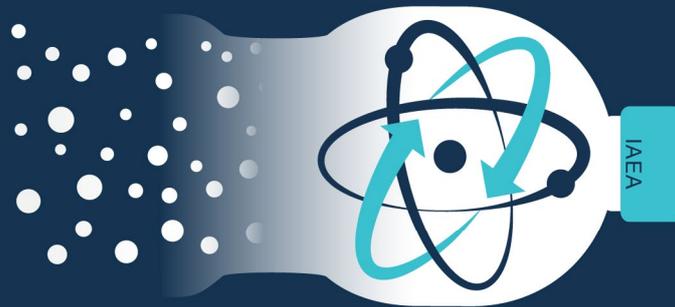


# SUMMARY REPORT



## **NUTEC Plastics** A nuclear solution to plastic pollution

# **ROUNDTABLE**

FOR ASIA AND THE PACIFIC REGION

18 May 2021, Vienna, Austria



**IAEA**

International Atomic Energy Agency  
*Atoms for Peace and Development*



The sea as seen through a discarded plastic bottle by the beach. (Photo: Karuvadgraphy/Pixabay)

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In collaboration with



# NUTEC Plastics Roundtable

FOR THE ASIA AND THE PACIFIC REGION

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## Background on NUTEC Plastics

Following current trends, the oceans are expected to contain one tonne of plastic for every three tonnes of fish by 2025, and by 2050, there will be more plastic than fish. Approximately 70% of all plastics produced to date is now waste and of this only 9% has been recycled. In many places, plastic waste is mismanaged and ends up in unregulated landfills or open dumps from where it enters the ocean.

Plastic waste pollution not only has adverse effects on the oceans, but also on terrestrial environments such as soil and groundwater. Even as waste, plastic does not decompose due to its durability and longevity. When it reaches the ocean it can remain there for hundreds of years, and over time it fragments and turns into micro- and nano-plastic. The problem of plastic pollution is increasingly receiving global attention, but gaps in addressing the problem remain due to the lack of sufficient awareness, knowledge, technology, financing and effective policy.



70%

of all plastics produced to date is now waste.

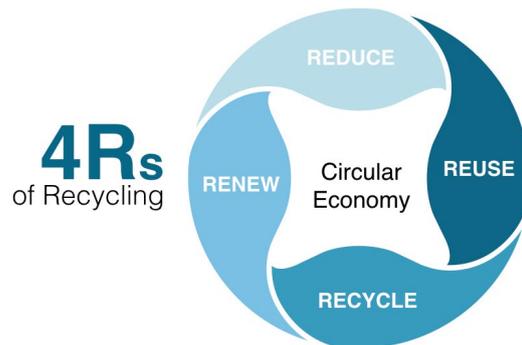
Only 9%

of all plastic waste has been recycled.

### Towards a circular economy

The linear model of producing, using and disposing plastic is unsustainable. A global approach is needed that establishes a circular economy and focuses on the '4Rs': reduce, reuse, recycle and renew. Analysis and evidence show that nuclear applications can complement existing technologies and thus accelerate the transition towards a circular economy for plastics.

However, the potential contribution of nuclear science and technology for addressing the plastic waste problem is not well known, and hence is rarely integrated into proposals for sustainable, scalable solutions. A change is needed to increase the knowledge and awareness of these techniques and technologies. More importantly, they need to be applied more broadly in practice in order



to use the full potential of nuclear techniques in reducing the global plastic waste burden.

For this to happen, and based on its previous and existing work, the IAEA has developed NUTEC Plastics to assist IAEA Member States in integrating nuclear techniques in their efforts to address challenges of plastic

pollution – making IAEA's contribution to solving this global problem more apparent and perceptible. The IAEA supports research and uptake of nuclear techniques in two main areas: monitoring and assessment of marine plastics and plastic/polymer waste recycling and upcycling.

## Radiation technology in plastic waste recycling

Radiation technology for industrial purposes, such as gamma and electron beams, offers unique advantages for reducing plastic and polymer waste and therefore fill existing technological gaps in dealing with such waste. Irradiation can address sorting challenges experienced by mainstream mechanical recycling methods by enabling effective sorting of plastic wastes to feed into recycling streams, thus improving the quality and value of the recycled plastics.

Radiation technologies can be used to transform or recycle plastic waste into other products, such as fillers and binders for construction materials. They can also be used to break down or convert waste plastic polymers into smaller components, fuel or monomers to generate chemical feedstocks to produce consumer products, with or without the addition of virgin polymers. Reduction of plastic waste is also possible by replacing petroleum-based plastics with biodegradable biopolymers obtained through radiation-driven processes.

Furthermore, radiation technology offers cleaner production and recycling processes, thus reducing the use of potentially harmful additives and solvents, as well as delivering energy savings.

NUTEC Plastics will integrate radiation technologies for plastic waste recycling into national, regional and global initiatives. Ongoing laboratory scale activities are paving the way for pilot plastic recycling plants to establish the volume, energy and financial balances associated with using radiation technologies to recycling various plastic wastes. Based on the proof of principle and experience



Radiation technology can help in the effective sorting of plastic wastes thus improving the value of the recycled plastics. (Photo: D. Jekic/123rf)

gained from the pilot(s), the technology will be scaled up to a large scale plastic waste recycling demonstration plant(s).

## Protecting the oceans

Oceans are the final repository of mismanaged and unrecycled land-based plastics, and there is a lack of sufficient knowledge and understanding of the abundance and impact of microplastics in the ocean. More accurate data are needed to assess the effect that microplastics and associated contaminants have on marine organisms that are part of the global food chain, such as food for human consumption, and therefore on seafood exports, food safety and human health. Isotopic techniques offer unparalleled precision and complement conventional techniques in tracking the abundance and



Photo: R. Quevenco



Researchers at the IAEA Environment Laboratories model realistic scenarios to examine how and to what extent microplastics can transfer contaminants to marine organisms and eventually to humans. (Photo: Francois Oberhaensli and Hugo Jacob/IAEA)

distribution of nano- and micro-plastics in the marine environment.

Isotopic tracers, imaging techniques and gamma and beta counters have unique abilities to assess the impacts of micro- and nano-plastics on marine biota. These techniques provide important markers for studying the toxicity of plastics on living organisms, to reveal in detail the impacted organs and systems, and allow to trace the actual toxicological stress and their possible propagation in food chains that can ultimately impact humans through consumption of seafood.

NUTEC Plastics will strengthen and scale up the development of reliable and cost-effective techniques to assess the spatial and temporal abundance and character of marine plastics to better understand their origin, transport mechanisms, as well as fate and impact. This includes the establishment of harmonized, standardized protocols to identify microplastics in environmental samples, analytical techniques that are in line with best practices and state-of-the-art science, and training for scientists and technicians in their use.

## Global partnership needed

A holistic and sustainable solution to the global plastic burden requires an integrated and comprehensive approach that can only be achieved in partnership with organizations that have complementary roles and

expertise. Working within existing national, regional and international initiatives, including private-public partnerships is essential. This includes collaboration with United Nation entities, multilateral development banks, philanthropies, existing large scale initiatives and multi-stakeholder platforms, private sector, and scientific and research institutions. The private sector will be a critically important partner in making the transition to a circular plastic economy, underpinned by strong governmental action and ownership through enabling policies and supportive legal environment.

NUTEC Plastics' two main components – monitoring and assessment and plastic recycling – are logically intertwined as both represent a contribution to the solution of the global plastic pollution problem. However, implementation of the two components is not contingent on each other.

Taking this connected but not co-dependent relationship into account, NUTEC Plastics adopts a modular approach. This approach offers the advantage of facilitating the implementation of certain activities according to resource availability, while offering Member States and partners the opportunity to engage in activities linked to their profile, preferences and priorities.

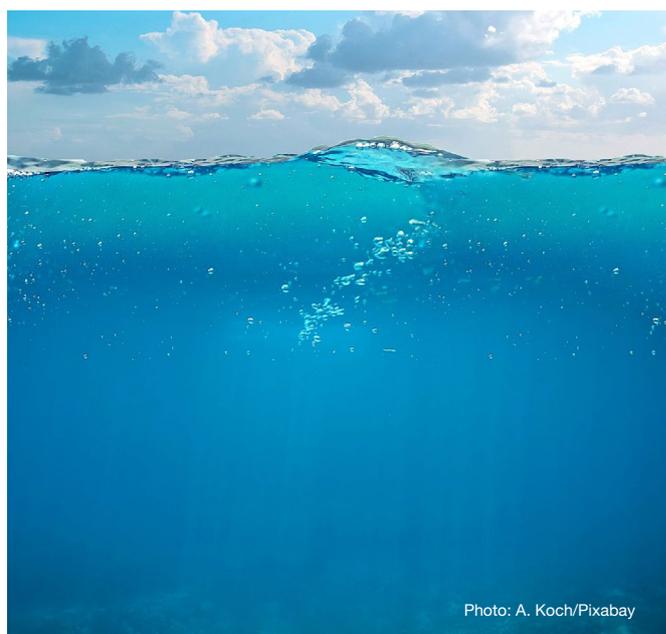


Photo: A. Koch/Pixabay



## Summary of the NUTEC Plastics Roundtable for the Asia and the Pacific Region

The NUTEC Plastics Roundtable for the Asia and the Pacific Region, “Atoms Contributing to the Search for Solutions to Plastic Pollution”, was organized to provide a platform for presenting and discussing new solutions to address global plastic pollution, with a particular focus on the unique contributions of nuclear technologies and the promotion of partnerships for an integrated, coordinated and solution-oriented approach in the global fight against plastic pollution. As a result, new partnerships for NUTEC Plastics were established and ways of cooperation in the Asia and the Pacific Region were outlined.

The Roundtable was the first in a series of similar events that provide a platform to discuss ongoing efforts, innovative solutions and partnerships to confront plastic pollution from a regular perspective.

IAEA staff, along with researchers and scientists from Australia, Republic of Korea, Malaysia and others shared their knowledge of, and expertise in technologies for recycling plastic waste and monitoring marine plastic pollution. They also exchanged information on existing programmes and practices to explore partnership opportunities.

The Roundtable event clearly discussed how plastic pollution adversely affects the marine environment, the food chain and, ultimately, human health. Participants also learned how the plastic pollution problem hinders the achievement of many Sustainable Development Goals (SDGs). Discussions highlighted the urgent need to move away from the common use of plastic today, and to step away from the linear

‘take-make-waste’ model towards a sustainable circular economy for plastics built on the 4R principles: reduce, reuse, recycle and renew.

Participants learned about various initiatives, programmes and projects launched at the national level, and by international and regional institutions in the region to apply sustainable solutions to plastic pollution. Furthermore, speakers at the Roundtable emphasized the critical role of science, technology, innovation and partnerships in addressing the issue.

Through NUTEC Plastics, the IAEA supports and contributes to these global, regional and national responses. It builds on the IAEA’s efforts to deal with plastic pollution through its portfolio of existing and planned research projects and activities. IAEA technical cooperation projects strengthen the recycling process using radiation technology and marine microplastic monitoring with the use of isotopic tracing techniques.

In summary, the Roundtable presented activities under NUTEC Plastics that will support the continuing development of new solutions to address plastic pollution, with a particular focus on the unique contributions of nuclear technology. It highlighted the need to strengthen partnerships for an integrated, coordinated and solution-oriented approach to tackling plastic pollution.

### Roundtable Participants

-  **505** total attendees  
125 IAEA + 380 external participants
-  **47** countries represented
-  **10** international organizations
-  **28** panelists  
internal and external senior level officials
-  **3** roundtable sessions

Attendance Per Affiliation	
Permanent Mission	33
IAEA TC Project Counterpart	41
IAEA TC-National Liaison Officers/ National Liaison Assistants/National Representatives	29
Industry/Private Sector	6
International/Regional Organization	26
Ministry/Governmental institution	133
Non-Governmental Organization	13
University/Research Institution	73
Other	4
<b>Total</b> (including 22 external panelists)	<b>380</b>

Attendance Per Country			
Afghanistan	2	Mongolia	1
Australia	5	Morocco	3
Austria	26	Myanmar	14
Bahrain	1	Nepal	2
Bangladesh	3	New Zealand	1
Belgium	1	Oman	1
Brunei Darussalam	5	Pakistan	5
Cambodia	4	Palau	1
China	14	Palestine	2
France	1	Philippines	26
Germany	1	PNG	1
Greece	1	Qatar	9
Indonesia	63	Republic of Korea	7
India	5	Singapore	9
Iran	5	Sri Lanka	5
Japan	10	Switzerland	1
Jordan	3	Syria	2
Kenya	1	Thailand	24
Kuwait	3	USA	10
Lao People’s Republic	1	Vanuatu	1
Lebanon	1	Viet Nam	12
Malaysia	52	Western Samoa	4
Marshall Islands	2	Yemen	3
<b>Total</b> (including 22 external panelists)			<b>380</b>

## Introduction



Global plastic pollution has become one of the major environmental challenges of the 21st century. The Asia and the Pacific region is the largest producer of plastic, and countries in the region are heavily affected by plastic waste pollution. The issue is, therefore, high on the political agenda both regionally and nationally.

Decision makers from all levels are involved in adopting measures to prevent and reduce plastic pollution in an integrated land-to-sea approach. Calls for action include scientific developments to provide effective and accurate methodologies to monitor plastic pollution and prevent it at its roots on land, to reduce plastic waste amounts through broader and intensified recycling efforts and to scientifically support holistic decision making for healthy marine and terrestrial environments.

### The role of the IAEA

The IAEA is the world's central intergovernmental forum for scientific and technical cooperation in the nuclear field. It works for the safe, secure and peaceful use of nuclear science and technology, contributing to international peace and security and the United Nations' Sustainable Development Goals.

The technical cooperation (TC) programme is the IAEA's primary mechanism for building capacities in the peaceful

application of nuclear technology in Member States, supporting their efforts to address key development priorities.

The IAEA technical departments provide the nuclear scientific and technological expertise for the TC programme. In particular, the IAEA Environment Laboratories, and the Divisions within the Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture provide the majority of support to the TC programme in transferring proven nuclear techniques, as well as conducting research and development and providing training and analytical services to IAEA Member States.

The IAEA undertakes these research and development (R&D) activities in its own laboratories in Seibersdorf and Monaco, as well as through its extended research networks composed of research institutions, academia and reference laboratories around the world, and its Coordinated Research Programme and Collaborating Centres schemes.

## NUTEC Plastics...

... builds on a portfolio of IAEA research and technical cooperation projects in plastic recycling using radiation technology and marine monitoring of microplastics using isotopic tracing techniques. With NUTEC Plastics, the IAEA seeks to engage and expand the dialogue with Member States, partners, industry, and civil society. It provides a vision for the solutions that the IAEA offers to better manage plastic waste. Implementation of specific activities will take place through established IAEA delivery modalities, such as technical cooperation and coordinated research projects and other programmatic activities.

## Roundtable for the Asia and the Pacific Region

With the view of increasing the visibility of NUTEC Plastics among Member States and partners, a three-hour virtual Roundtable for the Asia and the Pacific Region titled “Atoms Contributing to the Search for Solutions to Plastic Pollution” was organized on 18 May 2021 to provide a platform for presenting and discussing new solutions to address the global plastic pollution challenge. Its particular focus was on the unique contributions of nuclear technologies and to promote partnerships for an integrated, coordinated and solution-oriented approach in the global fight against plastic pollution.

Member States in Asia and the Pacific already participate in the regional TC project called “Reutilizing and Recycling Polymeric Waste through Radiation Modification for the Production of Industrial Goods (2020–2023)”.

The project aims to develop capacity in reutilizing and recycling polymeric waste for the production of industrial goods. Additionally, a four-year regional project developed for 2022–2025 on “Monitoring of the Marine Environment for Enhanced Understanding of the Abundance and

Impact of Marine Plastic Pollution in Asia and the Pacific” aims to improve plastic management in the Asia and the Pacific Region through enhanced understanding of the abundance and impact of marine plastic pollution.

The project focuses on:

- » Raising global awareness on the application of nuclear and isotopic techniques for marine plastic monitoring and impact assessment;
- » Identifying public and private partners to support improved monitoring capacities of marine laboratories;
- » Improving the laboratories’ capacities with adequate equipment and trained staff as well as adoption of appropriate protocols; and
- » Establishing a marine plastics monitoring network.



A three-hour virtual Roundtable for the Asia and the Pacific Region titled “Atoms Contributing to the Search for Solutions to Plastic Pollution” was organized by the IAEA on 18 May 2021. (Photo: Dean Calma/IAEA)

## Proceedings of the Roundtable

### Session One

#### Plastic Pollution: Challenges and the Need for Global Action

### Opening Remarks



Ms Jane Gerardo-Abaya, IAEA Director of the TC Division for Asia and the Pacific. (Photo: Omar Yusuf/IAEA)

Ms Jane Gerardo-Abaya, Director of the IAEA Technical Cooperation Division for Asia and the Pacific, welcomed the participants to the Roundtable on NUTEC Plastics, organized by the IAEA in cooperation with the Association of Southeast Asian Nations (ASEAN), the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the United Nations Environmental Programme (UNEP), and Member States in the region. The Roundtable is focused specifically on the Asia and the Pacific region and its 42 Member States, in the first in a series of similar roundtables for NUTEC Plastics.

She acknowledged the participation of representatives from environmental, nuclear and industrial sectors from IAEA Member States in the region, and participants from international and non-governmental organizations, as well as the private and academic sectors. She then introduced a video on NUTEC Plastics that was produced for the event. (See box.)

Following the video presentation, Ms Gerardo-Abaya introduced the IAEA Director General, Mr Rafael Mariano Grossi; Deputy Director General and Head of the Department of Nuclear Sciences and Applications, Ms Najat Mokhtar, and Deputy Director General and Head of the Department of Technical Cooperation, Mr Hua Liu. She also welcomed the Ministers, Heads of organizations and the experts participating in the Roundtable.

#### IAEA Video on NUTEC Plastics



A video on NUTEC Plastics set the stage for session one, introducing the background and basics of radiation technology for recycling and monitoring marine plastic pollutions, and mitigation efforts by Member States.

Through the video, participants learned how the IAEA is contributing to the search for solutions to plastic pollution. First, through well established isotopic tracing techniques that track microplastics through oceans and ecosystems. Second, by developing innovative recycling methods using radiation technology to break down or convert large amounts of plastics into secondary products or feedstock.

(Link to video: [https://youtu.be/lqN2hUZG\\_S8](https://youtu.be/lqN2hUZG_S8))

## Remarks from the IAEA Director General

IAEA Director General Rafael Mariano Grossi opened Session One by welcoming the participants – from Afghanistan to Samoa (the newest Member States in Asia and the Pacific) – to the first Roundtable organized by the IAEA on the ways to address plastic pollution using nuclear technology. He stated that even though we are acutely aware of both the opportunities and benefits of plastic, we also know of the externalities and negative impacts, and noted the growing awareness of the problem.



Mr Grossi paid tribute to the many efforts and achievements aimed at tackling the global plastic pollution problem in Asia. These include the ASEAN Bangkok Declaration on Combating Marine Debris, the Osaka Blue Ocean Vision and the Closing the Loop project implemented by ESCAP, to name just a few.

Mr Grossi stressed that these challenges have transboundary effects and that global problems need global solutions. He emphasized the importance of international efforts for developing creative and scalable solutions to address plastic pollution in both plastic recycling and marine microplastic monitoring.

In that regard, he stated that nuclear techniques can help in assessing and understanding the dimension of the problem. In concluding his remarks, Mr Grossi emphasized the need to work together and form partnerships both globally and regionally, particularly in the Asia and the Pacific region.



IAEA Director General Rafael Mariano Grossi addressing the Roundtable event. (Photos: Dean Calma and Omar Yusuf/IAEA)

***“Global problems need global solutions and we can only solve big issues when we come together.”***

— IAEA Director General Rafael Mariano Grossi

## Keynote Speech by Mr Peter Thomson (UN Secretary General's Special Envoy for the Ocean)

In his keynote speech, delivered via a video message, Mr Peter Thomson shared five important points on the global challenge of marine plastic pollution:

1. There can be no healthy planet without a healthy ocean, and the ocean's health is currently in decline.
2. Marine plastic pollution is a major cause of the decline of the ocean's health with a staggering 11 million tonnes of plastic entering the ocean every year. Unless urgent global action is taken, plastic pollution is set to double by 2030.
3. Only a coordinated global response, which holds into account both businesses and government, can stop this plastic plague.
4. Plastic has entered the marine food chain from zooplankton up to the end-consumers of sea food, which is consumed as nano-plastics. The health effects are still unclear, but scientists are reporting nano-plastics crossing



Participants at the Roundtable watching Mr Thomson's keynote speech. (Photo: Omar Yusuf/IAEA)

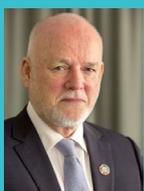
our blood, brain and placental barriers.

5. We have a clear path to a peace table in the form of an international treaty to stop plastic from entering the ocean.

In closing, Mr Thomson stated his gratitude and appreciation for IAEA's efforts in the marine plastic pollution arena using nuclear technologies, which can help in assessing technological gaps and pushing us towards a circular economy for plastic.

***“There can be no healthy planet without a healthy ocean.”***

— Peter Thomson, UNSG's Special Envoy for the Ocean



***“We must make peace with nature, without further delay or preconditions. We have to sit down at the peace table and establish a relationship of new respect for nature.”***

— Peter Thomson, UNSG's Special Envoy for the Ocean

## Roundtable Discussion

IAEA Director General Rafael Mariano Grossi chaired the Roundtable discussion on several pertinent topics, including key policy and socio-economic issues; achievements and gaps in policy and regulatory frameworks; international, regional, and national instruments and initiatives; and opportunities for strengthening partnership and synergy, including resource mobilization.

Mr Grossi explained the IAEA’s mandate under Atoms for Peace and Development, its major programmes, and the framework for transforming its mandate into action to serve its Member States. He stressed that the IAEA does not work in isolation, but is rather governed by Member States. Forty-two Member States from the Asia and the Pacific region were in attendance at the Roundtable, he noted.

Mr Grossi indicated that the IAEA also seeks to contribute to the global development agenda, including the SDGs, and to specific global action on issues like plastic pollution. He said that the IAEA is ready to contribute to these global efforts through nuclear science and technology. NUTEC Plastics will leverage the resources and networks of all interested countries and will provide a solid platform for North-South, South-South and triangular cooperation on marine plastic pollution.

Mr Grossi explained how the policy framework helps to join and coordinate efforts at the national, regional and global levels. He pointed out opportunities for synergies and partnerships, and provided examples of efforts and networks aimed at stopping marine plastic pollution.

Mr Grossi also mentioned that he presented NUTEC Plastics in July 2020 to the ASEAN Ambassadors in Vienna who expressed keen interest in the programme.

He then invited the Secretary General of ASEAN, Mr Lim Jock Hoi, to speak on the ASEAN perspective for tackling plastic pollution and marine littering, as well as the key policy and strategy aspects, and regional and international partnerships, to address this global challenge.

Session One Panelists	
 HE Mr Dato Lim Jock Hoi Secretary General ASEAN	 HE Mr Huang Runqiu Minister of Ecology and Environment China
 Mr Zhang Zhifeng Deputy Director General Department of Marine Ecology and Environment, China	 HE Ms Siti Nurbaya Bakar Minister of Environment and Forestry Indonesia
 HE Mr Hiroyoshi Sasagawa State Minister of the Environment Japan	 HE Mr Tomohiro Kondo, Vice-Minister for Global Environmental Affairs Ministry of Environment, Japan
 Ms Armida Salsiah Alisjahbana, Under Secretary-General of the UN and Executive Secretary (ESCAP)	 Ms Dechen Tsering Director for Asia Pacific Region UNEP



### Mr Dato Lim Jock Hoi, Secretary General (ASEAN)

informed participants that ASEAN is now facing the dual problem of plastic waste generation and its proper management. High rates of urbanisation and population growth coupled with increased purchasing power and consumption have increased plastic use and waste in the region. Single-use plastic products, unfortunately, have become an integral part of everyday life in many forms, such as food wrapping and containers, bottled water and cutlery.

Mr Hoi stated that the current COVID-19 pandemic also magnifies the existing burden of plastic waste with the increasing amount of plastic packaging and health industry-related waste. Masks, gloves, protective suits, face shields, sanitizer bottles, and other medical and chemical waste are adding up to the existing mounds of trash. Plastic waste generated worldwide is estimated at 1.6 million tonnes per day, and approximately 3.4 billion single-use face masks and face shields are discarded each day globally. Specifically, a recent Asian Development Bank report estimates that over a period of 60 days during the pandemic, five cities in Southeast Asia could collectively produce about 60,000 tonnes of medical waste.

Mr Hoi said that ASEAN's commitment to tackling the challenge of plastic pollution is reflected in the 2019 Bangkok Declaration on Combating Marine Debris and the ASEAN Framework of Action on Marine Debris. ASEAN is currently working on a Regional Action Plan for Combating Marine Debris that is aimed at enhancing regional and international coordination over the next five years. Under the ASEAN Economic Community, work is underway to develop the Framework for Circular Economy. The work will focus on circular economy approaches by identifying priority areas and entry points from an economic perspective and strengthening coordination with the environment sector. Moving forward, ASEAN's work on circular economy will be one of the building blocks for a sustainable ASEAN Community, a key component of ASEAN's post-2025 work.

Mr Hoi further stated that ASEAN applies a whole-community coordination approach that is key to its handling of plastic pollution. ASEAN is also actively engaging with its partners, such as Norway, Japan, Germany, the UN ESCAP and the World Bank to implement the ASEAN Framework of Action on Marine Debris. Among others, these partnerships will focus on capacity building, information sharing and best practices, and technical support in areas such as an integrated land-to-sea policy approach, circular economy, and waste management through the 3Rs concept, namely to reduce, re-use, and re-cycle.

Mr Hoi called upon businesses and the private sector to play a more active role in fulfilling their environmental responsibilities through improved business practices, proportionate investment in environmentally friendly technologies and responsible investment.

***“ASEAN applies a whole-community coordination approach that is key to its handling of plastic pollution.”***

—Dato Lim Jock Hoi, Secretary General, ASEAN



Mr Hoi expressed hope that NUTEC Plastics could be an option for a more sustainable future. He said that ASEAN is open to learn and consider ways on how to leverage new nuclear-derived technologies and techniques. In this regard, he looks forward to concrete follow-up actions to the Practical Arrangement cooperation between ASEAN and the IAEA.

Lastly, Mr Hoi shared his view that while technologies are important, it is even more important to make advanced technologies accessible to businesses, especially micro, small and medium enterprises through affordable and easily adapted innovative solutions. He suggested that careful consideration be given to the roll-out of NUTEC Plastics so that it could truly benefit people and communities.

In response, IAEA Director General Rafael Mariano Grossi noted the IAEA-ASEAN Practical Arrangement, which facilitates greater collaboration between the organizations on various topics. He added that several ASEAN Member States are very advanced in research and development (R&D) and industrial applications of nuclear science and technologies for plastic recycling. Member States are key stakeholders and partners of NUTEC Plastics, and countries from all geographical regions are actively engaged in the effort to reduce plastic pollution, he said.

Mr Grossi went on to say that a group of developed countries are very active in the global debate and action on this topic, and have allocated significant resources to address the issue at the country, regional and global levels. Mr Grossi noted the IAEA programmes that support north-south, south-south and triangular cooperation which can accelerate technically viable and economically feasible long term solutions.

Mr Grossi then invited participants to listen to the video message of Huang Runqiu, Minister of Ecology and Environment of the People's Republic of China.



### **Mr Huang Runqiu, Minister of Ecology and Environment, China**

remarked on China's positive progress and elaborated on how China has improved the management system for the production, sale, use, recycling and disposal of plastic products. Non-degradable plastic bags will be banned in all cities, and non-degradable disposable plastic tableware prohibited in catering services. Moreover, unsolicited single-use plastic articles will no longer be provided, and non-degradable plastic packaging bags, plastic tapes, disposable plastic woven bags, etc. will be forbidden in all post offices and express delivery services point nationwide, he said.

Mr Runqiu informed participants that China has improved the use of alternatives to plastic, promoting the use of non-plastic products, degradable shopping bags, degradable mulch film, etc. It is also vigorously developing the industries for degradable substitutes and new biobased materials. China has enhanced the sorting, separation, collection and recycling of plastic recyclables. Moreover, he said that all cities in China, at the prefecture level and above, have started household waste sorting and separation in an all-round way. They have also intensified dedicated operations to clean up plastic waste in the environment, such as in rivers, lakes, seas, ocean, and cultivated land.

He said that, while continuing its domestic initiatives and endeavours, China actively participates in international cooperation on marine plastic litter governance and

***“Nuclear technology for controlling plastic pollution will enjoy a promising prospect with the active initiative by the IAEA and through strengthening global cooperation and technological research.”***

*—Huang Runqiu, Minister of Ecology and Environment, China*



respective bilateral and multilateral initiatives. China has engaged in UNEP’s international process of marine plastic litter governance; has established an expert dialogue platform on marine litter between China and Japan; and promoted regional cooperation on marine litter under the framework of the Tripartite Environment Ministers’ Meeting between China, Japan and the Republic of Korea.

Mr Runqiu said that China will continue to enhance its efforts in preventing and controlling marine plastic pollution by reducing its stock, controlling additional pollution and strengthening regulations. Moreover, China will intensify long term monitoring and research on marine microplastics to provide technical support for its prevention and control.

Mr Runqiu next turned his attention to the implementation of the 2030 Agenda for Sustainable Development. He stated that China is a big country in terms of nuclear technology application, with about 150 000 radioactive sources and 205 000 radiation devices, both widely used in industries, agriculture, scientific research, environmental protection and other areas.

All radioactive sources and radiation devices are under strict regulation by the governmental departments in charge of ecological environment and radiation safety, and have been maintained at a good level for a long time. He noted that in recent years, China has vigorously promoted research and application of nuclear technology in the area of environmental protection and pollution control.

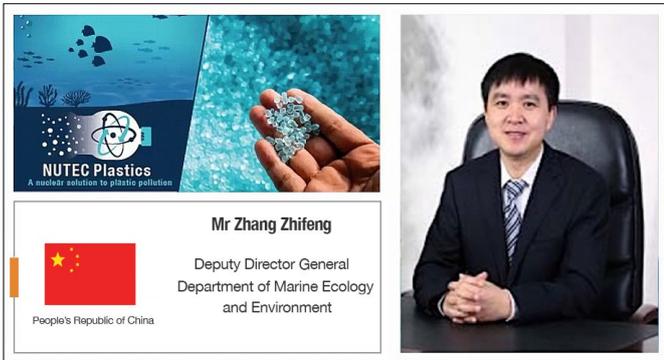
In his closing remarks, Mr Runqiu expressed his confidence, on behalf of China, that nuclear technology for controlling plastic pollution will enjoy a promising prospect with the active initiative by the IAEA, and through the strengthening of global cooperation and technological research. China is willing to further promote cooperation with all parties to concretely protect the marine ecological environment, build a clean and beautiful world, and protect our blue planet together.

Following Mr Runqiu’s message, Mr Grossi expressed that the initiatives China has taken locally and internationally to control and forbid the use of plastics and the introduction of biodegradable materials are both very refreshing. To see how China is working with neighbouring countries is also inspiring. Mr Grossi expressed his hope that the IAEA will be added to these efforts and noted that China can also benefit from partnering with the IAEA.

Next, Mr Grossi invited Mr Zhang Zhifeng, Deputy Director General of the Department of Marine Ecology and Environment, Ministry of Marine Ecology and Environment in China, to take the floor.



Photo: Dean Calma/IAEA



**Mr Zhang Zhifeng, Deputy Director General of the Department of Marine Ecology and Environment, Ministry of Ecology and Environment in China,** remarked on China's Action Against Plastic Pollution and shared insights on the successes in mainstreaming nuclear technologies for recycling. Mr Zhang informed participants that China pays high attention to ocean pollution, including plastic pollution, and has established a comprehensive legislative framework. The prevention and treatment measures on plastic pollution and legal responsibility have been highlighted in relevant national laws and regulations.

Additionally, Mr Zhang informed that Chinese institutes have conducted research on pollution of marine waste and marine microplastics. Furthermore, he indicated that China is focusing on the formulation of national policies specifically for plastic pollution; the development of relevant monitoring technologies and methodologies in line with international practice; the revision of ocean plastic monitoring procedures; and the establishment of long term monitoring systems.

Mr Grossi responded by adding that NUTEC Plastics will leverage the resources and networks of all interested countries and will provide a solid platform for cooperation. The IAEA maintains and operates laboratories in Austria and Monaco, he said. These laboratories have a proven track record in conducting applied R&D; providing training and analytical service; and transferring proven nuclear technologies and techniques to Member States.

He emphasized that there are opportunities for synergies and partnerships and conscious actions have to be exerted to make this happen.

Next, Mr Grossi started a conversation with Minister Siti Nurbaya Bakar on plastic waste reduction in Indonesia and invited her to speak about the formulation and promulgation of the country's National Plastic Waste Reduction Strategic Action Plan.



**Ms Siti Nurbaya Bakar, Minister of Environment and Forestry in Indonesia** began her remarks by noting that Indonesia is addressing plastic waste pollution in a comprehensive manner by tackling challenges both inland and in the marine environment. She said that Indonesia places high importance on marine plastic waste reduction. From 2017 to 2020, there was a 15.3% reduction in marine plastic litter from both land and marine sources. Ms Bakar indicated that Indonesia will continue its efforts to reduce plastic pollution by 25.9% by the end of 2021 and 38.5% by the end 2022.

Secondly, in the context of legal frameworks, Ms Bakar explained that the presidential regulation on handling marine litter is set to reduce marine litter by 70% in 2025. Thirdly, she shared that Indonesia has set up five strategies to reduce plastic waste in the long run comprising of the following:

- » To enhance national movement involving stakeholders supported by strong regulation,



**“Indonesia places high importance on marine plastic waste reduction. From 2017 to 2020, there was a 15.3% reduction in marine plastic litter from both land and marine sources.”**

—Siti Nurbaya Bakar, Indonesia Minister of Environment and Forestry

- » To plan solid waste management by improving community participation and promoting a circular economy,
- » To enhance plastic waste management, including marine plastic pollution from transportation, residential, tourism, and sports activities,
- » To strengthen institutional capacity building, and
- » To use R&D to encourage innovation and improve technology.

Ms Bakar said that Indonesia has cooperated with Denmark, Germany, and the United States, as well as organizations such as the Asian Development Bank (ADB), the World Bank and ASEAN on ending plastic pollution. Furthermore, she introduced Indonesia’s National Nuclear Agency (BATAN), which carried out R&D activities on plastic composite and radiotracing microplastics and aquatic radioecology.

Ms Bakar informed participants about Indonesia’s pioneering National Plastic Action Partnership (NPAP) and explained Indonesia’s plan to cut maritime plastic waste by 70% in just five years. She also shared key interventions – policy, programme, regulatory – that are in place to achieve this goal.

Following Ms Bakar’s presentation, Mr Grossi recognized that there are clear, successful examples of efforts and networks to stop marine plastic pollution. He said that one of these important efforts is the Osaka Blue Ocean Vision announced at the G20 Summit in 2019 in Osaka. He then invited participants to listen to the video message of Mr Hiroyoshi Sasagawa, State Minister of the Environment of Japan.



### **Mr Hiroyoshi Sasagawa, State Minister of the Environment of Japan**

congratulated IAEA Director General Grossi for successfully organizing the NUTEC Plastics Roundtable. As marine plastic pollution is one of the greatest environmental challenges that the world faces, Japan highly values the initiative taken by the Director General. Mr Sasagawa stated that Japan is committed to working closely with the IAEA and its partners to find sustainable solutions to plastic pollution.

Japan fully agrees with Mr Grossi that nuclear science and technology can play a significant role in tackling this global issue from various aspects. In this regard, as one of the leading countries in nuclear technology, the government of Japan will support NUTEC Plastics projects by providing technical assistance and financial contributions.

At the G20 Osaka Summit in 2019, G20 leaders shared the “Osaka Blue Ocean Vision”, which aims to reduce additional pollution by marine plastic litter to zero by 2050. The vision is now shared by as many as 86 countries and regions, going well beyond G20 members alone and approaching half the world in terms of participating countries. This vision should become a universal one, as



**“ At the G20 Osaka Summit in 2019, G20 leaders shared the “Osaka Blue Ocean Vision”, which aims to reduce additional pollution by marine plastic litter to zero by 2050. This vision should become a universal one, as this problem requires a global solution.”** —Hirooyoshi Sasagawa, State Minister of the Environment, Japan

the problem at hand requires a global solution. Second, regarding national action, the Japanese government has submitted a new bill on plastic resource circulation to the current Diet session. The bill would encourage all actors to take necessary actions in the entire life cycle of plastic products from design to disposal. This is key to realizing the transition towards a circular economy.

Mr Sasagawa said Japan will continue to share its efforts with the international community as good practices in tackling the issue. He stated his firm belief that ‘we can only make a difference when we join forces’.

In his response, Mr Grossi noted that Mr Sasagawa’s message foreshadows what will be a very meaningful and important contribution from Japan to NUTEC Plastics in the near future. Mr Grossi then welcomed Mr Vice-Minister Tomohiro Kondo to take the floor.



**Mr Tomohiro Kondo, Vice-Minister for Global Environmental Affairs, Ministry of the Environment in Japan** elaborated on Japan’s global and national actions on marine plastic litter. He also mentioned plastic litter and reiterated the Osaka Blue Ocean Vision and its common global goal. In order to achieve this shared goal, the G20

Implementation Framework was adopted at the G20 Environment Ministers Meeting and later endorsed by the G20 Osaka Summit, he said.

Furthermore, he noted that the objective of the G20 Implementation Framework is to facilitate information sharing and peer learning. The Framework called the “G20 Report on Actions against Marine Plastic Litter” has compiled relevant policies, plans, and measures since 2019. This year’s G20 Presidency, the Government of Italy, has agreed to develop the third report, for which Japan will provide support. Mr Kondo further said that he listened to the activities of the IAEA with great interest and noted the importance of the IAEA’s contribution to the report as well.

Next, Mr Kondo said the joint initiative of the Ministry of the Environment Japan, the European Union (EU), and the United States Environmental Protection Agency (USEPA) took place in October 2019 to discuss and share scientific knowledge and innovative solutions. Japan’s role was to take the lead in monitoring methodologies and data compilation, including sources, pathways, and impacts, as well as measures to combat plastic waste leakage by the EU and innovative solutions by USEPA.

Regarding Japan’s activities on monitoring methodologies and data compilation, Mr Kondo shared information on various ongoing activities.

First, Japan launched “Guidelines for Harmonizing Ocean Surface Microplastic Monitoring Methods” in 2019, which made it possible to compare monitoring data. This used to be difficult or sometimes impossible due to the different methods applied in each country and region.

Secondly, he indicated that in order to improve the technical capacity of monitoring, trainings on monitoring have been provided mainly to experts in the Asia Region since 2016. There were 36 participants from 7 countries in total, and Japan will continue providing this capacity building training. For the next step, Japan is planning to compile monitoring data available globally. This way, Japan may be able to collaborate with the IAEA.

As another example of Japan's initiative in the Asia and the Pacific region, the Regional Knowledge Centre was established at the Economic Research Institute for ASEAN and East Asia (or ERIA) in 2019.

The purpose of the Centre is to:

- » Network and raise awareness,
- » Promote innovative actions in each country, and
- » Facilitate national and regional cooperation.

Through this Centre, information collection and sharing, capacity building, and other services have been provided, Mr Kondo indicated.

Mr Kondo shared with participants that, in addition to global efforts, Japan has been promoting national efforts as well. Japan submitted a new bill on plastic resource circulation to the current Diet session and compiled the best technology and know-how on micro-plastics that Japanese companies possess.

Furthermore, Japan has been working globally and nationally to further promote measures against marine plastic litter. In this regard, it is important to:

- » Act urgently on a global scale;
- » Involve large, plastic consuming countries and emerging countries, which are reportedly large emitter of marine plastic litter; and
- » Call for the voluntary involvement of multi-stakeholders, including the private sector, especially those responsible for product design and waste management technology.

To promote global actions under different circumstances in different countries, Mr Kondo said Japan believes that it is effective to utilize the G20 Implementation Framework with the Osaka Blue Ocean Vision as a common vision. Mr Kondo ended his remarks by saying that Japan highly values the initiative taken by IAEA Director General Grossi, and is committed to working closely with the IAEA to tackle the plastic pollution challenge.

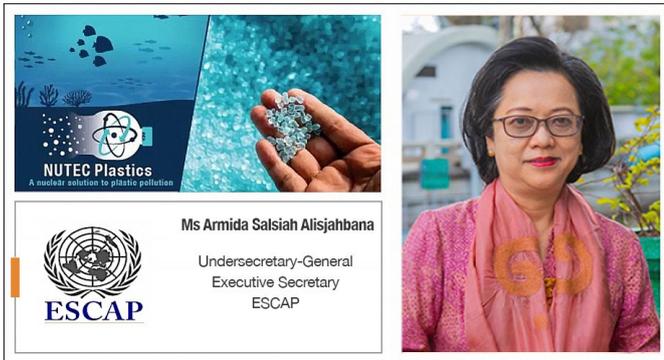
Mr Grossi responded to Mr Kondo's presentation by adding that the effort to reduce plastic waste to zero is daring and courageous. To achieve meaningful results by 2050, Mr Grossi noted that we have to be working today on reaching zero plastic litter for the sake of the children of 2050.

Next, he introduced and welcomed the Under Secretary-General of the UN and Executive Secretary of ESCAP, Ms Armida Salsiah Alisjahbana.

***“Japan has been promoting national efforts as well. Japan submitted a new bill on plastic resource circulation to the current Diet session and compiled the best technology and know-how on micro-plastics that Japanese companies possess.”***

*— Tomohiro Kondo, Vice-Minister for Global Environmental Affairs, Japan*





**Ms Armida Salsiah Alisjahbana, Under Secretary-General of the UN and Executive Secretary (ESCAP),** introduced ESCAP’s plastic waste initiatives and the Closing the Loop project, which are geared at detecting and monitoring the sources and pathways of plastic waste entering rivers.

Ms Alisjahbana noted the achievements of the Closing the Loop project, which includes digital innovation that tackles marine plastic pollution in ASEAN cities, and includes the project, “Scaling up Innovation to Tackle Marine Plastic Pollution in ASEAN Cities”.

Lastly, she shared both the “upstream/mitigation” and “downstream/marine monitoring” activities of several ESCAP led fora taking place in Member States within the region, which highlighted the need for technological solutions to plastic pollution. The IAEA is an active participant in these activities, sharing its various applicable experiences in using radiation technology.

**“Working together, we can help promote technological solutions for controlling plastic pollution.”**

—Armida Salsiah Alisjahbana, Executive Secretary, ESCAP

In response, Mr Grossi acknowledged ESCAP’s efforts and initiatives on marine plastic waste pollution. He said the IAEA’s collaboration is complementary with ESCAP’s efforts as the IAEA brings technology into the mix.

As the last item for Session One, Mr Grossi then invited Ms Dechen Tsering, Director for Asia and the Pacific in UNEP, to share UNEP’s perspective as a leading organization in addressing plastic pollution.



**Ms Dechen Tsering, Director for Asia Pacific Region (UNEP)** shared how UNEP is addressing plastic pollution using creative approaches and innovative tools, such as geo-spatial analysis, image recognition and artificial intelligence to detect, map and track plastic pollution from the source to rivers and the seas. For example, the new machine models developed by UNEP in cooperation with Google and GIC are helping efforts to map plastic pollution in the Ganges and Mekong rivers.

Ms Tsering also highlighted how countries in the region have broadened and accelerated actions on marine plastic pollution as reported by Ministers during the Roundtable. There is really much scope for sharing and cross-fertilization within the region, and UNEP will be happy to support these efforts through the Global Partnership in Marine Litter and the Regional Seas Programme.

**“Let us all join hands so that we can collectively bring the knowledge, political commitment and investment that solving the plastic pandemic calls for.”**

—Dechen Tsering, Director for Asia and the Pacific, UNEP

## Session One: Wrap-up and Observations

IAEA Director General Rafael Mariano Grossi wrapped up Session One and concluded with the following observations:

- » Global awareness of the scale and impact of plastic pollution and the need for urgent, concrete actions to find sustainable solution to the problem have been well emphasized. Actions are required now.
- » Actions are enabled by regional and national instruments in place in many countries to harmonize policy and programmes that address plastic pollution. They include the Bangkok Declaration, Osaka Blue Ocean Vision, and individual country policy and regulatory frameworks, such as Indonesia's National Plastic Waste Reduction Strategic Actions.
- » Collaborative programmes and projects for addressing plastic pollution that have been established by international and regional institutions in the region provide the platform for greater collaboration and synergies. They include, for example, ESCAP's Closing the Loop project, the National Plastic Action Partnership programme in Indonesia, the Sea of Solutions, and many others.
- » Elements for a stronger drive forward to combat plastic pollution are already in place, including: strong policy instruments and programmes both at national and regional levels; strong capacity in R&D and innovation; and partnership with industry.
- » Session One has reaffirmed the urgency to move away from the linear 'take-make-waste' model to a sustainable circular plastic economy built on the 4R principles: reduce, reuse, recycle, and renew.
- » There is a need to identify opportunities for strengthening and enlarging the contribution of nuclear science and technology in this common global endeavour, and NUTEC Plastics can provide a platform for cooperation.
- » The discussion and exchange in this Roundtable provide a strong momentum to move forward and for continued engagement and follow up action.
- » Concerted efforts, including synergy and partnership among various initiatives in mobilizing required resources, are needed to ensure effective intervention in addressing both the mitigation and monitoring aspects of plastic pollution.
- » The IAEA stands ready to continue the journey in contributing to solutions to the global plastic pollution.

# Proceedings of the Roundtable

## Session Two

### Partnerships for Sustainable Solution to Plastic Pollution



Ms Najat Mokhtar, IAEA Deputy Director General and Head of the Department of Nuclear Sciences and Applications. (Photo: D. Calma/IAEA)

Session Two was chaired by Ms Najat Mokhtar, IAEA Deputy Director General and Head of the Department of Nuclear Sciences and Applications. This session aimed to:

- » Highlight available technologies for recycling of plastic waste and monitoring plastic pollution in the ocean for scientifically supported decision making in the Asia and the Pacific Region;
- » Exchange information on existing programmes and practices (e.g., R&D, industrial practices, regional initiatives and activities for capacity building and advocacy); and
- » Explore opportunities for cooperation and partnerships in the context of NUTEC Plastics, including resource sharing and mobilization.

Ms Mokhtar opened the discussion with an overview of NUTEC Plastics and then invited the presenters to share their presentations on technological advancements.

### Session Two Presentations

-  **Nuclear technologies for upstream recycling of plastic waste**, Ms Melissa Denecke, Director of the Division of Physical and Chemical Sciences, IAEA
-  **Nuclear technologies for marine microplastic monitoring**, Ms Florence Descroix-Comanducci, Director, IAEA Environment Laboratories
-  **Identifying the hotspots**, Mr Stefanos Fotiou, Director, Environment and Development Division, ESCAP
-  **Environmental impacts of marine plastics**, Mr Tom Cresswell, Senior Research Scientist, ANSTO, Australia
-  **Monitoring the marine environment and assessing the plastic pollution challenges, and opportunities for regional collaboration**, Mr Nader Alawadhi, Executive Commissioner for International Cooperation, National Liaison Officer for the IAEA, Kuwait Institute for Scientific Research (on behalf of Mr Mane Al-Sudairawi, Acting Director-General, KISR)
-  **Development of recycling technology of waste plastic by radiation**, Dr Youn-Mook Lim, Principal Researcher, KAERI, Republic of Korea.
-  **Success in recycling**, Ms Chantara Theyy Ratnam, Senior Director, Malaysian Nuclear Agency

***“Joining forces with NUTEC Plastics can make a difference, improve knowledge, and develop solutions.”***

— Najat Mokhtar, IAEA Deputy Director General and Head of the Department of Nuclear Sciences and Applications



**Ms Melissa Denecke, IAEA Director of the Division of Physical and Chemical Sciences** presented the nuclear technologies available for the upstream recycling of polymer waste. She started by reiterating that only 9% of plastic waste generated is being recycled globally. Everyone can take part in reducing the amount of plastic waste. One example is reducing one’s use of single-use plastic. Ms Denecke explained how radiation technologies can help replace petroleum-based plastics with bio-based ones, improve recycling, and can be used to renew end-of-life plastics.

In brief, radiation can support and complement conventional recycling strategies by enabling better

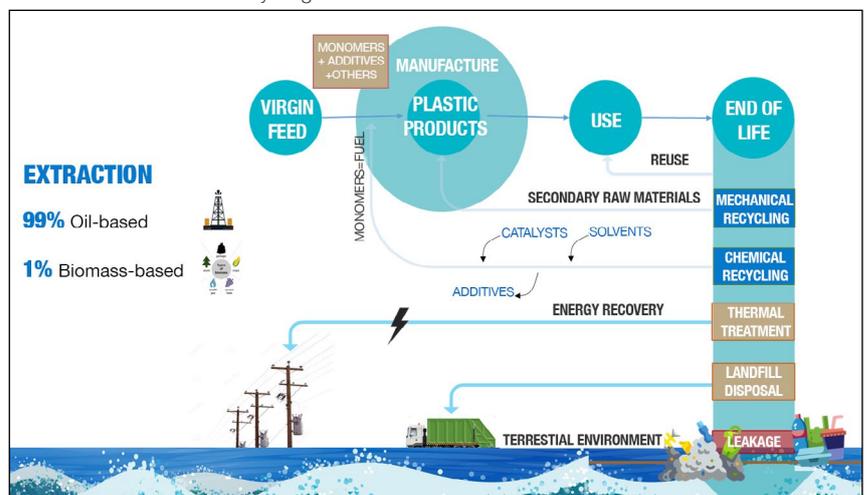
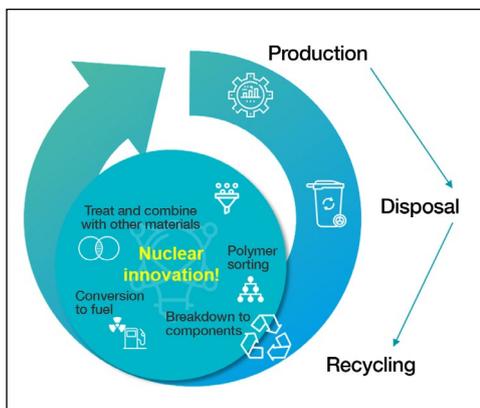
sorting of recycled plastic pellets according to the polymer type and breaking down polymers for generating new secondary products. Other innovative forms of recycling include converting plastic into fuel and feedstocks through irradiation assisted chemical recycling. Treating plastic to make composite materials with tailored properties is yet another innovative recycling strategy.

What exactly is ionizing radiation? Ms Denecke explained that it can be used to make and modify polymers in a green chemistry process at moderate conditions that save energy. She then went on to explain how the IAEA is assisting its Members States with these techniques.

Through technical meetings, publications, coordinated research projects (CRPs) and the TC programme, the IAEA enhances Member States capabilities in the application of innovative radiation techniques for reducing plastic waste volumes. Secondly, the IAEA plans to strengthen the capabilities of Member States to develop, construct, and operate pilot recycling plants, focusing on the conversion of plastic waste into novel/functional materials. Lastly, Ms Denecke expressed the need to form partnerships and expand activities to tackle the global plastic pollution problem.

Ionizing radiation can modify or breakdown polymer materials and thus contribute to mechanical or chemical recycling methods.

Nuclear innovation in the plastic value chain.





**Ms Florence Descroix-Comanducci, IAEA Director of the Environment Laboratories** spoke about NUTEC Plastics and Nuclear technologies for marine microplastic monitoring. She stated that microplastics are everywhere – air, water, dust and food are all important exposure routes. The smallest particles are the most dangerous.

Ms Descroix-Comanducci stressed the need to assess the sources, transport and sinks of marine microplastics in oceans; gain information on the fate of microplastics following ingestion by marine animals and humans; and lastly, the need to understand how microplastics interact with marine life. Nuclear science and technology can contribute to close these knowledge gaps.

Ms Descroix-Comanducci explained how to identify marine plastics hotspots. She noted that nuclear and isotopic techniques can characterize and monitor marine microplastics. Furthermore, she detailed that once plastics are discarded, they enter oceans from various sources, in particular rivers and urban rivers, fishing, wastewater treatment, etc.

Moreover, microplastics are found in the water column and also in sediments. These are known as legacy plastic pollution. Nuclear and isotopic techniques can be used to characterize and monitor plastics, which can help to identify marine microplastics hotspots by evaluating the

transfer from microplastic sources, how microplastics are carried by currents, etc.

Ms Descroix-Comanducci explained how stable isotopic and radiotracer techniques complement conventional methods to:

- » Quantify atmospheric and riverine inputs to the ocean,
- » Test and validate microplastics transport and transfer models,
- » Characterize processes in sediment and establish chronologies of environmental decay and impact, and
- » Test effectiveness of measure to improve management of plastic waste.

Next, Ms Descroix-Comanducci warned that chemicals leaching from plastics can affect coral reefs. Radiolabelled chemicals can help in evaluating sorption and leaching from microplastics, and stable isotope labelling can improve data accuracy.

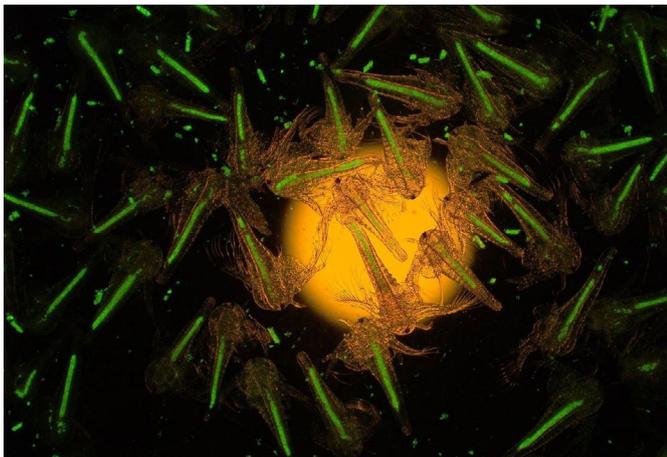
Ms Descroix-Comanducci further explained that radiotracing and radio-imaging microscopy can track the fate and transfer of microplastics in the food chain, and also assess the stress that microplastics can present for marine biology.

Coral exposed to microplastics: Tropical coral *Stylophora pistillata* in the presence of fluorescent microplastic. (Photo: Francois Oberhaensli)





Experiment on the effect of microplastic on calcification in the tropical coral *Stylophora pistillata*. (Photo: Francois Oberhaensli)



Nauplii of brine shrimp *Artemia salina* after 3 hours of feeding with fluorescent nanoplastic. (Photo: Francois Oberhaensli)

Regarding the next steps, Ms Descroix-Comanducci said that the Monaco laboratory is planning on the following:

- » To enhance the marine laboratory capacities; leverage partnerships to facilitate wider utilization of isotopic techniques;
- » To develop guidelines and protocols for sampling, quantification and characterization; and, lastly
- » To establish a NUTEC Plastics Monitoring Network for exchange of data, knowledge and best practices.



**Mr Stefanos Fotiou, ESCAP Director of the Environment and Development Division**, shared

crucial information about plastic pollution hotspots in the region. He defined a hotspot as a location where there is a relatively high concentration of the measure in question.

Mr Fotiou described what the Closing the Loop project wants to achieve: Cities in ASEAN use innovative and smart technology to monitor, assess, and sustainably manage plastic waste. Furthermore, cities develop policy and investment strategies to apply circular economy approaches in managing plastic.

Ways to achieve that include a baseline assessment, digital mapping tools, and city action plans. Partners include Danang, ESCAP, IGES, IUCN, and Japan Space Systems.

Mr Fotiou then described the methods for identifying hotspots, which include primary data collection fed into the Plastic Pollution Calculator. This uses material flow analysis to answer questions like: Which products end up as water pollutants? Where in the waste management process did they leak into the environment? Which areas are the hotspots?

Mr Fotiou also shared a method for identifying hotspots, which includes using remote sensors to record images that are then stored on a platform to produce hotspot maps. Hotspots could help inform action plans, such as

identifying policy priorities and investments strategies, he said.

Mr Fotiou then shared an action plan that everyone can practice, which includes reducing the use of plastic bags, reduce illegal dumping, improve waste storage and more.



Closing the Loop is an ESCAP project that aims to reduce the environmental impact of ASEAN cities by addressing plastic waste pollution entering the marine environment.

Mr Cresswell said that ANSTO continues to have strong collaborative links with the IAEA Radioecology Laboratory in Monaco for radioecology and ecotoxicology research via individual research projects. ANSTO also collaborates with other laboratories in Cuba and Hong Kong, as well as other radioecology laboratories located in China, Indonesia, Philippines, Japan, Malaysia and Thailand.

ANSTO has also done collaborative work in the United States using small angle neutron scattering (SANS) to explore the nature of protein corona formed on polystyrene nano-plastics. The aim is to better understand the nature of this emerging source of nanomaterials, which is being produced by standing stocks of plastic marine debris in the world's oceans.

As previously noted by other speakers, Mr Cresswell reiterated that marine microplastic is a transboundary issue that no single nation or organization can solve. He highlighted that we can make a difference if we join forces, and ANSTO is ready to contribute. There is a potential for capacity building and technology transfer through ANSTO as the region's IAEA Nuclear Science Collaborating Centre.

On a lighter note, ANSTO is also collaborating with the author of a children's book to raise awareness of marine plastics issues among the younger generation.

There is need to raise awareness of marine plastic pollution issues among the younger generation. (Photo: Osaka Blue Ocean Vision)



**Mr Tom Cresswell, ANSTO Senior Research Scientist**, spoke about regional work related to plastics and its relevance in the search for solutions, as well as collaborations in the region and with the IAEA. Mr Cresswell posed the question: What effect do small pieces of plastic have on marine animals and plants? He then went on to explain the concept of ecotoxicology.

He also explained that some of the work at ANSTO includes:

- » Sorption of radionuclides to microplastics and
- » Nuclear techniques in environmental plastics research.



**Mr Nader Alawadhi, Executive Commissioner for International Cooperation, National Liaison Officer for the IAEA, Kuwait Institute for Scientific Research (KISR)** spoke on behalf of Acting Director General, Mr Mane Al-Sudairawi and presented Kuwait’s programme for monitoring the marine environment and assessing the plastic pollution challenges. He noted that Kuwait has signed two Practical Agreements with the IAEA, mostly in the marine sciences. In 2019, Kuwait had the privilege to sign a Collaborative Centre agreement with the IAEA.

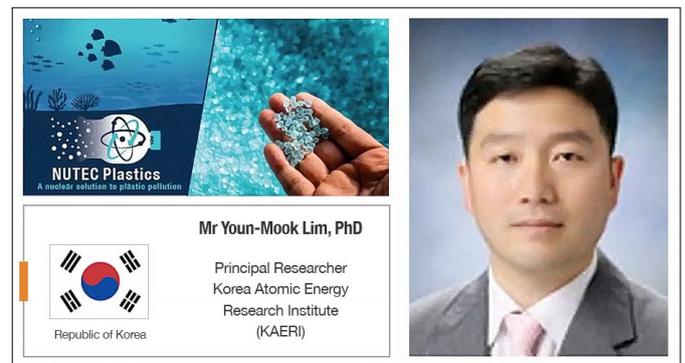
Mr Alawadhi acknowledged the importance of tackling the plastic pollution problem. He noted that Kuwait is collaborating with the IAEA and its Monaco laboratory to undertake assessments. He then presented the 56-meter research vessel, RV Mostakshif, equipped with state-of-the-art facilities, clean rooms, and laboratories used for marine microplastics monitoring. He stated that when it comes to collaboration, Kuwait would like to

The 56-meter RV Mostakshif equipped with state-of-the-art facilities, clean rooms, and laboratories. (Photo: Dr Nader Alawadhi, Kuwait Institute for Scientific Research, KISR)



advocate the establishment of a microplastics network that could start as an Asia-Pacific network. The Asia and the Pacific region accounts for over half of the world’s population with several large economies with excessive resources and massive quantities of plastic waste, he noted.

Lastly, Mr Alawadhi said Kuwait is enthusiastic about sharing its expertise to help make verifiable forms of scientific strategies to manage microplastics.



**Mr Youn-Mook Lim, Principal Researcher at the Korea Atomic Energy Research Institute (KAERI)**

presented the development of recycling technologies of plastic waste by radiation. Upon taking the floor, Mr Lim presented the purpose of the E-Beam Irradiation Centre for large commercialization or upscaling research.

The recent applications involve developing composite for automobiles and enhancing the wind turbine blade properties, aerospace materials and cables for extreme environments. Some advantages include:

- » A shorter fabrication time,
- » Lower temperatures involved in the process, and
- » Superior mechanical strength.

Mr Lim then talked about radiation recycling for polyurethane waste that represents a large market. He explained that this type of recycling will contribute considerably to mitigating plastic pollution.



**Ms Chantara Theyv Ratnam, Senior Director of the Malaysian Nuclear Agency** spoke about the success of polymer waste recycling using nuclear technology. Ms Theyv Ratnam presented the radiation-induced reactions in polymers waste that may contribute to the recycling process. She explained the benefits of radiation technology when applied to Polytetrafluoroethylene (PTFE) recycling, which allows the particle size to be reduced according to the desired application.

Ms Theyv Ratnam then presented the process of PTFE recycling by using radiation on a commercial scale in Apar, India. The micro-fine PTFE powder is used for

industrial lubricants and for mixing with virgin polymers. She presented the benefits that degradation by radiation processing have over conventional methods, which include saving energy, cleaner modification, and quicker processing time. Next, Ms Theyv Ratnam presented another rubber recycling application used from post-consumed tires to produce secondary products with enhanced combabilities for diverse sealing applications.

In conclusion, Ms Theyv Ratnam stated that ionizing radiation is very useful for processing waste polymers because:

- » It is a highly penetrating process,
- » It is able to reduce the molecular weight by scission,
- » It is able to enhance and improve the compatibility, especially when amalgamating different polymers,
- » It is an efficient tool to produce grafted products with unique properties and tailored functions, and
- » It is a rapid, uniform, and clean process.



IAEA Director General Rafael Mariano Grossi with Ms Najat Mokhtar at the Roundtable. (Photo: Omar Yusuf /IAEA)

In her observation following the presentations, Ms Najat Mokhtar noted that the different institutions working in the region show, in different ways, the extent to which expertise, knowhow, research and development, and innovative capacity already exists in the Asia and Pacific region – be it on marine microplastics or radiation technology. In her view, these are ideal conditions to further advance innovations and actions against plastic pollution, involving governments, research institutions, regional organizations and the private sector.

She added that the IAEA stands ready to support countries and governments in the region in their efforts against plastic pollution. These countries will also play a leading role in implementing NUTEC Plastics. Ms Najat Mokhtar then proceeded to introduce and invite four brief oral interventions, as well as interventions received from the Roundtable’s online chat function.

## Oral Interventions




**Mr Jordan F. Madrid PhD**  
Supervising Science Research Specialist  
Philippine Nuclear Research Institute (PNRI)

Philippines

**Mr Jordan Madrid, Supervising Science Research Specialist from Philippine Nuclear Research Institute (PNRI)** commented on the radiation processing technology that the PNRI is promoting as a solution to the plastic waste problem. This initiative includes a strong national public-private collaboration, with a private company doing the non-biodegradable plastic waste recycling. The DOST-Industry Technology Development Institute is a government institution which houses a polymer processing facility. Together with the PNRI, the institute is implementing studies for the production of fiber-reinforced composites and materials with enhancing properties.




**Ms Kasinee Hemvichian, PhD**  
Senior Nuclear Scientist  
Thailand Institute of Nuclear Technology (TINT)

Republic of Thailand

**Ms Kasinee Hemvichian, Senior Nuclear Scientist from the Thailand Institute of Nuclear Technology** commented on the potential for applying radiation technology in recycling plastics, and the gaps in the conventional recycling methods that could be covered by radiation technology. She stated that it is not easy

to convince private companies to include radiation processing due to the high initial capital costs for the installation. But she also noted that if businesses see that products with a longer lasting lifetime can be made from this process, they may be willing to get on board. Lastly, she stated that it is likely that nuclear technology will be well accepted by regulatory bodies.




**Mr Doug Woodring**  
Founder and Managing Director  
Ocean Recovery Alliance

**Mr Doug Woodring, Founder and Managing Director of the Ocean Recovery Alliance** said the Ocean Recovery Alliance has been working on this topic for over 12 years in Hong Kong and has done work with both the United Nations and World Bank. He further commented on the importance of bringing together new ways of thinking, technologies, creativity, collaboration, and initiatives to help improve the ocean environment.




**Mr Cameron Diver**  
Deputy Director-General  
Operations and Integration  
Pacific Community (SPC)

**Mr Cameron Diver, Deputy Director-General Operations and Integration at the Pacific Community (SPC)** gave the SPC's perspective on the challenges of plastics pollution to the sustainable management of marine resources and the partnership



Brine shrimp *Artemia salina* after 3 hours of feeding with fluorescent microplastics. (Photo: Francois Oberhaensli)

opportunities. He highlighted recent studies which estimate that around 81% of ocean plastics come from Asian rivers. For example, the Philippines alone contributes to around one-third of the global total. He explained that to better understand and manage plastics in the Pacific, we need to better map the ocean currents that are bringing allochthonous plastics from Asia and elsewhere. This can also potentially involve the use of proxies that can be monitored remotely to get some idea of plastic influx, and therefore the actions that need to be taken to address the challenge of plastic pollution.

Mr Diver noted that what is clear in the Pacific is that plastic pollution impacts the health of the Pacific Ocean and its marine resources, but with spatial differences. For example, plastics reach the sea from the coast but can travel long distances with oceanic currents. Some plastics will accumulate on the sea floor and others will float in the ocean, and both threaten marine life. Mr Diver warned that plastic pollution is a direct threat to the sustainability of marine resources. It causes the death of marine organisms and contamination of the flesh which is, in turn, problematic for edible species. And it threatens protected species, such as turtles or seabirds.

He explained that at SPC, several projects study the impact of plastic on the marine environment and

marine resources. These project include the analysis of plastic contamination in tuna flesh (Project TIPTOP, fonds Pacific), as well as a survey of the movement and stranding of fish aggregating devices (FAD) used in the tuna industry. With regards to the latter, SPC is engaging with industry partners to examine bio-degradable FAD materials to mitigate impacts. SPC is also working with some Member States to help estimate the volume of plastic waste in aquaculture, and to repurpose, recycle and manage such waste in a structured way.

Mr Diver noted that these are just some examples of the challenges we face. And to respond we need global partnerships, from science, industry, coastal communities, cities, governments, the international community. Much like climate change, the challenge of plastic pollution needs a whole of society approach.

He highlighted that there is a real opportunity for partnership. For example, through technical cooperation and via the IAEA Marine Laboratories, partnerships can be formed to help address some of these issues, and conjugate efforts and networks. This would deepen the science base for evidence-based action, cooperation and policy decisions in the Pacific region.

Nauplii of brine shrimp *Artemia salina* three hours after being fed with fluorescent microplastics. (Photo: Francois Oberhaensli)



## Interventions via the Online Chat Function

**Ms Suchin Udomsomporn, RCA Chairperson, Thailand** said the RCA appreciates IAEA assistance to Member States in addressing the global challenges of plastic pollution. The collaborative partnerships in research; the technical cooperation projects on plastic recycling using radiation technology; and an assessment of potential impacts of microplastics on marine ecosystem using isotopic tracing techniques will comprehensively support sustainable development and the bio-, circular- and green economy for the region.

**Mr Bilal Nsouli, ARASIA Chairperson, Lebanon** stressed the need for sustainable measures to limit plastics pollution. Like any other region, ARASIA countries are facing this challenge and needs to join efforts to find a solution to address this challenge. The IAEA's different modalities, be it through TC projects or Coordinated Research Projects (CRPs), are strong tools to address plastic pollution. The CRPs are important in assisting the scientific and industrial communities in working together to understand and find concrete solutions to plastic pollution. The TC programme is also a strong vehicle which can support the implementation of NUTEC Plastics. The ARASIA TC programme will address this problem under a flagship project to address the transboundary issue of plastic pollution.

**Mr Pill Hwan Park, Director of the RCA Regional Office (RCARO)** stated that plastic pollution has been a serious concern for the global community, one that needs immediate and long term solutions across the region. By engaging with a diverse range of stakeholders, governments, international organizations, civil society and the private sector, 'inclusive partnership' may be initiated based on a shared understanding of the common goal of fighting against plastic pollution. Raising awareness on the advantages of nuclear and isotopic techniques would be essential in facilitating these partnerships. This is the key element that RCARO puts emphasis on in exploring partnerships for the RCA.

**Mr Ákos Kőszegváry, Industrial Development Officer from UNIDO** noted that in June 2020, the IAEA and UNIDO signed an agreement on cooperation in the area of peaceful uses of nuclear technology for inclusive and sustainable industrial development. Since then, both agencies had various information exchanges and technical discussions on potential joint programmes on marine plastic pollution, as well as on circular approaches for the plastic value chain.

The NUTEC Plastics Roundtable for the Asia and the Pacific region took place on both live and virtual platforms. (Photo: Omar Yusuf/IAEA)



## Session Two: Summary and Remarks

Ms Najat Mokhtar summarized and concluded Session Two with the following remarks:

- » There is progress and advancement in the development and utilization of nuclear science and technology to address plastic pollution in the region, both in the fields of radiation and recycling, as well as in marine plastic monitoring.
- » There is a need for continued technological innovation and scientific development, in order to maximize the benefits of nuclear solutions to plastic pollution.
- » Several countries have developed good R&D infrastructure and promising research products that are being evaluated to be upscaled. Many countries have also established long-standing cooperation with industry and are actively engaged in regional initiatives on plastic pollution.
- » Now is the time to identify specific areas for cooperation to further strengthen joint efforts in addressing plastic waste pollution. These efforts need to focus on hot spots and the readiness level of potential and existing R&D products towards upscaling. The IAEA stands ready to support its Member States and partners through NUTEC Plastics – be it with regard to enhancing national marine monitoring capacities and establishing a marine microplastic monitoring network, or with the establishment of pilot plants for plastic waste recycling.
- » Nuclear science and technologies add value to existing programmes and initiatives that address plastic waste pollution. The plastic waste challenge is simply too big to not consider the opportunities that nuclear science and technology offers.
- » NUTEC Plastics – with its modular programmes and delivery mechanisms – provides a platform for facilitating joint efforts and mobilizing resources that address plastic pollution.
- » In a spirit of cooperation, NUTEC Plastic is implemented through established delivery mechanisms, such as research and technical cooperation projects or the Peaceful Uses Initiative.

Ms Najat Mokhtar called for continuing the dialogue and keeping the momentum, working in partnership to combat this global challenge, and finding solutions to plastic pollution that complement other international and regional efforts to support transitioning towards a circular plastic economy. Plastic pollution is a transboundary issue that no single nation or organization can solve. Joining forces with NUTEC Plastics can make a difference.

## Proceedings of the Roundtable

### Session Three Wrap Up and Way Forward



Mr Hua Liu, IAEA Deputy Director General and Head of the Department of Technical Cooperation (Photo: D. Calma/IAEA)

Mr Hua Liu, IAEA Deputy Director General and Head of the Department of Technical Cooperation called the meeting to order and led the wrap up session which aimed to concretize follow-up actions through collaborative programmes and a continuum of activities.

As the first item in the session, Ms Dechen Tsering, Director for Asia Pacific Region, UNEP provided her closing remarks and vision for the way forward. In her remarks, she said that plastic pollution is a cross-sectoral problem created by us. To reverse this, we must join hands and support decision making and transformational changes towards a safe, clean, healthy and sustainable environment. She pointed out that we can reverse the plastic pollution problem by discovering and nurturing new technologies and research that will bring more insight into environmental problems by promoting open access to the latest data, and by creating public consciousness around plastic pollution.

Mr Hua Liu then concluded the session with his closing remarks, outlining the way forward and several follow-up actions from the Roundtable discussions.

#### Session Three Items

- » Remarks by Ms Dechen Tsering, Director for Asia Pacific Region, UNEP
- » Way Forward and Conclusions by Mr Hua Liu, Deputy Director-General, Head of the Department of Technical Cooperation, IAEA

***“This Roundtable marks the start of activities under NUTEC Plastics that will support the continuing development of new solutions to address plastic pollution, with a particular focus on the unique contributions of nuclear technology.”***

— Hua Liu, IAEA Deputy Director General and Head of the Department of Technical Cooperation

Mr Hua Liu said that the Roundtable event signified clearly how plastic pollution hinders the achievement of the Sustainable Development Goals, its consequences for our oceans, and its impact on the food chain and on human health. He said that the discussions highlighted the urgent need to move away from the way we use plastic today. We are creating mountains of plastic waste in our lands, rivers and oceans; we need to produce and use plastic materials in a far more sustainable way; and we have to step away from the linear ‘take-make-waste’ model, towards a sustainable circular economy for plastics built on the 4R principles: reduce, reuse, recycle and renew, Mr Hua Liu said.

He pointed out that various initiatives, programmes and projects launched by international and regional institutions, as well as by countries in the region, are converging towards this approach, and gearing up to find and apply sustainable solutions to plastic pollution. Furthermore, distinguished speakers have emphasized that science, technology, innovation and partnership are key to finding these sustainable solutions, he added.

Through NUTEC Plastics, the IAEA will contribute to the global response towards a sustainable solution to plastic pollution. NUTEC Plastics builds on the IAEA’s efforts to deal with plastic pollution through recycling, using radiation technology, and marine monitoring using isotopic

Participants listening to Mr Hua Liu, IAEA Deputy Director General and Head of the Department of Technical Cooperation delivering his closing remarks. (Photo: Bridget Carter/IAEA)



tracing techniques, through its portfolio of existing and planned IAEA research and technical cooperation projects. NUTEC Plastics builds on the comparative advantages and added value that the IAEA can offer in using nuclear techniques. Its approach foresees the application of nuclear techniques both upstream and downstream. Radiation technology can improve plastic recycling, and isotopic tracing techniques are key to monitoring the behaviour and fate of microplastics in the seas and oceans.

Through NUTEC Plastics, the IAEA seeks synergies and partnerships with other international efforts to address plastic pollution, Mr Hua Liu said. It aims to assist Member States to integrate nuclear techniques into their efforts to address plastic pollution in a comprehensive way. As noted in this Roundtable, the regional and global actions outlined in ASEAN’s Bangkok Declaration on Combating Marine Debris, the Osaka Blue Ocean Vision and the various international programmes of UNEP and ESCAP, provide important frameworks, he said. The IAEA’s contribution will strengthen the research capacity and the application of scientific knowledge to combat marine debris, supporting science-based policy and decision making.

Mr Hua Liu said that this Roundtable marks the start of activities under NUTEC Plastics that will support the continuing development of new solutions to address plastic pollution, with a particular focus on the unique contributions of nuclear technology. It aims to strengthen partnerships for a coordinated and solution-oriented approach to global efforts.

He reminded participants that the IAEA already has in place various modalities that can support these activities, ranging from coordinated research projects to field applications of research results through the technical cooperation programme. Through NUTEC Plastics, the IAEA aims to enlarge its contribution in identifying and applying sustainable solutions to plastic pollution. Mr Hua Liu reiterated what IAEA Director General Grossi said: “This roundtable is also the first of a series of similar

events with other regions to discuss solutions to plastic waste pollution and to further explore opportunities for synergies, partnerships and actions.” He pointed out that the IAEA foresees several follow-up actions from the Roundtable discussions. *(See box below.)*

In conclusion, Mr Hua Liu acknowledged the cooperation of IAEA Member States and partners – including ASEAN,

ESCAP and UNEP – for making the NUTEC Plastics Roundtable for the Asia and the Pacific region become a reality. He also acknowledged the coordinated efforts of various IAEA Departments and Divisions.

Finally, Mr Hua Liu took the opportunity to reiterate his appreciation for the support of the participants and their important contributions.

## Follow-up Actions from the Roundtable Discussions

- » Strengthen the implementation of ongoing regional technical cooperation project on plastic recycling to help Member States to consolidate ongoing studies, and to promote pilot plants and, ultimately, demonstration scale plants for eventual commercial scale dissemination, based on Member States needs and requests.
- » Move forward the development of a new technical cooperation project that focuses specifically on monitoring microplastics in the marine environment. This region-specific project on the marine environment, proposed for Asia and the Pacific, aims to enhance regional understanding of the abundance and impact of marine plastic pollution by strengthening the capacities of existing laboratories and institutions to monitor the marine environment.
- » Support research and development, through IAEA laboratories and IAEA Collaborating Centres, to fine tune the technology and methodologies and adapt them to the needs of Member States in a cost-effective manner.
- » Use different fora to enhance awareness and address plastic pollution; engage with other partners, including the private sector, at the national and regional level; and promote greater collaboration for upscaled, impactful projects in the region, ensuring synergies with ongoing initiatives to converge efforts towards a common goal: A healthy planet for today and for future generations.
- » Initiate measures to establish a NUTEC Plastics Monitoring Network for the sustainable management of marine plastic pollution; put in place immediate measures to procure basic equipment for marine monitoring laboratories; and provide the necessary support to ensure that existing laboratories have adequate equipment and trained human resources.
- » Continue engagement with institutions and stakeholders of the many important national, regional and global initiatives and projects that have discussed together. The IAEA's goal is to explore and forge formal cooperation, as well as to add value, providing the scientific and technological dimension to these initiatives.
- » Join hands to plan and organize a webinar dedicated to explaining nuclear technologies relevant to the treatment of plastic waste and monitoring/assessing the impact of marine microplastics, and to addressing more technical questions.

## Roundtable Attendees

Participants from International Organizations		
Name	Country/Region	Organization
Thomas Bell	Philippines	Partnerships in Environmental Management for the Seas of East Asia
Vong Sok	Indonesia	ASEAN
Rachana Kong	Cambodia	UNIDO
Shuang Zhu	Kenya	United Nations
Nilgun Tas	Austria	UNIDO
Kakuko Yoshida	Thailand	ASEAN
Joy Sinay	Indonesia	ASEAN
Hyunkyong Jeon	Republic of Korea	RCARO-RCA
Anjali Acharya	Singapore	World Bank
Tonilyn Lim	China	UNIDO
Annisa Wahidah	Indonesia	ASEAN
Gilang Wahyu Kuntoaji	Indonesia	ASEAN
Mauliyati Nuraini Slamet	Indonesia	World Bank
Raymund Quilop	Indonesia	ASEAN
Thao Nguyen	Indonesia	ASEAN
Saïl Dutt	Indonesia	UNIDO
Janet Salem	USA	United Nations
Jacqueline Chang	Malaysia	Not International
Konstantinos Elememoglou	Belgium	EU
Michele Chew	Indonesia	Unknown
Narin Sok	Cambodia	UNIDO
Natalia Derodofa	Indonesia	ASEAN
Peter Smalley	Austria	UNIDO

Permanent Mission Attendees		
Name	Title/Institute	Country
Qaseem Muhtat	Permanent Mission to the IAEA	Afghanistan
Xiaoyang Peng	Permanent Mission to the IAEA	China
Daeki Kim	Permanent Mission to the IAEA	Republic of Korea
Youngmin Bae	Permanent Mission to the IAEA	Republic of Korea
Andrea Lazaro	Permanent Mission to the IAEA	Philippines
Gaetan Castillon	Permanent Mission to the IAEA	Sri Lanka
Amer Manzoor	Permanent Mission to the IAEA	Pakistan
Wina Kbri	Permanent Mission to the IAEA	Indonesia
Mohd Fazil Zakaria	Permanent Mission to the IAEA	Malaysia
Jarrod Powell	Permanent Mission to the IAEA	Australia
Margot Gibson	Permanent Mission to the IAEA	New Zealand
Le Duy Tran	Permanent Mission to the IAEA	Viet Nam
Toshiaki Mizuno	Permanent Mission to the IAEA	Japan
Brami Van Crombrugge	Permanent Mission to the IAEA	Japan
Guk Qaiser Sarwani	Permanent Mission	Pakistan
Takeshi Hikihara	Permanent Mission to the IAEA	Japan
Masayuki Sorimachi	Permanent Mission to the IAEA	Japan
Shen Xinyuan	Permanent Mission to the IAEA	China
Nur Asida Omar	Permanent Mission to the IAEA	Malaysia
Atsushi Kuabara	Permanent Mission to the IAEA	Japan
Asako Aoyagi	Permanent Mission to the IAEA	Japan
Jiranut Pitakannop	Permanent Mission to the IAEA	Thailand
Tetsuro Sone	Permanent Mission to the IAEA	Japan
Akio Yuguchi	Permanent Mission to the IAEA	Japan
Felicia Wong	Permanent Mission to the IAEA	Singapore
Deena Amatong	Permanent Mission to the IAEA	Philippines
Dimas Irawan	Permanent Mission to the IAEA	Indonesia
Rachael Parrish	Permanent Mission to the IAEA	USA
Lili Xiao	Permanent Mission to the IAEA	China
Bandar El-Eryani	Permanent Mission to the IAEA	Yemen
Darmansjah Djumala	Permanent Mission to the IAEA	Indonesia
Kiichiro Iwase	Permanent Mission to the IAEA	Japan
Tah Jiun Tan	Permanent Mission	Singapore

The coordinated efforts of staff from various IAEA departments and divisions helped make the Roundtable discussion a reality. (Photo: Omar Yusuf/IAEA)





Photos 1-4: Onsite participants at the NUTEC Plastics Roundtable that was held at IAEA headquarters in Vienna, Austria on 18 May 2021. Ms Jane Gerardo-Abaya, Director of the IAEA Technical Cooperation Division for Asia and the Pacific with IAEA Director General Rafael Mariano Grossi. (Photos: D. Calma/IAEA)

# Agenda of the Roundtable for the Asia and the Pacific Region

18 May 2021

## 08:00 – 09:00 Session 1 - Plastic Pollution: Challenges and the Need for Global Action

- Opening and welcome remarks by Ms Jane Gerardo-Abaya, Director of the Division of Technical Cooperation in Asia and the Pacific, IAEA
- Introductory video presentation on NUTEC Plastics
- Remarks by Mr Rafael Mariano Grossi, IAEA Director General
- Keynote speech by Mr Peter Thomson, UNSG's Special Envoy for the Ocean
- Roundtable discussion with Distinguished Panelists, Chaired by IAEA Director General

Panelists include::

- HE Mr Dato Lim Jock Hoi, Secretary General, ASEAN
- HE Mr Huang Runqiu, Minister of Ecology and Environment, Minister and Secretary, China (video message)
- Mr Zhang Zhifeng, Deputy Director General, Department of Marine Ecology and Environment, Ministry of Ecology and Environment
- HE Ms Siti Nurbaya Bakar, Minister of Environment and Forestry, Indonesia
- HE Mr Hiroyoshi Sasagawa, State Minister of the Environment, Japan (video message)
- HE Mr Tomohiro Kondo, Vice-Minister for Global Environmental Affairs, Ministry of Environment, Japan
- Ms Armida Salsiah Alisjahbana, Under Secretary-General of the UN and Executive Secretary, ESCAP (video message)
- Ms Dechen Tsering, Director for Asia Pacific Region, UNEP

## 9:00 – 9:15 Break and slideshow on NUTEC Plastics

## 09:15 – 10:45 Session 2 - Partnerships for Sustainable Solutions to Plastic Pollution

Presentations and discussion chaired by Ms Najat Mokhtar, Deputy Director General, Head of the Department of Nuclear Sciences and Applications, IAEA :

- Innovation to mitigate plastic waste, by Ms Melissa Denecke, Director of the Division of Physical and Chemical Sciences, IAEA
- IAEA's Nuclear Techniques for tackling marine plastics, by Ms Florence Descroix-Comanducci, Director, IAEA Environment Laboratories
- Closing the Loop, by Mr Stefanos Fotiou, Director, Environment and Development Division, ESCAP
- Programme of Kuwait for monitoring the marine environment and assessing the plastic pollution challenges and opportunities for regional collaboration, by Mr Nader Alawadhi, Executive Commissioner for International Cooperation, Kuwait Institute for Scientific Research (on behalf of Mr Mane Al-Sudairawi, Acting Director General-General, Kuwait Institute for Scientific Research).
- Environmental impacts of marine plastics, by Mr Tom Cresswell, Senior Research Scientist, IAEA Collaborating Center / ANSTO, Australia.
- Development of recycling technology of waste plastic by radiation, by Dr Youn-Mook Lim, Principal Researcher, KAERI, Republic of Korea
- Success in recycling of polymer wastes using nuclear technology, by Ms Chantara Thevy Ratnam, Senior Director, Malaysian Nuclear Agency

Short oral interventions:

- Mr Jordan F. Madrid, Supervising Science Research Specialist, Philippine Nuclear Research Institute
- Ms Kasinee Hemvichian, Senior Nuclear Scientist, Thailand Institute of Nuclear Technology
- Mr Doug Woodring, Founder and Managing Director, Ocean Recovery Alliance
- Mr Cameron Diver, Deputy Director-General, Operations and Integration at the Pacific Community (SPC)

Online interventions:

- Ms Suchin Udomsomporn, RCA Chairperson, Thailand
- Mr Bilal Nsouli, ARASIA Chairperson, Lebanon
- Mr Pill Hwan Park, Director, RCA Regional Office
- Mr Ákos Kőszegváry, Department of Environment, UNIDO

## 10:45-11:00 Session 3: Wrap Up and Way Forward

- Remarks by Ms Dechen Tsering, Director for Asia Pacific Region, UNEP
- Way forward and conclusions by Mr Hua Liu, Deputy Director-General, Head of the Department of Technical Cooperation, IAEA

**Prepared by the IAEA**

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