



# Upcycling plastic wastes into construction and industrial materials

## POST-RADIATION REACTIVE EXTRUSION



## PLASTIC USE IN THE PHILIPPINES

Plastics are one of the most versatile materials for most of the commodity and industry products. But too much use of plastic has resulted in some problems that need to be addressed immediately.

- Average Filipino uses **591** pieces of sachets, **174** shopping bags, and **163** sando bags yearly.
- Though the Philippines has a high garbage collection rate among Southeast Asian countries, rubbish is not properly disposed of.
- Out of 1.1MT plastic waste generated in the Philippines, **only 28% are recycled**.
- Plastic waste is hurting the environment, polluting our waters, may release toxic gases, and hinders sustainable development.
- The Philippines ranks as the **world's third biggest polluter**, with 2.7 million metric tons of plastic waste generated each year.
- **386,000 tons of plastic** are leaked into the ocean every year.
- The Philippines has very limited facilities for recycling single-use and low-value plastics.
- **P790M annual loss** because of no demand for recycling.



# RECYCLING PLASTIC THROUGH IRRADIATION



## DOWNCYCLE

- Low-value products
- Limited use



## UPCYCLE

- High-value products
- Variety of uses

Ionizing radiation can change the structure and properties of bulk materials in various forms and states without adding or very minimal addition of chemical reactants in moderate conditions.

Through irradiation, certain types of plastic wastes can be modified for recycle. One of the potential applications of irradiation is the altering of structures in the waste plastic material, enabling its different components to blend better. The result: A new product that is stronger and with enhanced properties.



Enables the production of pellets with superior properties at a competitive cost



Is a viable technology to complement existing recycling and reuse capacities



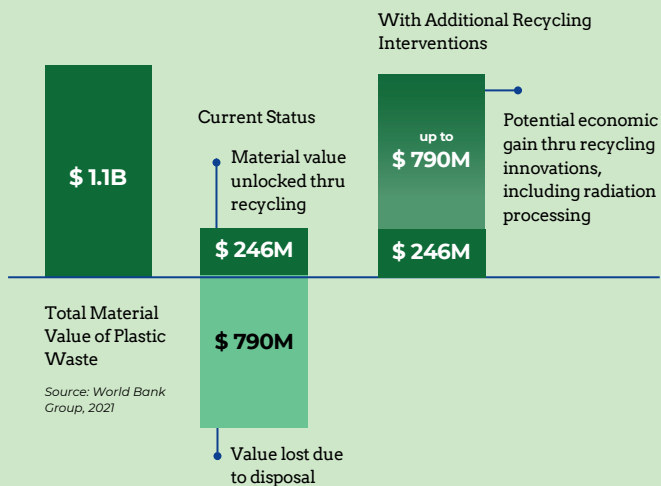
Helps to manage plastic wastes in support of extended producer responsibility (EPR)



Offers opportunities for collaborations on innovative, environment-friendly, and trendy modes of plastic recycling

## ECONOMIC IMPACT

\*Currency in USD



## CURRENT DEVELOPMENTS




Philippine's **NUTEC Plastics PREx** recently completed Technology Readiness (TRL) Level 4, and now moving towards TRL 5. We are expecting to reach TRL5 by 2025.


## Contact us

For more information, please email  
[information@pnri.dost.gov.ph](mailto:information@pnri.dost.gov.ph)




Department of Science and Technology  
**PHILIPPINE NUCLEAR RESEARCH INSTITUTE**

 /PNRIDOST

 DOSTPNRI

   @dost\_pnri

 [pnri.dost.gov.ph](http://pnri.dost.gov.ph)