



IAEA

International Atomic Energy Agency
Atoms for Peace and Development

IAEA Overview on Radiation Science and Technology

May 2023

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Department of Nuclear Sciences and Applications
International Atomic Energy Agency

Three Pillars of the IAEA Mandate



Science & Technology



Safety & Security



Safeguards & Verification



Health

Environment

Water

Food

Industry

Radiation Technology

B E T T E R S T E R
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IAEA mechanisms

NA Programme

TC Programme



R&D

- Laboratories
- CRPs
- CCs
- TMs
- CMs



Validation

- CRPs
- Pilot plants



Tech Transfer
TC Projects (WS,
RTC, FE, SV, EM)
Education &
Training



Health Applications

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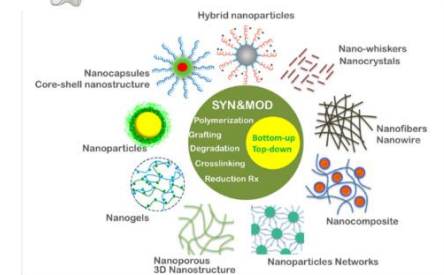
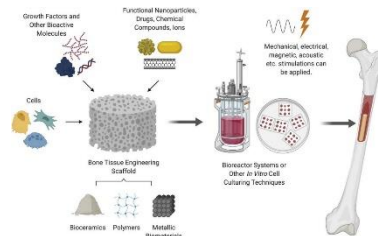
• Sterilization of Healthcare Products

- Decontamination of raw materials
- Medical Devices, Tissue allografts, Packaging Materials, Toys



• Advanced biomaterials

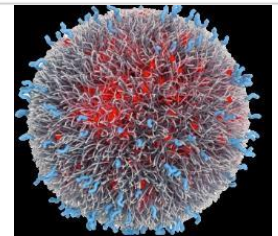
- Biomaterials, functionalised polymers
- Nanomaterials for medical and industry



F22070: Enhancing the Beneficial Effects of Radiation Processing in Nanotechnology (2019 -2023)

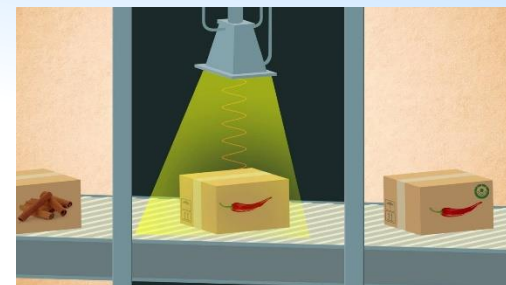
F23035: Radiation Effects on Polymer Materials Commonly Used in Medical Devices (2021~2025)

F22079: Biomaterials for sustainable health care (2024~2028)



Food applications

- Irradiation for Sanitary purposes
- Phytosanitary treatment
- Sterile Insect Technique (SIT)
- Surface disinfestation
- Mutation breeding

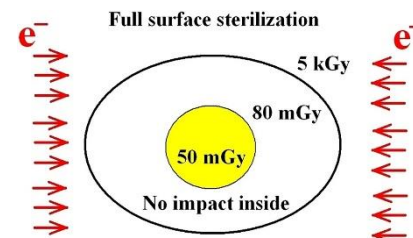


D24015 Radiation-induced Crop Diversity and Genetic Associations for Accelerating Variety Development

D44004 Mosquito Irradiation, Sterilization and Quality Control

D61026 Phytosanitary Treatment of Food Commodities and Promotion of Trade

D61025 Innovating Radiation Processing of Food with Low Energy Beams from Machine Sources



Industrial Application

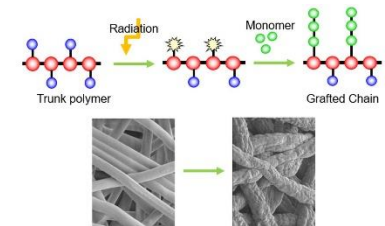
- **Cross-linking of Polymer**
 - Improve mechanical and thermal property
 - Wire and cable production, Surface Curing
- **Coating/curing on surface**
- **Grafted polymers**
 - Provides new functional properties
 - Heavy Metal adsorbent
- **Degradation of Polymers**



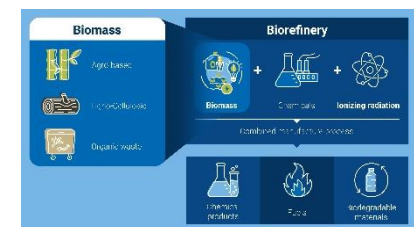
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RADIATION

F22072: Development of Grafted Membrane for Cleaner and Sustainable Energy (2019~2023)



F22081: Strengthening the Use of Biomass for Synthesis of Bioplastics and Other Compounds, Using Radiation Technology (2023-2027)



Preservation of Cultural Heritage

- **Disinfection of Cultural Heritage**

- Microbial decontamination
- Controlled biocidal effects



- **Consolidation of Porous materials**

- Improve the mechanical properties of porous material



F22082: Development and Implementation of Cultural Heritage Preservation using Ionizing Radiation Technology (2023- 2027)



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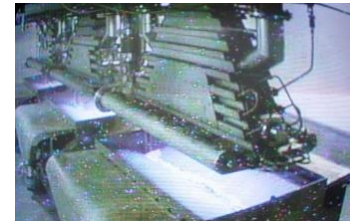
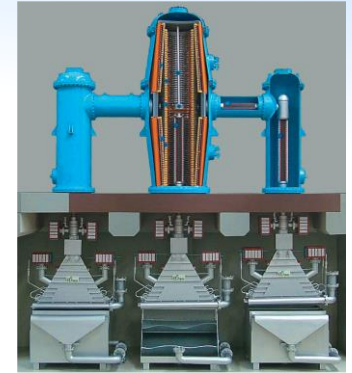
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Environmental Applications

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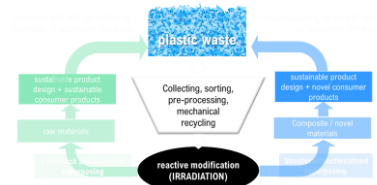
- Flue Gas Treatment
- Industrial Wastewater Treatment
- Sludge Hygienisation
- Recycling of Wastes



F23033: Radiation Inactivation of Bio-hazards Using High Powered Electron Beam Accelerators (2018 -2022)

F23034: Removal of Emerging Organic Pollutants in the Wastes by Radiation (2019 -2023)

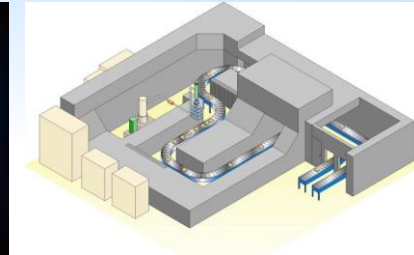
F23036: Recycling of polymer waste for structural and non-structural materials (2021~2025)



Irradiation Facilities and Quality Management

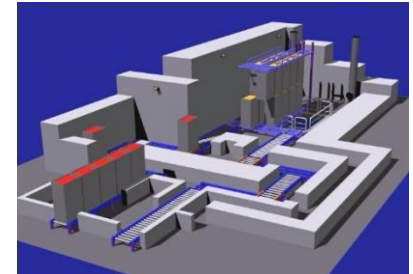
• Radiation Sources:

- Radioisotope sources (Gamma ray)
- Radiation Generators (EB, X ray)



• Quality Management:

- Inter-Comparison Dosimetry
- IQ, OQ, PQ

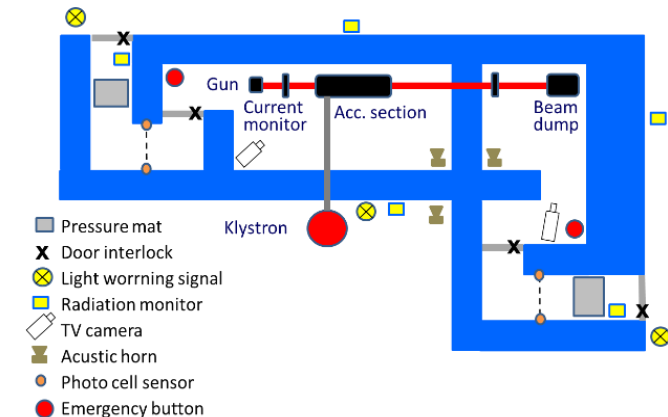


• Safety and Security:

- Maintenance and Upgrade
- Safety program implementation

• Guidelines:

- Setting-up facilities
- Feasibility studies



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Three Flagship Initiatives



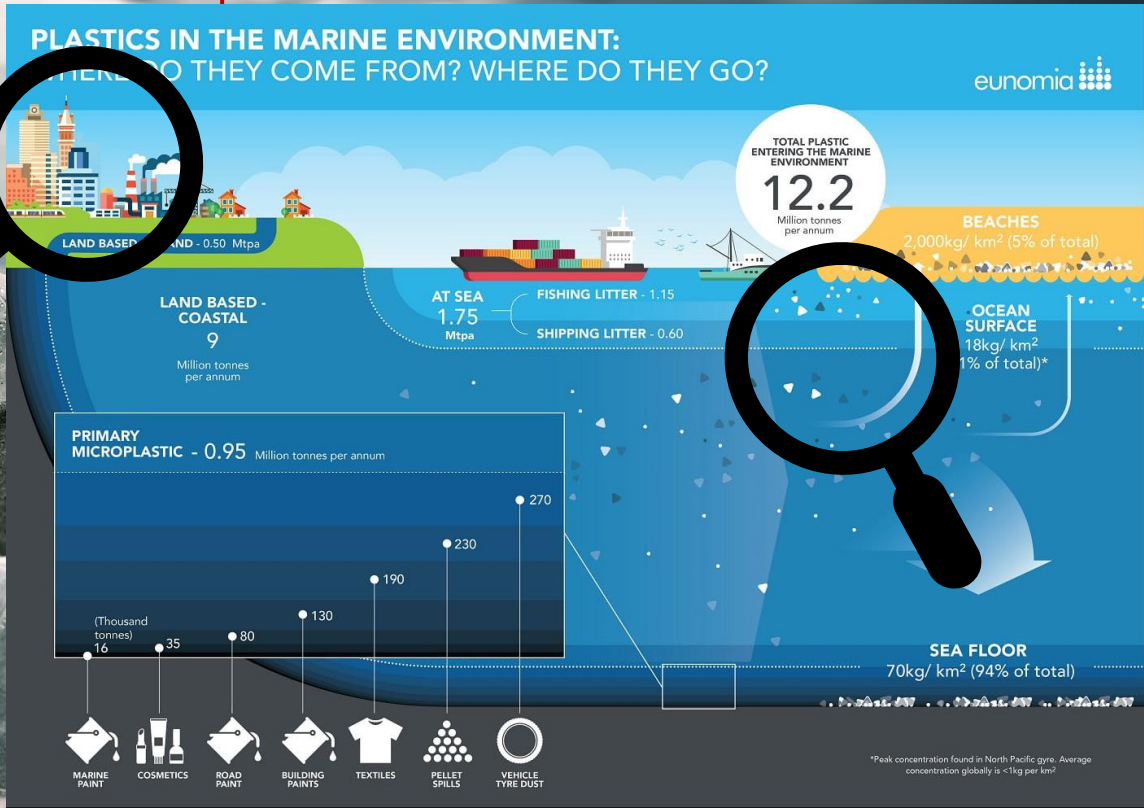


**NUclear TEChnology for
Controlling Plastic
Pollution**







**NUTEC
UPSTREAM
ACTIVITIES**
*Plastics Recycling &
Biosources*

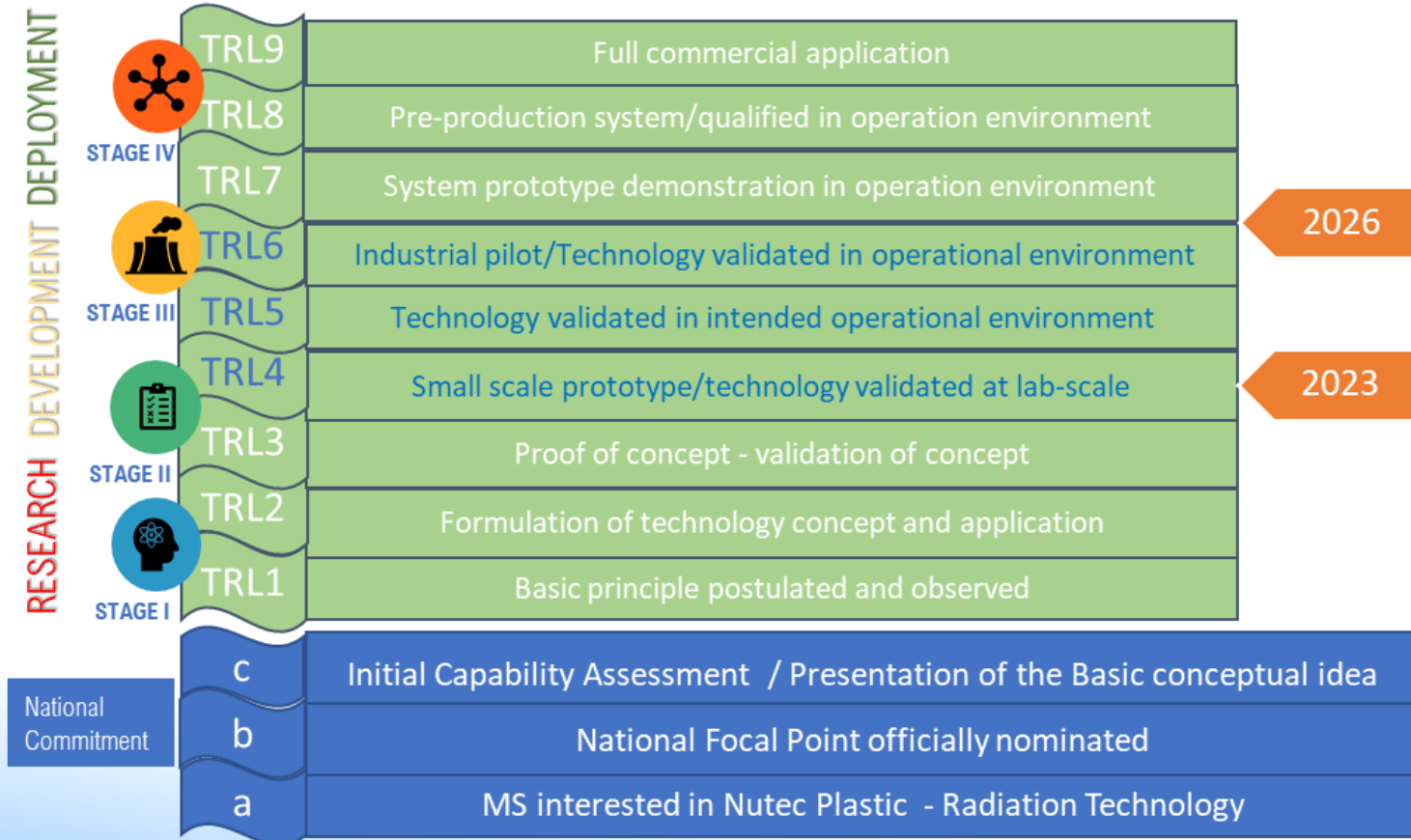
**NUTEC
DOWNSTREAM
ACTIVITIES**
Marine Plastic Monitoring



NUTEC UPSTREAM ACTIVITIES

Plastics Recycling & Biosources

-  **STAGE IV:** Ultimate upscaling to commercialisation
-  **STAGE III:** Pilot plant build and operation
-  **STAGE II:** Verification of proof of concept and economic feasibility
-  **STAGE I:** Capacity Building, R&D





NUclear TEChnology for Controlling Plastic Pollution

NUTEC Plastics Portal

A single Portal to facilitate consultation, improve coordination and access periodic progress reports



NUTEC PLASTICS

"Plastic pollution threatens sustainable development and our own well-being. We must work together to address it using science to inform smart policies. The application of nuclear for the monitoring of plastics in the environment and for recycling and creation of biodegradable plastics gives it an indispensable role in meeting our environment challenges".

Rafael Mariano Grossi (Director General, IAEA)

ABOUT NUTEC
Learn more →

UPSTREAM

DOWNSTREAM

NEWS & EVENTS

PARTNERSHIPS

PROGRESS CENTER

Progress Reports

IDC Meeting Minutes

BRIEFING CENTER

Upload | Edit in grid view | Sync | Export to Excel | All Documents

Name	Modified	Modified By
SAP_NUTECH Plastics May 2022.pdf	November 14	VANESSA_Selva
NUTEC - PM4 T&U.pdf	November 14	VANESSA_Selva

RESOURCE CENTER

- Webinars & Meetings
- Financial Management
- Country Profile Repository

NUTEC @ SOCIAL MEDIA

IAEA HQ @IAEAHQ

IAEA's Minister of Science, Technology & Environment @BibakouPM and @IAEAHQ Deputy Director General Nout Moutier sign agreements in Nairobi on cooperation in IAEA initiatives.

#IAEAHQ #How (start) and #NUTECPlastics (plastic pollution) @IAEAHQ #IAEAHQ #IAEAHQ

Nov 29, 2022

Rafael Mariano Grossi @rafmargrossi

Orgulho de formar 2 acadêmicos de @carloslaros @BorjagoCofaro que son miembros de tecnología nuclear en beneficio de personas y medio ambiente de América Latina.

#NUTECPlastics # Rays of Hope

¡Nuestro orgullo de #IAEAHQ en la #América de #NUTECPlastics!

Oct 20, 2022

Rafael Mariano Grossi @rafmargrossi

Excellent to meet Science, Tech & Environment Minister @BibakouPM at #ICDP27. Our technical cooperation supports Gabon, most recently in 'humanity first' approach. We'll work more together in the future through our Rays of Hope @IAEAHQ @CarlaCabrera & #NUTECPlastics initiatives.

Nov 10, 2022

NUTEC MANAGEMENT

DENEDE Malisa
Executive Director of Physical

PLATFORM FEATURES

- Nutec Events/News/Social Media
- Nutec Progress reports and Dashboards
- Partners activities
- Nutec Outreach Documents
- Nutec Scientific Papers
- Collaborative workspace with restrictive access

Our Donors

Our Partners

UPCOMING EVENTS

+ Add event

DEC 5

Meeting
IDC Meeting

Mon, Dec 5, 2:00 PM

DEC 14

Presentation of new CRP at the CCRA Meeting

Wed, Dec 14, 5:00 PM
Vienna, Austria

FEB 24

Regional Coordination Meeting: Africa

Fri, Feb 24, 2:00 PM
Monaco, Monaco

NEWS

Workshop to launch the guideline document on the E-BEAM Tool

Consultancy Meeting to prepare the Guideline document

UNEP Regional Program for Marine Litter & Plastic Pollution

REMARCO Workshop in Latin America & the Caribbean

Integrating Electron Beam Technology into the plastic recycling process

Radioisotopes as a powerful tool for polymer waste recycling

Polymer recycling: potential application of radiation technology

Keystone and stumbling blocks in the use of ionizing radiation for recycling...

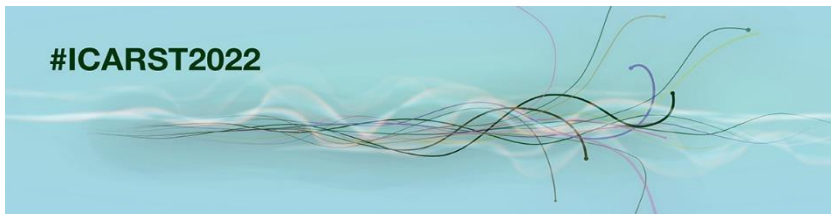
ATOMS FOR PEACE AND DEVELOPMENT

How the IAEA supports the Sustainable Development Goals



Next ICARST

Next AccConf



- **April 7-11, 2025**
- IAEA Headquarters, Vienna

- **Spring 2026**
- IAEA Headquarters, Vienna

THANK YOU FOR YOUR ATTENTION!

