron (average 16.81%) and plastics (average 15.97%). CRT TV and smartphone contained disposal materials more than recyclable materials around 68.94% and 60.26%, respectively.

WEEE estimation and material flow analysis

The results showed that volume of 5 types of households WEEE was estimated at 311,843.39 ± 42,722.54 tons per year. The stock of WEEE in household was 30% of yearly generation. Volume of recyclable materials was 172,005.63 ± 43,453.90 tons per year (78.80%) while total non-recyclable was 46,284.74 ± 4,628.47 tons per year (21.20%) as shown in figure 1

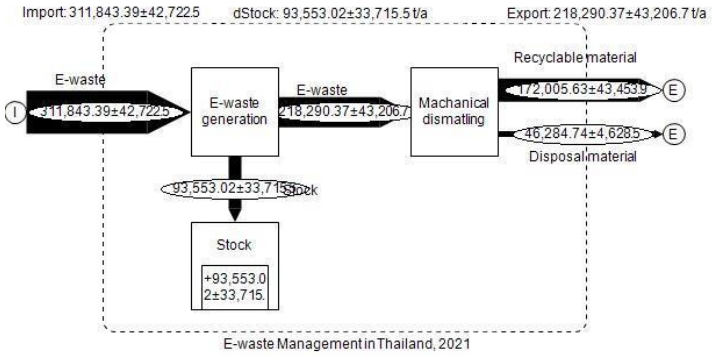

Figure 1 Material flow analysis of WEEE management in Thailand

CONCLUSION

Generation and composition of 5 types of WEEE were estimated, then material flow analysis of WEEE management in Thailand was produced. The results indicated that dismantling of studied WEEE provided both recyclable and disposal materials. There was around 50,000 tons per year of disposal materials that need to be managed properly. This information can be used by policy maker to set targets and action plan for WEEE management in Thailand.

ACKNOWLEDGEMENT

This research was supported by the National Research Council of Thailand.

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