



**Technology Solutions for Holistic Waste Management:
A Global Dialogue with the Private Sector**
21-23 May 2019

EVENT REPORT



OSAKA CITY

大阪市



Overview

The International Environmental Technology Centre (IETC) of the United Nations Environment Programme (UNEP) organized a *Global Dialogue with the Private Sector: Technology Solutions for Holistic Waste Management* jointly with Osaka City, the Global Environmental Centre Foundation (GEC), and other partners, in Osaka, Japan during 21-23 May 2019. The event brought together government leaders, experts, the private sector and civil society organizations in a series of events focused on solutions for holistic waste management. The Global Dialogue provided a platform to share and learn about state of the art environmentally sound technologies related to different waste streams. It promoted a synergy of ideas and business opportunities in addressing global environmental challenges with focus on holistic waste management. This was in follow-up to the waste management resolutions adopted at the Fourth Session of the United Nations Environment Assembly (UNEA4), convened in Nairobi during 11-15 March 2019. The Global Dialogue also provided inputs in the lead up to G20 Ministerial Meeting and Summit in Osaka, Japan.

The Global Dialogue focused around four thematic areas: *Plastics and Marine Litter, E-waste and Hazardous Wastes, Waste to Energy, and Holistic Waste Management*. The first day of the Global Dialogue (21 May) consisted of Closed Sessions around the four thematic areas and was by invitation only. This resulted in effective collaboration with relevant private sector companies. The morning of the second day (22 May) consisted of the *UNEP Symposium on Plastic Waste Problems: Reducing Ocean Plastic Waste*, with support from the Government of Japan. The afternoon of 22 May consisted of Open Sessions for the general public on e-Waste and hazardous waste, Waste to Energy and Holistic Waste Management. The Open Sessions focused on sharing information on state-of-the-art technologies and current waste management approaches. A field trip to a waste management facility in Mie prefecture to experience state of the art holistic waste management approaches and technologies was organized on 23 May in collaboration with Osaka city.

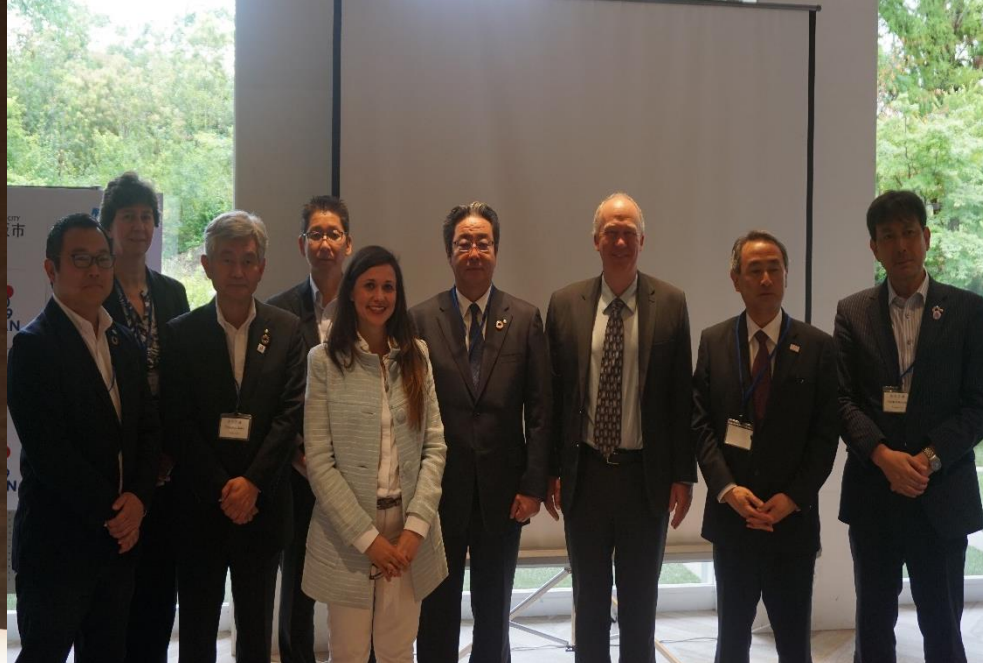


Closed session 1: Plastic and Marine Litter

The Fourth Assembly of the United Nations Environment Assembly (UNEA 4) recognized plastic waste as a major environmental challenge and adopted two resolutions to address this challenge. In response to these resolutions, IETC organized a session on Plastic and Marine Litter. The key objective of the session was to exchange information and best practices on concrete options to reduce single-use plastic leakage to the environment through private sector engagement. Presentations were made by Mr. Kawamura (Sunpower Corp), Mr. Masai (Ajinomoto Corp.), Mr. Takeoka (Kaneka Corp.) and Mr. Mihara from Osaka City. An engaging panel discussion on plastic pollution and its economic impacts followed the presentations. The panel discussed the main challenges associated with reducing plastic pollution and highlighted potential solutions and examples of successful implementation. The session concluded with the signing of three partnership pledges: one between IETC and Osaka city and two with private sector companies, namely Sunpower Corp. and Kaneka Corp. This highlighted a clear commitment from private sector companies to collaborate with UNEP-IETC for the identification of innovative solutions to reduce plastic and marine litter.

Key messages

- Private companies and cities are aware of the challenge plastic pollution places on the environment and human health. They are committed to reducing plastic pollution. However, they need government interventions to create an environment for their activities to be both profitable and sustainable. (IP, public policies, subsidies, etc.).
- Environmental policies (i.e. a plastic bag ban) can attract foreign investment that can potentially lead to (environmentally sound) technology transfers.
- Standardization of definitions and evaluation methodologies such as biodegradability is important. Accurate labelling of product sustainability can give consumers greater confidence while also informing them how to best use/discard the products. Furthermore, it can enhance policymaking by enabling governments to better understand the specifications and utility of products.



Closed session 2: E-waste and Hazardous Waste

The objective of the E-waste and Hazardous Waste session was to identify and discuss the optimal combinations of upstream and downstream management options for E-waste and hazardous wastes. The five presenters represented various sectors, such as public, private and civil society, to ensure diverse perspectives. The speakers were: Mr. Rolph Payet, Executive Secretary of the Secretariat of the Basel, Rotterdam and Stockholm Conventions; Mr. Go Suzuki, Senior Researcher at the National Institute of Environmental Studies; Mr. Kazuma Koyama, Manager for Daikin CSR & Global Environment Center; Mr. Nicolas Humez, Chair of ISWA Hazardous Waste Working Group, and Mr. Mark Gordon, Deputy Director-General of the Chemicals and Waste Management Branch, Department of Environmental Affairs, South Africa.

The session highlighted recent developments of the Basel Convention on the status of hazardous waste and implications of the new classification of plastic waste, whereby it could now be labelled as hazardous waste depending on its contamination level with other wastes. The session also looked into the status of e-Waste management at the national level in Japan and South Africa, including specific gaps and opportunities in legislation and infrastructure. A private sector perspective was presented by Daikin, which outlined its waste management processes, including CSR work on the recovery of refrigerants and recycling of air-conditioning units in Sri Lanka. ISWA presented a circular economy perspective and highlighted key outcomes and challenges, as well as several proposals to addressing them.

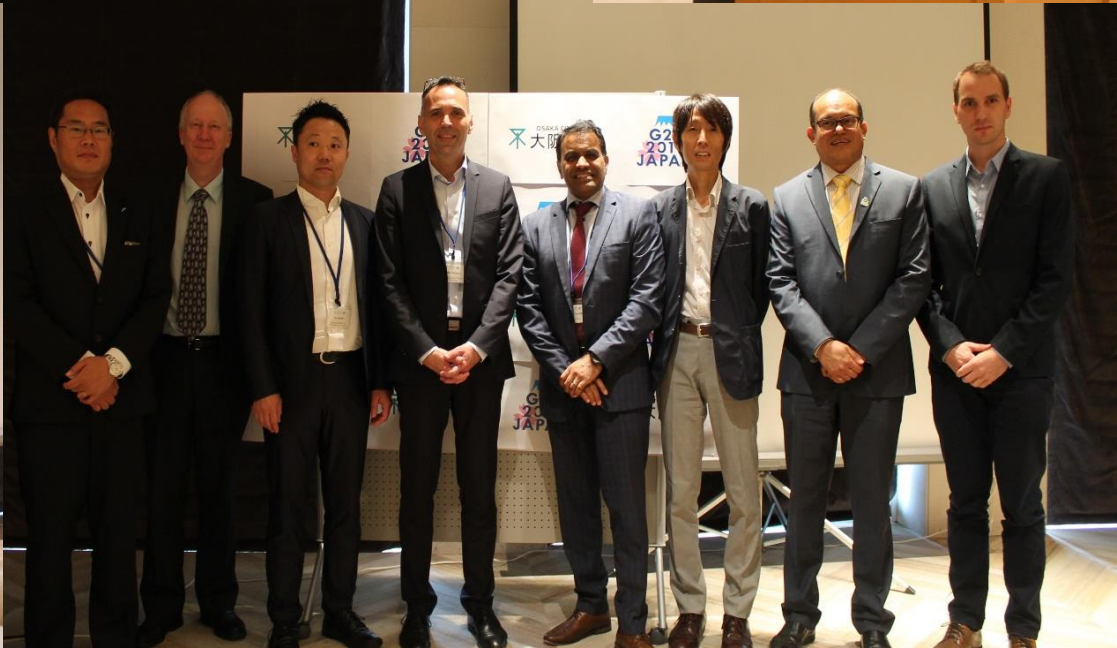
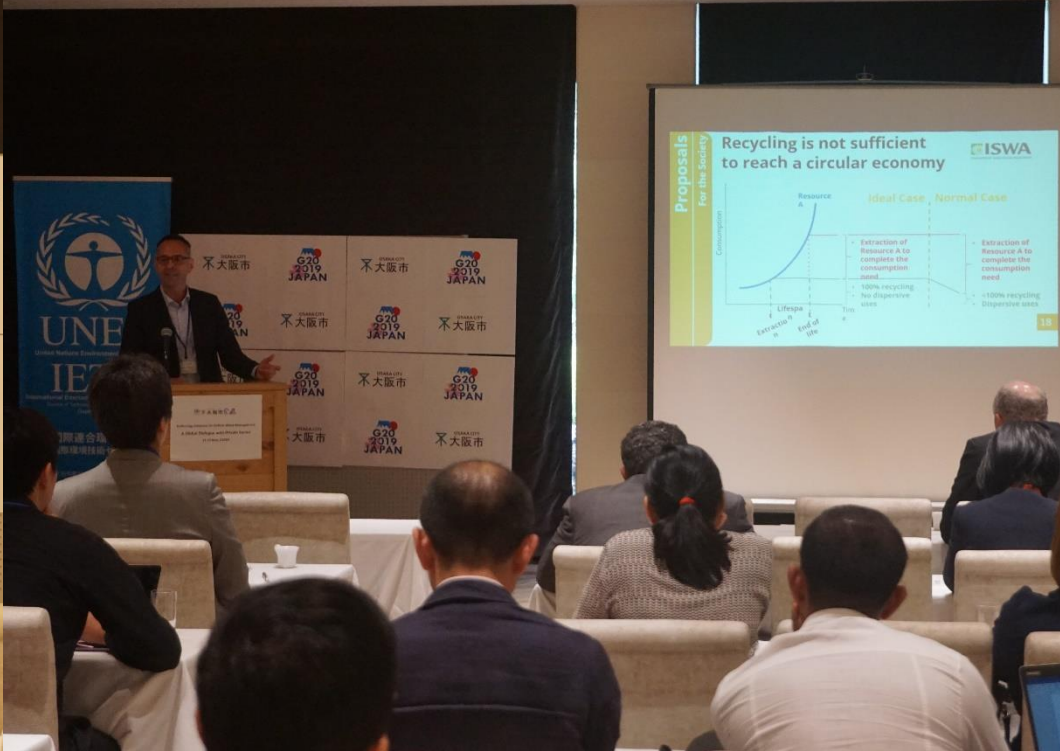
Key messages

- Given the increasing complexity of recycling, global coordination of hazardous waste and e-waste management is required as not all countries can currently manage this rapidly growing challenge.
- Innovation and efficiency regarding hazardous waste and e-waste streams needs to be addressed carefully, as current economic models encourage accumulation, instead of replacement.



National
Institute for
Environmental
Studies, Japan





Closed session 3: Waste to Energy (WtE)

This session focused on knowledge exchange on innovative and state of the art WtE (thermal) technologies as well as identification of partnerships between IETC and the private sector. Following a brief introduction on WtE by Mahesh Pradhan (*UNEP IETC*), private sector representatives provided updates on their WtE operations. These included presentations by Makoto Takano (*Hitachi Zosen*), Marc Nyhan (*Takuma*), Gen Takahashi (*JFE Engineering*), and Ruofei Wang (*SUS Environment Shanghai*). Following the four private sector presentations, Antonis Mavropoulos, President of ISWA, moderated an interactive panel discussion which covered the following issues: global trends and the role of WtE in the circular economy; Improving environmental performance of incinerators; opportunities and challenges for WtE in developing countries; replication of WtE good practices in developing countries; and WtE sector contribution to the Sustainable Development Goals. The session concluded with the launch of IETC's report *Waste to Energy: Considerations for informed decision making* and the signing of a partnership pledge between IETC and SUS Environment, Shanghai.

Key messages

- Following the waste hierarchy to promote reduce, reuse and recycling options prior to incineration/waste to energy is important.
- The primary focus of WtE is on waste treatment, with energy production as a by-product, and should not be approached vice versa.
- WtE should be approached in a systematic way, including both hardware and software considerations, from a long-term and strategic perspective.
- Strong governance and adequate financial resources are a pre-requisite for any WtE facility.
- Thermal WtE can potentially reduce waste sector greenhouse gas emissions compared to open burning and landfills as they do not have methane gas capture and use, but cannot completely abate greenhouse gas emissions.
- WtE has been receiving considerable attention in developing countries. It is important that countries are cognizant of associated opportunities and challenges before investing in WtE facilities.





Closed session 4: Holistic Waste Management

This session focused on information sharing and developing partnerships between IETC, IGES CCET, and the private sector in regard to holistic waste management, particularly Sustainability Assessment of Technologies (SAT) and application of anaerobic digesters. The session started with welcome remarks from Kazunobu Onogawa (CCET) and an introduction by Iyngararasan Mylvakanam (IETC). Following these, Zhen Wang highlighted Green Technology Bank's collaboration with nearly 40 technology transfer organizations in China, and expressed interest to collaborate with IETC to update IETC's SAT guidance manual. Next, Hiroyuki Sato (AMITA Group) presented on the application of an anaerobic digester (biogas) to create closed-loop organic waste management and promotion of a sustainable society. AMITA Group promotes anaerobic digester application that considers the social, economic, and environmental impacts, and has successfully implemented anaerobic digesters in Japan (Minami Sanriku) and reached out to developing countries such as Palau. The session concluded with the signing of a Partnership Pledge between IETC and Green Technology Bank.

Key messages

- Policy makers and stakeholders are increasingly recognizing that environmental, social and economic concerns must be taken into account when selecting appropriate technologies for waste management.
- An updated SAT guidance manual will be a useful tool for policy makers and stakeholders to facilitate the selection of optimal waste management technologies for local conditions and context.
- Public-Private Partnerships for the application of anaerobic digesters for organic waste are often economically feasible and work well.
- The public and private sectors should have a common goal for successful anaerobic digester operation.
- Development of a regional circular approach for waste management should use as its primary steps the application of a holistic waste hierarchy and reaching consensus with local residents. This is also the case for anaerobic digesters.

AMITA IGES





UNEP Symposium: Plastic Waste Problems – Reducing Ocean Plastic Waste

This symposium was held on the morning of 22 May 2019, during the second day of IETC's *Global Dialogue with the Private Sector: Technology Solutions for Holistic Waste Management*. The symposium aimed to share information on current plastic waste issues, in addition to expertise on environmentally sound plastic waste management. The symposium was attended by over 250 participants and culminated in a message for the upcoming G20 Summit, 28-29 June 2019, Osaka.

The symposium venue, Hilton Osaka, shared their efforts to reduce single-use plastics while also ensuring the symposium was free of single-use plastics. The event opened with Japanese calligrapher Ms. Yuuna Okanshi providing a live performance that highlighted a common aspiration of the symposium: *Towards a Sustainable Planet – Return to True Blue*. Mr. Seigo Tanaka, Vice Mayor of Osaka City then encouraged all to protect rivers and ocean from plastic waste to build an SDG- advanced society. H.E. Mr. Yasuo Takahashi, Vice Minister for Global Environmental Affairs, Ministry of the Environment, Japan, followed with a keynote speech entitled *Domestic and Foreign Situation of Marine Plastic Waste Problem*.

Part 1 of the symposium focused on the *Challenges and Solutions on Plastic Waste Management*. Mr. Khaled Abdelall, former Minister of Environment Egypt, delivered a Keynote Speech on *Policy Measures for Reducing the Use of Non-Biodegradable Plastic Bags in Egypt*. An interactive panel discussion on solutions for plastic waste management followed the keynote speech. The panel included Mr. Shunichi Honda of UNEP IETC, Mr. Makoto Mihara from Osaka City Government, Mr. Yuuichi Arita from Kitakyushu City, Mr. Ozaki Kazuo from Seven & i Holdings Co., Ltd. and Mr. Tsunekichi Kuriyama from Showa Denko K.K.

The theme of Part 2 of the symposium was *Time to Act Reducing Ocean Plastic*. The them was facilitated by Mr. Keith Alverson, Director of UNEP IETC. Mr. Rolph Payet, Executive Secretary of Secretariat of the Basel, Rotterdam and Stockholm conventions, Ms. Ligia Noronha, Director of Economy Division, UNEP and Mr. Shinichi Sakai, Professor, Kyoto University participated in a panel discussion to create a message for the G20 Osaka Summit in June 2019.

In the concluding segment, a *Message from UNEP Symposium on Plastic Waste Problems to G20 Osaka Summit & G20 Ministerial Meeting* was submitted to the Government of Japan. H.E. Mr. Hideo Suzuki, Vice Minister of Foreign Affairs, Japan gave the closing remarks on behalf of the G20 Presidency of the G20 Osaka Summit.



Open Sessions

The afternoon of 22 May consisted of three open sessions for the general public on Holistic Waste Management, E-Waste and Hazardous Waste, and Waste to Energy. Ms. Kamar Yousuf, head of UN Environment's Private Sector Unit, provided an update on UN Environment's partnerships with the private sector, and highlighted several key partnerships, such as Nippon TV, Formula E, Google and the UN Alliance for Sustainable Fashion.

Open session A: Holistic Waste Management

During this session, presenters demonstrated and shared proven solutions for holistic waste management, with a focus on organic waste management. Organic waste comprises the largest percentage of municipal solid waste in developing countries. Therefore, the session provided an opportunity to present good practices and case studies on holistic organic waste management solutions, and facilitated a dialogue between the public and the participating private sector and civil society organizations.



Open session B: E-waste and Hazardous Waste

In this session, e-waste and hazardous waste experts shared their knowledge and discussed the challenges of managing e-waste and hazardous waste sustainably. The session allowed the public to engage in the discussions and interact with the panellists.



Open session C: Waste to Energy

In this session, WtE experts from the private sector informed the public of state of art and innovative technologies, and highlighted major sector challenges and opportunities. A panel discussion on the future of WtE followed, and included challenges and opportunities, with a focus on developing countries. The public had an opportunity to interact with the WtE panellists from the private sector.





Message

From UNEP Symposium on Plastic Waste Problems To G20 Osaka Summit & G20 Ministerial Meeting

The International Environmental Technology Centre of the United Nations Environment Programme organised a UNEP Symposium on Plastic Waste Problems on 22nd May 2019 in Osaka, Japan, premised on the need for environmentally sound management of plastic waste in order to solve the marine plastic litter issue.

The problem of plastic waste and ocean pollution is an urgent global issue. In addition to the plastic waste problem on the land, plastic waste leaking into the ocean is a serious threat to ecosystems. Microplastics miniaturized by the influence of waves and ultraviolet rays have been found in marine life and may eventually cause adverse effects to human health through the food chain.

The Fourth Session of the United Nations Environment Assembly organised in March 2019 adopted resolutions on “Marine Plastic Litter and Microplastics” and “Addressing Single-use Plastic Products Pollution”. The United Nations Environment Assembly recognised the important role of the United Nations Environment Programme in combatting plastic waste and its ocean pollution globally.

The symposium participants, including professionals and experts, identified issues surrounding environmentally sound management of plastic wastes, and environmental technologies, successful practices and solutions which can contribute to solving the marine plastic litter issue were introduced. Furthermore, the symposium discussed how to raise public awareness of this issue.

The symposium also recognised that: 1) all countries’ efforts are indispensable in order to solve the marine plastic litter issue; and 2) promotion of international cooperation is important in order to enhance waste management capacity in developing countries by applying advanced technologies for waste management and disposal from Japan and other countries.

Based on the resolutions adopted by the Fourth Session of the United Nations Environment Assembly, the symposium confirmed that the United Nations Environment Programme would accumulate scientific and technological knowledge, and support improving waste management and developing national and regional action plans. Furthermore, the symposium emphasized sustainable solutions of environmental problems should be sought through waste management by promoting that the International Environmental Technology Centre of the United Nations Environment Programme would implement various international projects on environmentally sound management of wastes to promote sustainable solutions to environmental problems.

The G20 has been dealing with a wide range of issues facing the global community, such as environmental issues including the marine plastic litter problem. As the “premier forum for international economic cooperation,” the G20 has to lead the world in the efforts to tackle the issue of marine plastic litter.

It is imperative for the G20 to advance actions to prevent the discharge of marine plastic litter into the ocean, especially by improved waste management, recovery of marine litter and innovative solutions. In addition, it is essential for the G20 to support efforts to address the issue by countries which need assistance, inter alia, through sharing knowledge and technologies regarding waste management, in collaboration with international organizations including the UNEP.

The participants of the symposium hope that Japan will exercise its leadership at the G20 Summit and G20 Ministerial Meeting on Energy Transitions and Global Environment for Sustainable Growth to be held next month to make substantial progress in the efforts to address this issue.


On behalf of all the participants in the symposium,

Ligia Noronha

Director, Economy Division, United Nations Environment Programme

22 May 2019

PARTNERSHIP PLEDGE

TOWARDS A PLASTIC POLLUTION FREE PLANET

Recognising that plastic waste, is not managed effectively, and *conscious* that only nine per cent of the nine billion tonnes of plastics ever produced have been recycled and that most of it ends in landfills, dumps and the environment, a **PARTNERSHIP PLEDGE FOR A PLASTIC POLLUTION FREE PLANET** is made

BETWEEN: The International Environmental Technology Centre (UNEP-IETC), which works with developing countries to implement sustainable solutions to environmental challenges, with focus on holistic waste management.

AND: KANEKA Corporation (Kaneka Corp.), a company with the commitment to provide technological solutions for the realization of a sustainable society through breakthrough technology.

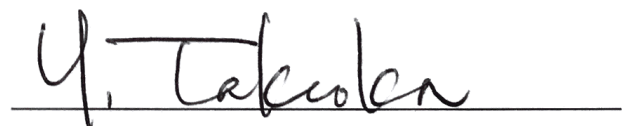
PLEDGE INTENT: To conserve the sustainability of our ocean, KANEKA reaffirms its commitment made at the fifth 'Our Ocean Conference' in Bali in 2018, to scale-up KANEKA's investment to produce biodegradable products using an innovative technology, the KANEKA Biodegradable Polymer PHBH®. KANEKA will continue to distribute biodegradable polymer PHBH® to the global market, and in collaboration with UNEP-IETC, intends to strengthen the knowledge available around the biodegradability of products to reduce the negative impacts to the environment caused by plastic pollution.

PARTNERSHIP PLEDGE INTENT:

This partnership agreement between KANEKA Corp. and UNEP-IETC confirms both parties' dedication to the shared ambition towards a Plastic Pollution Free Planet. The above-mentioned intent, in response to the UNEA4 resolution UNEP/EA.4/L.8 on Environmentally Sound Management of Waste, is fully supported by UNEP-IETC. Through this Partnership Pledge, KANEKA confirms its intention to continue reducing plastic pollution through PHBH® related applications and awareness raising activities, with UNEP-IETC being a knowledge partner in this endeavour.



Keith Alverson
Director, **UNEP-IETC**



Yoshiki Takeoka
Managing Executive Officer, General Manager of
New Business Development Department
KANEKA Corporation

PARTNERSHIP PLEDGE

TOWARDS A PLASTIC POLLUTION FREE PLANET

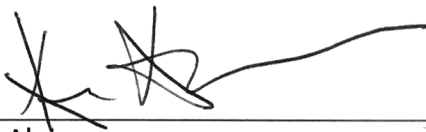
Recognising that plastic waste, is not managed effectively, and *conscious* that only nine per cent of the nine billion tonnes of plastics ever produced have been recycled and that most of it ends in landfills, dumps and the environment, a ***PARTNERSHIP PLEDGE FOR A PLASTIC POLLUTION FREE PLANET*** is made

BETWEEN: The **International Environmental Technology Centre (IETC)**, which works with developing countries to implement sustainable solutions to environmental challenges, with focus on holistic waste management.

AND: **Sunpower Corp.**, whose vision is to contribute to tire recycling and re-use as part of the waste management hierarchy; and to contribute to the achievement of the SDGs through the creation of social businesses and the development of entrepreneurs around the globe.

PLEDGE INTENT: Sunpower Corp. intends to expand its activities to promote not only tyres reuse, but also **waste-tyre recycling** in the developing countries of its operations. In the pursuit of this goal IETC will collaborate with Sunpower as knowledge partner. Sunpower Corp. and IETC will collaborate to (i) update the UNEP IETC compendium of technologies for waste-tyre recycling; (ii) pursue the development of alternative technologies to recycle waste-tyre; and (iii) enhance knowledge exchange through various platforms and events including workshops and trainings to increase entrepreneurial awareness in the waste sector with focus on tyre waste.

PARTNERSHIP PLEDGE: This partnership agreement between Sunpower Corp. and IETC confirms both parties' dedication to the shared ambition towards a Plastic Pollution Free Planet. The above intent, in response to the UNEA4 resolution UNEP/EA.4/L.8 on Environmentally Sound Management of Waste, is fully supported by IETC. By signing this Partnership Pledge, Sunpower Corp. confirms its intention to continue reducing plastic pollution by increasing recycling of tyre-waste and IETC to be a knowledge partner in this endeavour.



Keith Alverson
Director, **UNEP IETC**



Takuya Kawamura
President, **Sunpower Corp.**
Chairman, Consultative Committee on Global Initiative for Tire Recycling

*Signed on the 21th of May 2019 during the Global Dialogue on Technology Solutions for
Holistic Waste Management in Osaka, Japan*

PARTNERSHIP PLEDGE

TOWARDS A PLASTIC POLLUTION FREE PLANET

Recognising that plastic waste, is not managed effectively, and *conscious* that only nine per cent of the nine billion tonnes of plastics ever produced have been recycled and that most of it ends in landfills, dumps and the environment, a **PARTNERSHIP PLEDGE FOR A PLASTIC POLLUTION FREE PLANET** is made

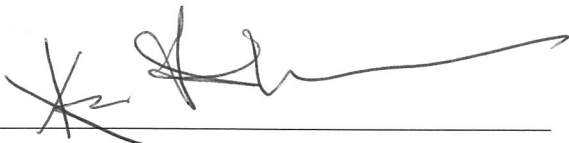
BETWEEN: The International Environmental Technology Centre (IETC), which works with developing countries to implement sustainable solutions to environmental challenges, with focus on holistic waste management.

AND: Osaka City, whose vision is to contribute to the achievement of SDGs.

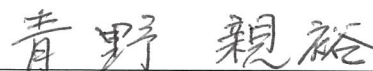
PLEDGE INTENT: Osaka City is committed to promoting globally, in cooperation with IETC, the effective operations and activities of Osaka City to reduce plastic waste and to optimize plastic resources. This pledge is made in line with the Osaka Declaration toward Zero Plastic Waste¹, signed by the Mayor of Osaka City and the Governor of Osaka Prefecture on 28 January 2019.

PARTNERSHIP PLEDGE INTENT:

This partnership agreement between Osaka City and IETC confirms both parties' dedication to the shared ambition towards a Plastic Pollution Free Planet. The above-mentioned intent, in response to the UNEA4 resolution UNEP/EA.4/L.8 on Environmentally Sound Management of Waste, is fully supported by IETC. Via this project and through this Partnership Pledge, Osaka City confirms its intention to continue reducing plastic pollution in its operations and activities locally and globally and IETC to be a knowledge partner in this endeavour.



Keith Alverson
Director, **UNEP IECT**



Chikahiro Aono
Director General , **Osaka City**

*Signed on the 21th of May 2019 during the Global Dialogue on Technology Solutions for
Holistic Waste Management in Osaka, Japan*

¹ Osaka Declaration toward Zero Plastic Waste (2019):

<https://www.city.osaka.lg.jp/kankyo/cmsfiles/contents/0000459/459635/declaration.engver.pdf>

PARTNERSHIP PLEDGE

TOWARDS SUSTAINABLE SOLUTIONS FOR HOLISTIC WASTE MANAGEMENT

CONTEXT: Recognising that waste, if not managed effectively and consciously, can cause significant environmental problems and hinder progress towards achieving the UN Sustainable Development Goals.

PARTNERS: In response to *UNEA4 resolution UNEP/EA.4/L.8* on Environmentally Sound Management of Waste, the following partners pledge to work together:

- **International Environmental Technology Centre (IETC)**, which works with developing countries to implement sustainable solutions to environmental challenges, with focus on holistic waste management.
- **SUS Environment**, whose vision is to create a cleaner and friendlier environment.

INTENT: IETC and SUS Environment intend to explore joint activities related to:

- Assisting developing countries with their waste management master plans with focus on Municipal Solid Waste (MSW);
- Capacity building for developing countries on Waste to Energy (WtE), based on ongoing SUS WtE projects/training centre, whereby developing countries are cognizant of associated challenges and opportunities before investing in WtE facilities;
- Organizing joint study tours to visit and learn from ongoing SUS operational WtE projects;
- Co-organizing international conferences and workshops on waste sorting, WtE and low-carbon eco-industrial park which is to integrate treatment of MSW and non-MSW, minimize the waste quantity, maximize energy recovery and promote circular economy.

PARTNERSHIP: This partnership pledge between SUS Environment and IETC confirms both parties' intent and shared ambition towards sustainable development and implementation of environmentally sound technologies for holistic waste management, with focus on waste to energy solutions.



Keith Alverson
Director, UNEP IETC



Jisheng Long
CEO, SUS Environment

PARTNERSHIP PLEDGE

Study and Release of a Handbook of Green Technology Assessment

Green technology is an important means of solving environmental pollutions and addressing climate change, which is also an essential tool to achieve the 2030 Sustainable Development Goals. Therefore, identifying and assessing green technologies is of great significance.

BETWEEN:

International Environmental Technology Centre (IETC), which works with developing countries to implement sustainable solutions to environmental challenges, with focus on holistic waste management.

AND:

Green Technology Bank, whose vision is to implement the 2030 Agenda for Sustainable Development and a comprehensive service platform converging advanced and practical green technologies. It will also consolidate the integration of science and technology with finance to realize the transfer of green technology.

PLEDGE INTENT: Green Technology Bank and IETC will collaborate to:

- (i) Jointly study and update a Handbook on Sustainability Assessment Technology (SAT). For this, the Green Technology Bank will provide market practice data and co-financing, and IETC will provide expert advice based on the SAT methodology. This will be supplemented by Tongji University with theoretical research methods and results on green technologies;
- (ii) Use the Handbook to strengthen capacity of developing countries and countries with economies in transition including the countries along One belt and Road on Sustainable Technology assessment.

PARTNERSHIP PLEDGE: This partnership pledge between Green Technology Bank and IETC reaffirms both parties' dedication to the shared ambition towards development of a Handbook of Green Technology Assessment. By signing this Partnership Pledge, Green Technology Bank confirms its intention to continue studying and providing data of green technology assessment as well as financing, with IETC's role as a substantive and knowledge partner.



Keith Alverson
Director, UNEP IETC



Wang Zhen
Director, Shanghai Science and Technology Exchange
Center, Green Technology Bank

*Signed on the 21th of May 2019 during the Global Dialogue on Technology Solutions for
Holistic Waste Management in Osaka, Japan*

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